



BULLETIN

GENERAL CATALOG

ARIZONA STATE UNIVERSITY

1961-62

1962-63

GENERAL CATALOG

ARIZONA STATE UNIVERSITY



Vol. LXXVI

No. 2

May, 1961

Tempe, Arizona

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1961-62

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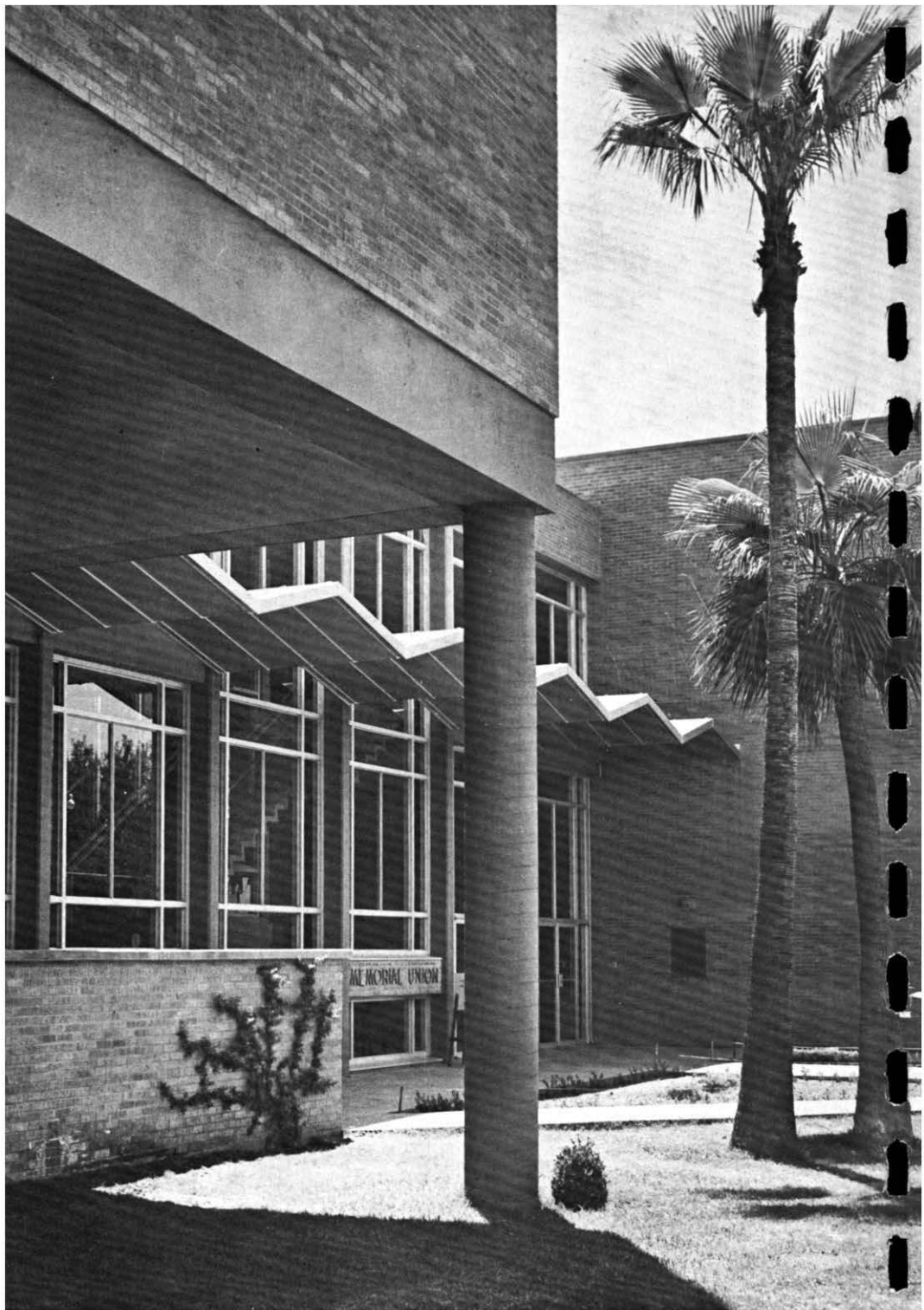
The Administration Building, its modern architecture displayed in a setting of tree-bordered lawns, houses the offices of top administrative officers.



Old and new combine gracefully in this view from the Eighth Street entrance to the campus. At left is Old Main (1894); at right, the Social Sciences Building (1960).

Some classes, like this one in Physical Sciences, are large. Others have only a very few students.





Cultural and social center of the campus is the Memorial Union, which may on a single day play host to a symposium, an art exhibit, a concert, a dinner dance, and a bowling tournament.



The sound of music, played by small groups like this one or by the 110-piece Sun Devil Band, is an integral part of campus life.

Study of the behavioral patterns of rodents and birds, conducted in this Social Sciences Building laboratory, prove absorbing to psychology students.





The new four-story Social Sciences Building houses the classrooms and laboratories of the Division of Behavioral and Social Sciences.



Students in the School of Nursing receive supervised training in Phoenix hospitals.

Students swim the year around in the University's beautiful Olympic-size pool.





The General Electric Computer Center is one of the largest on any university campus.

The mysteries of chemistry and other physical sciences unfold in University laboratories.



GENERAL CATALOG

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Arizona State
University

Requests for detailed information should be addressed
as follows:

Registrar and Director of Admissions

Arizona State University

Tempe, Arizona

Arizona State University reserves the right to change without notice any of the materials—information, requirements, regulations—published in this bulletin. The catalog is not to be regarded as a contract.

CALENDAR

1961-62-63

1961

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University Calendar

1961-62 1962-63

Fall Semester

	1961-62	1962-63
Faculty Planning Conference	Sept. 8 Friday	Sept. 7 Friday
Residence Halls and Dining Hall Open	Sept. 10, Su.	Sept. 9, Su.
First Freshman Assembly	Sept. 11, M. 8:15 a.m.	Sept. 10, M. 8:15 a.m.
Orientation and Guidance for Freshmen..... (All Freshmen are expected to be in attendance on these days for the special orientation programs and aptitude tests.)	Sept. 11, 12, 13, 14, 15, 16 M., Tu., W., Th., F., Sa.	Sept. 10, 11, 12, 13, 14, 15 M., Tu., W., Th., F., Sa.
Sophomores, Juniors, Seniors and Graduates Receive Registration Materials	Sept. 14, Th.	Sept. 13, Th.
Sophomores, Juniors, Seniors and Graduates Complete Registration	Sept. 15, F. to noon Sa., Sept. 16	Sept. 14, F. to noon Sa., Sept. 15
Freshman Students will Complete Registration and Pay Fees.....	Sept. 14, Th.	Sept. 13, Th.
Instruction Begins	Sept. 18, M.	Sept. 17, M.
Last Day of Registration for Credit.....	Sept. 25, M. 4:00 p.m.	Sept. 24, M. 4:00 p.m.
Veterans' Day, No Classes	Nov. 11, Sa.	Nov. 12, M.
Mid-Semester Scholarship Reports Due	Nov. 15, W. 4:00 p.m.	Nov. 14, W. 4:00 p.m.
Candidates For Bachelor's Degrees Must File Application for Graduation by	Nov. 15, W.	Nov. 15, Th.
Thanksgiving Recess	Nov. 22, W. 10:30 p.m. to Nov. 27, M. 7:40 a.m.	Nov. 21, W. 10:30 p.m. to Nov. 26, M. 7:40 a.m.
Christmas Vacation	Dec. 20, W. 10:30 p.m. to Jan. 3, W. 7:40 a.m.	Dec. 19, W. 10:30 p.m. to Jan. 2, W. 7:40 a.m.
Final Examinations	Jan. 22, 23, 24, 25, 26, 27 M., Tu., W., Th., F., Sa.	Jan. 21, 22, 23, 24, 25, 26 M., Tu., W., Th., F., Sa.
First Semester Grade Reports Due.....	Jan. 29, M. 4:00 p.m.	Jan. 28, M. 4:00 p.m.

Spring Semester

	1961-62	1962-63
Residence Halls Open to New Students	Jan. 28, Su.	Jan. 27, Su.
New Freshmen and Transfer Students take Aptitude Examinations.....	Jan. 30, Tu.	Jan. 29, Tu.
Registration Days	Feb. 1, 2, 3 Th., F., Sa. to noon	Jan. 31, Feb. 1, 2, Th., F. Sa., to noon
(All students will complete registration and pay fees)		
Instruction Begins Second Semester.....	Feb. 5, M.	Feb. 4, M.
Last Day of Registration for Credit.....	Feb. 12, M.	Feb. 11, M.
Washington's Birthday, No Classes.....	Feb. 22, Th.	Feb. 22, F.
Mid-Semester Scholarship Reports Due	Mar. 15, Th. 4:00 p.m.	Mar. 15, F. 4:00 p.m.
Easter Vacation	April 19, Th. 10:30 p.m. to Apr. 24, Tu. 7:40 a.m.	April 11, Th. 10:30 p.m. to Apr. 16, Tu. 7:40 a.m.
Scholarship Reports Due for all Students Completing Requirements for Degrees	May 28, M. noon	May 27, M. noon
Final Examinations	May 28, 29, 30, 31, June 1, 2, M., T., W., Th., F., Sa., to noon	May 27, 28, 29, 30, 31, June 1, M., T., W., Th., F., Sa. to noon
Commencement Rehearsal	June 1, F. 8:00 a.m.	May 31, F. 8:00 a.m.
(Sun Devil Stadium)		
R.O.T.C. Honors Ceremony and Parade	June 1, F. 8:00 p.m.	May 31, F. 8:00 p.m.
Baccalaureate Service	June 3, Su. 8:00 p.m.	June 2, Su. 8:00 p.m.
Commencement Exercises	June 5, Tu. 8:00 p.m.	June 4, Tu. 8:00 p.m.
Second Semester Grade Reports Due.....	June 4, M. 12:00 noon	June 3, M. 12:00 noon
Residence Halls Closed	June 6, Wed. 12:00 noon	June 5, Wed. 12:00 noon

Summer Session

First Summer Session Begins, Registration	June 18, M.	June 17, M.
First Summer Session Ends	July 21, Sa.	July 20, Sa.
Second Summer Session Begins, Registration	July 23, M.	July 22, M.
Second Summer Session Ends	Aug. 25, Sa.	Aug. 24, Sa.

ARIZONA STATE UNIVERSITY

COLLEGE OF LIBERAL ARTS

Division of Behavioral and Social Sciences

Departments of: History
Political Science
Psychology and
Philosophy
Sociology and
Anthropology

Division of Fine Arts

Departments of: Art
Music

Division of Health, Physical Education, and Recreation

Departments of: Air Science
Health, Physical Education,
and Recreation
Intercollegiate Athletics
Military Science

Division of Home Economics

Department of: Home Economics

Division of Language and Literature

Departments of: English
Foreign Languages
Humanities
Mass Communications
Speech and Drama

Division of Life Sciences

Departments of: Botany
Zoology
Poisonous Animals
Research Laboratory

Division of Physical Sciences

Departments of: Chemistry
General Physical Sciences
Geography
Geology
Mathematics
Physics

School of Nursing

COLLEGE OF EDUCATION

Departments of: Educational Administration
and Supervision
Elementary Education
Educational Foundations
Educational Psychology
and Guidance
Educational Services
Library Science
Secondary Education

Bureau of Educational Research and Services

COLLEGE OF BUSINESS ADMINISTRATION

Departments of: Accounting
Economics
General Business
Administration
Management
Marketing
Office Administration and
Business Education

Bureau of Business Services

COLLEGE OF APPLIED ARTS AND SCIENCES

Division of Agriculture
School of Architecture
School of Engineering
Division of Industrial Education
Research Center

GRADUATE COLLEGE

SUMMER SESSION

EXTENSION DIVISION

Arizona State University

G. HOMER DURHAM, Ph.D.President of the University
H. D. RICHARDSON, Ph.D.Academic Vice President
GILBERT L. CADY, B.A. in Ed.Vice President for Business Affairs

Board of Regents Universities and State College of Arizona

Ex-Officio

PAUL J. FANNIN, B.A.Governor of Arizona
W. W. DICK, B.A., M.A.State Superintendent of
Public Instruction

Appointed

	TERM EXPIRES
LYNN M. LANEY, B.S., J.D., President	January, 1963
O. D. MILLER, A.B., Secretary	January, 1967
VIVIAN L. BOYSEN, B.A., M.A., Treasurer.....	January, 1967
SAMUEL H. MORRIS, A.B., J.D., LL.D.	January, 1963
JOHN G. BABBITT, B.S.	January, 1965
ELWOOD W. BRADFORD, B.S.	January, 1965
GEORGE CHAMBERS	January, 1969
LEON FRED LEVY	January, 1969

JAMES BYRON MCCORMICK, LL.B., LL.M., S.J.D., LLD

.....Adviser to the Board

MYRON R. HOLBERT, A.B., M.A.Budget Officer for Board

ALVRED B. NETTLETON, M.S., C.P.A.General Examiner for Board

UNIVERSITY FACULTY

Administration

- G. HOMER DURHAM (1960)*President of the University;
Professor of Political Science
B.A., University of Utah; Ph.D., University of California,
Los Angeles
- HAROLD D. RICHARDSON (1940)Academic Vice President;
Chairman, Division of Instruction;
Professor of Education
Ph.B., Ph.M., University of Wisconsin; Ph.D., Northwestern
University
- GILBERT L. CADY (1934)Vice President for Business Affairs;
Chairman, Division of Business Management
B.A. in Ed., Arizona State University
- IRVING W. STOUT (1953).....Dean, Graduate College;
Professor of Education
B.Ed., Platteville State Teachers College;
M.A., Ed.D., Northwestern University
- ARNOLD TILDEN (1937)Dean, College of Liberal Arts;
Professor of History
B.A., M.A., DePauw University; Ph.D., University of Southern
California
- G. D. McGRATH (1950)Dean, College of Education;
Professor of Education
A.B., Findlay College; M.A., University of Michigan;
Ph.D., University of Colorado
- GLENN D. OVERMAN (1956)Dean, College of Business
Administration; Professor of Business Administration
B.S., Central State College; M.S., Oklahoma State University;
D.B.A., Indiana University
- LEE P. THOMPSON (1955)Dean, College of Applied Arts and
Sciences; Director, School of Engineering;
Professor of Engineering
B.A., Indiana University; M.S., Ph.D., Agricultural and Mechanical
College of Texas; Registered Professional Engineer in Texas and
Arizona
- JAMES W. ELMORE (1949)Director, School of Architecture;
Professor of Architecture
A.B., University of Nebraska; M.S. in Arch., Columbia
University; Registered Architect in Arizona and New York
- LORETTA A. HANNER (1957)Director, School of Nursing;
Associate Professor of Nursing
R.N., Michael Reese Hospital School of Nursing; P.H.N., B.S.,
University of Minnesota; M.S., Cornell University
- ROY C. RICE (1946)Director of Summer Session, Extension
and Correspondence; Professor of Education
B.S., New Mexico University; M.S., Massachusetts State College;
Ph.D., University of Texas
- W. P. SHOFSTALL (1950)Dean of Students; Chairman,
Division of Student Affairs; Director, Student Activities
B.S. in Ed., Northeast Missouri State Teachers College;
M.A., Ph.D., University of Missouri
- CATHERINE G. NICHOLS (1952)Associate Dean of Students
A.B., M.A., University of Kentucky; Ed.D., Teachers College,
Columbia University

*Year of first appointment to the faculty

- JOSEPH E. SPRING (1954)Chief, News Bureau
A.B., Illinois Wesleyan University; M.A., Ph.D., University
of Denver
- HAROLD W. BATCHELOR (1943).....Head Librarian;
Professor of Library Science;
Chairman, Department of Library Science
B.A., University of Oregon; B.S. in L.S., M.S., University of
Illinois
- ALFRED THOMAS, JR. (1939)Registrar and Director of Admissions
B.A. in Ed., M.A. in Ed., Arizona State University
- ROBERT F. MENKE (1947)Director of Placement Center;
Professor of Education
B.S., Oshkosh State College; M.A. in Ed., Ph.D.,
Northwestern University
- T. TILMAN CRANCE (1941)Comptroller
B.A. in Ed., M.A. in Ed., Arizona State University
- JOHN L. FORBES (1960)Director of Institutional Studies;
Assistant Professor of Education
B.S., M.A., University of Illinois; Ed.D., Michigan State University
- GEORGE A. BOYD (1955)Coordinator of Research
A.B., M.A., Austin College; M.S., University of Iowa
- EDWARD J. DEMSON (1958)Acting Director of Special Services;
Lecturer in General Business
A.B., LL.B., Ohio State University
- MARY L. BUNTE (1933)Secretary to the President
A.B. in Ed., Arizona State College;
M.A. in Ed., Arizona State University
- JAMES W. CREASMAN (1947).....Alumni Secretary
B.A. in Ed., Arizona State University
- CLYDE B. SMITH (1952)Director of Intercollegiate Athletics;
Head, Division of Health, Physical Education
and Recreation; Associate Professor of
Physical Education
A.B., Geneva College; M.S. in Ed., Indiana University

Resident Faculty

- ABBOTT, JOHN C. (1956).....Associate Professor of Education
B.S., M.S. in Ed., Ed.D., Indiana University
- ## ABRAHAM, WILLARD (1953)Professor of Education;
Chairman, Department of Educational Services
B.S., Illinois Institute of Technology; M.Ed., Chicago Teachers
College; Ph.D., Northwestern University
- ADAMS, WALLACE E., (1958)Assistant Professor of
European History
B.S., M.A., University of Oregon; Ph.D., Stanford University
- ALBRIGHT, ROBERT W. (1957)Associate Professor of Speech;
Chairman, Department of Speech and Drama
B.A., University of Washington; M.A., Ph.D., Stanford University
- ALISKY, MARVIN HOWARD (1957)Professor of Mass
Communications; Chairman, Department of
Mass Communications
B.A., M.J., Ph.D., University of Texas
- ALLEN, THEODORE, JR. (1959)Associate Professor of Engineering
B.S.M.E., M.S.M.E., Agricultural and Mechanical College of
Texas; Registered Professional Engineer in Texas

##On Leave, Second Semester, 1961-62

- ANTOINE, JOSEPHINE L. (1959)Associate Professor of Voice
B.A., M.M., University of Colorado
- ARMSTRONG, JACK R., MAJOR (1960)Assistant Professor of
Air Science
B.S., University of Kansas; M.B.A., University of Texas
- ARNER, DOUGLAS G. (1959)Associate Professor of Philosophy
B.S., Creighton University; M.A., Ph.D., University of Michigan
- ARONSON, JOHN N. (1959)Assistant Professor of Chemistry
B.A., The Rice Institute; M.S., Ph.D., University of Wisconsin
- #ASAI, RICHARD I. (1959)Assistant Professor of Chemistry
B.S., Oregon State College; Ph.D., University of Illinois
- ASHE, ROBERT W. (1955)Professor of Education
B.A., M.A., Arizona State University; Ed.D., University of
Southern California
- AUSTIN, GLENN (1950)Professor of Education
B.A., M.A., University of Kansas; Ph.D., Ohio State University
- AUTENRIETH, BERTHA (1946)Associate Professor of Music
B.M., New England Conservatory; M.M., University of Michigan
- AUTORE, DONALD D. (1959)Instructor in Engineering
B.S.E., University of Michigan; Registered Professional Engineer
in Minnesota
- AVERY, JAMES P. (1960)Associate Professor of Engineering
B.S.E., M.S.E., University of Michigan; Ph.D., Purdue University
- AX, LELAND S. (1959).....Associate Professor of Engineering
B.S.E.E., B.S.R.E., Tri-State College; M.S., Kansas State College
- BAKER, ROBERT L. (1956)Associate Professor of Education
B.S., M.A., Ph.D., University of Nebraska
- BAKER, VIRGIL R. (1955)Associate Professor of Geography
B.S., M.S., University of Nebraska;; Ph.D., University of Utah
- BALL, RACHEL STUTSMAN (1947)Professor of Psychology
A.B., University of Missouri; Ph.D., University of Chicago
- BARDRICK, RICHARD A. (1956)Associate Professor of Psychology
A.B., Ph.D., University of California, Los Angeles
- BARKLEY, BESS J. (1938)Associate Professor of Music
B.A., University of Arizona
- BARKSON, JOSEPH A. (1958)Professor of Engineering
B.S.E.E., University of Michigan; M.S., Ph.D., University of
Illinois; Registered Professional Engineer in Ohio
- BARNES, JOHN B. (1957)Associate Professor of Education;
Director, Bureau of Educational Research Services
B.A., M.A., University of Denver; Ed.D., University of Wyoming
- BAROODY, WILSON GEORGE (1957)Assistant Professor of English
B.A., Grand Canyon College; M.A., University of Arizona
- BARRETT, THOMAS W. (1950)Professor of Agronomy
B.S., Brigham Young University; M.S., Ph.D., Cornell University
- **BARRUTIA, RICHARD (1961)Assistant Professor of Spanish;
Director of Language Laboratories
B.A., M.A., Arizona State University

#On Leave, 1961-62

**Part Time

- BATCHELOR, HAROLD W. (1943)Professor of Library Science;
Head Librarian; Chairman, Department of Library Science
B.A., University of Oregon; B.S. in L.S., M.S., University of
Illinois
- BATEMAN, GEORGE M. (1927)Professor of Chemistry;
Head, Division of Physical Sciences
B.S., Utah State University; M.S., Ph.D., Cornell University
- BEAKLEY, GEORGE C., JR. (1956)Professor of Engineering;
Assistant Dean, College of Applied Arts and Sciences;
Chairman of the Mechanical Engineering Faculty
B.S.M.E., Texas Technological College; M.S.M.E., University of
Texas; Ph.D., Oklahoma State University; Registered Professional
Engineer in Texas, Oklahoma, and Arizona
- BEAL, RICHARD S., JR. (1958)Associate Professor of Entomology
B.S., University of Arizona; Ph.D., University of California,
Berkeley
- BEALS, ARTHUR R. (1951)Assistant Professor of Accounting
B.A. in Ed., M.A., in Ed., Arizona State University; C.P.A.,
Arizona
- BECK, JAMES H. (1959)Assistant Professor of Art
B.A., Oberlin College; M.A., New York University
- BECKER, WALTER G. (1955)Associate Professor of Finance
A.B., M.A., Loyola University; Ph.D., State University of Iowa
- BELL, RICHARD H. (1952)Assistant Professor of Education;
Director, Radio-TV Bureau
B.A., Miami University; M.A., Teachers College, Columbia
University
- BELOK, MICHAEL V. (1959)Assistant Professor of Education
B.S., Indiana University; M.A., Arizona State University; Ph.D.,
University of Southern California
- BENDER, GORDON L. (1953)Professor of Zoology
B.S., Iowa State College; M.S., University of Wisconsin; Ph.D.,
University of Illinois
- BENEDICT, JOEL A. (1946)Professor of Education; Director,
Audio-Visual Center
B.A., M.A., Arizona State University; Ed.D., Stanford University
- BERTKE, ELDRIDGE M. (1958)Assistant Professor of Zoology
B.S., M.S., Ph.D., University of Wisconsin
- BIGLER, HELEN FRANCES (1959)Assistant Professor of Nursing
R.N., St. Mary's Hospital School of Nursing, B.S., M.P.N.,
University of Washington
- BLOMSTROM, ROBERT L. (1960)Assistant Professor of
Management
B.S., M.S., University of Colorado
- BOARD, CORNELIUS Z. (1955)Instructor in Industrial Education
B.S., M.A. in Ed., Arizona State University
- BOETTO, LAUREL B. (1956)Assistant Professor of Education
B.A. in Ed., M.A. in Ed., Arizona State University
- BOGGS, LOHNE J. (1959)Associate Professor of Office
Administration and Business Education
B.S. in Ed., M.A., Ph.D., Ohio State University
- BORGO, PHILIP E. (1959)Instructor in Engineering
B.S.C.E., University of Cincinnati; Registered Land Surveyor in
Arizona
- BOWERS, CHARLES O. (1948)Assistant Professor of Music
B.S. in Ed., Southeast Missouri State College; M.M., Eastman
School of Music

- BOWMAN, RUSSELL KEITH (1956)Professor of Romance Languages; Chairman, Department of Foreign Languages
A.B., A.M., Ph.D., Columbia University
- BOYD, GERTRUDE A. (1958)Associate Professor of Education
A.B., M.S., Florida State University; Ed.D., Colorado State College
- BRANSTETTER, ELLAMAE (1958)Associate Professor of Nursing
R.N., Jewish Hospital School of Nursing; B.S. in P.H.N., St. Louis University; M.P.H., University of Minnesota
- BRESINA, BERTHA MARY (1960)Associate Professor of Home Economics
B.S., M.S., Stout State College
- BRITTON, MERVIN W. (1957)Assistant Professor of Music
B.S., M.S., University of Illinois
- BROWN, DUANE (1951)Professor of Chemistry
B.S., Brigham Young University; Ph.D., Cornell University
- BRYANT, ALEXANDER W., COLONEL (1958)Professor of Air Science; Chairman, Department of Air Science
B.S., Virginia Military Institute
- BRYANT, FRED O. (1950).....Associate Professor of Physical Education
B.S., Springfield College; M.S., University of Illinois; Ed.D., Arizona State University
- BRYANT, JERRY H. (1958)Assistant Professor of English
B.A., M.A., Ph.D., University of California, Los Angeles
- BUKER, ALDEN P. (1955)Associate Professor of Humanities
A.B., A.M., Harvard University; Ph.D., Boston University
- BULLINGTON, RICHARD E. (1961)Associate Professor of Secondary Education
B.S., Rutgers University; M.A., Ed.D., University of Alabama
- BULLOCK, ARNOLD H. (1941)Professor of Music
B.M., Yale University; M.A. in Ed., Arizona State University
- BURDETTE, WALTER E. (1956)Professor of Industrial Education; Head, Division of Industrial Education
B.S., M.S., Kansas State Teachers College; Ed.D., University of Missouri
- BURGESS, ROBERT L. (1960)Assistant Professor of Botany
B.S., M.S., University of Wisconsin
- BURGOYNE, EDWARD E. (1951)Professor of Chemistry
B.S., Utah State University; M.S., Ph.D., University of Wisconsin
- BURK, KARL W. (1949)Assistant Professor of Industrial Education
B.A. in Ed., M.A. in Ed., Arizona State University; Ed.D., Bradley University
- BURKHARD, SAMUEL (1921)Professor Emeritus of Education
B.A., Goshen College; M.A., Columbia University; Ph.D., New York University
- BURTON, ARLEIGH R. (1941)Professor of Accounting; Chairman, Department of Accounting
A.B., M.A., Emporia State Teachers College; Ph.D., University of Nebraska; C.P.A., Arizona
- BYERS, FRANK R. (1947)Professor of Drama
B.A., M.A., University of Cincinnati
- BYERS, NELLIE B. (1934)Associate Professor of Education
B.A., University of Cincinnati; M.A., Ohio State University
- CAMPBELL, WILLIAM R. (1959)Associate Professor of Management
B.S.B.A., M.B.A., Ohio State University; D.B.A., Indiana University
- CAMUNEZ, ARTHUR D., MAJOR (1959)Assistant Professor of Military Science

- CARPENTER, CLARENCE L. (1960)Assistant Professor of Chemistry
B.S., Arizona State University; M.Ed., M.S., University of Arizona;
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- CARR, ALICE ROSE (1955)Associate Professor of Mathematics
Education
A.B., St. Mary's College; M.A., Ohio University
- CASTILLO, SENON ARTHUR (1951)Instructor in Physical
Education; Track Coach
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- CAUTHORN, ROBERT CARTER (1959)Assistant Professor of
Economics; Chairman, Department of Economics
B.S., Georgia Institute of Technology; M.P.A., Princeton
University
- CAVALLIERE, WILLIAM A. (1947)Assistant Professor of
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B.A. in Ed., M.A. in Ed., Arizona State University
- CHAUSOW, EUGENE (1956)Assistant Professor of Music
B.A. in Ed., M.A. in Ed., Arizona State University
- CLOTHIER, RONALD R. (1955)Associate Professor of Zoology
A.B., Fresno State College; M.A., Montana State University;
Ph.D., University of New Mexico
- COHN, JAMES E. (1959)Assistant Professor of Mathematics
B.S., United States Naval Academy
- COLE, GERALD A. (1959)Associate Professor of Biology
A.B., Middlebury College; M.S., St. Lawrence University; Ph.D.,
University of Minnesota
- CONLIN, DAVID A. (1948)Professor of English Education
A.B., Syracuse University; Ph.D., Yale University
- COOKE, FRANKLIN O. (1956)Associate Professor of English
A.B., Princeton University; A.M., Colorado College; Ph.D.,
University of Colorado
- COPPOCK, HAROLD W. (1957)Associate Professor of Psychology
A.B., Antioch College; Ph.D., Indiana University
- CRAIG, SAMUEL EDWARD, JR. (1960)Assistant Professor of
Engineering
B.S., Oregon State College; Ph.D., University of Utah
- CROOKS, LOIS IDA (1959)Instructor in English
B.A., Ottawa University; M.A., University of Missouri
- CROSLAND, GEORGE N. (1959)Assistant Professor of English
B.S., M.A., University of California, Los Angeles
- CROUCH, BEULAH (1953)Assistant Professor of Education
B.A. in Ed., M.A. in Ed., Arizona State University
- DAMMANN, ARTHUR E. (1955)Assistant Professor of Zoology;
Assistant Director, Poisonous Animals
Research Laboratory
B.S., Arizona State University; M.S., Ph.D., University of Michigan
- DANNENFELDT, KARL H. (1956)Professor of History;
Head, Division of Behavioral and Social Sciences
A.B., Valparaiso University; M.A., Indiana University; Ph.D.,
University of Chicago
- DAUTEN, JOEL J. (1960)Professor of General Business
Administration; Chairman, Department of
General Business Administration
B.S., M.S., Washington University; Ph.D., State University of
Iowa
- DAVIS, KEITH (1958)Professor of Management; Chairman,
Department of Management
B.B.A., M.B.A., University of Texas; Ph.D., Ohio State University

- DAVIS, ROBERT EDWARD (1959)Assistant Professor of Speech
A.B., A.M., Ph.D., University of Illinois
- DAVIS, SANDFORD S. (1953)Professor of Education;
Chairman, Department of Educational Psychology
and Guidance
A.B., B.S., Central State College; A.M., University of Missouri;
Ed.D., University of Colorado
- DAWKINS, I.OLA B. (1959)Assistant Professor of Office
Administration
B.B.A., Texas Western College; M.B.A., University of Texas
- DAWSON, DORA (1959)Assistant Professor of Nursing
B.N., Edward W. Sparrow School of Nursing; B.S., Wayne State
University; M.A., University of Chicago
- DECOSTER, DON THEODORE (1959)Assistant Professor of
Accounting
B.B.A., West Texas State College; M.B.A., Ph.D., University of
Texas; C.P.A., Texas
- DEEVER, R. MERWIN (1959)Associate Professor of Education
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- DEJONG, JOHN ARLO (1959)Assistant Professor of History
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- DEMAREST, HAROLD R. (1957)Associate Professor of Business
Administration
B.S., United States Naval Academy; M.S.E., Harvard University;
M.S., Florida State University
- DICKINSON, ARTHUR L. (1952)Assistant Professor of
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B.A., Iowa State Teachers College; M.S., Indiana University
- DITSWORTH, RICHARD LEE (1959)Associate Professor of
Engineering
B.S., M.S., Iowa State College; Ph.D., Michigan State University;
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- DOUTHIT, J. C. (1950)Assistant Professor of Construction
B.F.E., University of Arkansas; M.A. in Ed., Arizona State
University; Registered Engineer in Arizona
- DOWLING, JEROME M. (1959)Assistant Professor of Physics
B.S., M.S., Ph.D., Illinois Institute of Technology
- DOYLE, ROY P. (1959)Associate Professor of Education;
Director, I. D. Payne Training School
University
B.A. in Ed., Arizona State University; M.A., Ed.D., Columbia
University
- DRESSKELL, MILES A. (1945)Professor of Music
B.M., Northwestern University; B.A., San Jose State College;
M.A., Teachers College, Columbia University
- DRESSKELL, NADINE (1946)Associate Professor of Music
B.S., Bowling Green State University; M.A., Teachers College,
Columbia University
- DUDEK, LEONA M. (1960)Assistant Professor of Education
B.Ed., National College of Education; M.A., Arizona State
University
- DUDLEY, GUILFORD A. (1956)Associate Professor of History
A.B., Harvard University; M.A., Ph.D., University of California,
Los Angeles
- DURHAM, G. HOMER (1960)President of Arizona State
University; Professor of Political Science
B.A., University of Utah; Ph.D., University of California, Los
Angeles
- DYCUS, AUGUSTUS M. (1959)Associate Professor of Botany
B. S., Akron University; Ph.D., Cornell University

- DYRESON, DELMAR A. (1958)Instructor in Mathematics
B.S., Texas College of Arts and Industries; M.S., Agricultural and
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- EDMONDSON, VOL GENE (1961)Associate Professor of
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B.A., M.A., University of Iowa; L.L.B., University of Oklahoma
- EDWARDS, MARVIN J. (1959)Instructor in Industrial Education
B.S., M.A. in Ed., Arizona State University
- ELLIS, JOHN C. (1957)Assistant Professor of English
B.A., M.A., Ph.D., University of Oregon
- ELLNER, ANTHONY, JR. (1960)Associate Professor of Architecture
B.A., Brooklyn College; M.A., Columbia University; B. Arch., Yale
University; Registered Architect in Connecticut, South Carolina,
and Kansas
- ELLSWORTH, LOLA (1938)Associate Professor of Home Economics
B.S., Brigham Young University; M.A., Teachers College,
Columbia University
- ELMORE, JAMES W. (1949)Professor of Architecture; Director,
School of Architecture
A.B., University of Nebraska; M.S. in Arch., Columbia University;
Registered Architect in Arizona and New York
- ERNO, RICHARD B. (1957)Assistant Professor of English
A.B., Michigan State University; M.A., University of Denver
- ESCUDERO, MARY J. (1948)Associate Professor of Spanish
A.B., San Diego State College; M.A., Claremont College; Diplome,
University of Paris--Institute de Phonetique; Ph.D., Cornell
University
- **ESSIG, MARY (1947)Assistant Professor of Home Economics
B.S. in Ed., University of Missouri; M.A. in Ed., Colorado State
University
- ETHINGTON, RAYMOND L. (1958)Assistant Professor of Geology
B.S., M.S., Iowa State College; Ph.D., State University of Iowa
- EYRING, LeROY (1961)Professor of Chemistry; Chairman,
Department of Chemistry
B.Sc., University of Arizona; Ph.D., University of California,
Berkeley
- FAILING, FRANCES (1956)Assistant Professor of Art
B.S., Western Reserve University; M.A., Columbia University
- FAIRBANKS, CHARLES L. (1958)Instructor in Physical Education;
Assistant Football Coach
B.S., Michigan State University
- FARRIS, MARTIN T. (1957)Associate Professor of Economics
B.A., M.A., Montana State College; Ph.D., Ohio State University
- FELKER, EUGENE M. (1959)Instructor in Physical Education;
Assistant Football Coach
B.S., University of Wisconsin
- FERRELL, PALMORE A., LT. COLONEL (1957)Professor of Military
Science; Chairman, Department of Military Science
B.S., Virginia Polytechnic Institute
- FERRELL, WILFRED ANDERSON (1959)Assistant Professor of English
B.A., M.A., Ph.D., University of Texas
- FIELDING, JANE P. (1957)Assistant Professor of Education
B.S., Western Reserve University; M.S., University of Wisconsin

**Part Time

- FINK, RAYMOND R. (1958)Associate Professor of Art
B.A.E., School of Art Institute of Chicago; M.S.A.E., Institute of
Design, Illinois Institute of Technology
- FISHER, MARVIN MARK (1958)Associate Professor of English
A.B., A.M., Wayne University; Ph.D., University of Minnesota
- FITZGERALD, DONALD G. (1958)Instructor in Physics
B.A., Coe College; M.S., State University of Iowa
- FITZGERALD, SHERMAN K. (1959)Associate Professor of Sociology
B.S., M.S., Brigham Young University; Ph.D., Cornell University
- FLETCHER, GRANT (1956)Professor of Music
B.Mus., Illinois Wesleyan University; M.M., University of
Michigan; Ph.D., Eastman School of Music
- FORBES, JOHN L. (1960)Assistant Professor of Education;
Director of Institutional Studies
B.S., M.A., University of Illinois; Ed.D., Michigan State University
- FREEMAN, ROBERT LEONARD, JR. (1959)Assistant Professor of
Animal Husbandry
B.S., D.V.M., University of California, Davis
- FRENCH, HELEN A. (1949)Assistant Professor of Education
B.S. in Ed., Geneva College; M.A. in Ed., University of Pittsburgh
- **FREUND, JOHN E. (1957)Professor of Mathematics
B.A., M.A., University of California, Los Angeles; Ph.D.,
University of Pittsburgh
- FRY, HAROLD (1958)Associate Professor of Engineering
B.S., Colorado State University; M.E., University of Wyoming;
M.S., University of Colorado; Registered Professional Engineer
in Colorado
- FUCHS, JACOB (1951)Professor of Chemistry
B.A., New York University; M.S., Ph.D., University of Illinois
- FULLERTON, BILLIE J. (1958)Associate Professor of Education;
Chairman, Department of Secondary Education
B.S. in Ed., Northwestern State College; Ed.M., Ed.D., University
of Oklahoma
- FULLINGTON, GILBERT A. (1959)Assistant Professor of Art
B.F.A., Ohio State University; M.A., Columbia University
- GAFFNEY, PHILIP D. (1957)Associate Professor of Education
B.S., Northern Illinois State College; M.A., Ph.D., State University
of Iowa
- GAGE, M. GERALDINE (1959)Associate Professor of
Home Economics
B.S., Drexel Institute; M.A., Columbia University; Ph.D., Cornell
University
- GALASYN, VALENTINE DAVID (1959)Assistant Professor of
Chemistry
B.S., Teachers College of Connecticut; M.S., Ph.D., University of
Illinois
- GAMBRELL, CARROLL B., JR. (1959)Professor of Engineering;
Chairman of Industrial Engineering Faculty
B.S.E., Clemson Agricultural College; M.S.E., University of
Florida; Ph.D., Purdue University; Registered Professional
Engineer in Texas
- GERCKENS, LAURENCE CONWAY (1960)Instructor in Architecture
Certificate in Art, The Copper Union Art School; B.S. in Arch.,
University of Cincinnati; M.R.P., Cornell University
- GIBBS, BYRON JUNIUS (1959)Associate Professor of Biology
B.S., College of St. Thomas; M.S., Ph.D., University of Minnesota

**Part Time

- GIESCHEN, DONALD W. (1959)Assistant Professor of Philosophy
B.S., Northwestern University; M.A., University of Minnesota
- GILLANDERS, DOROTHY F. (1937)Professor of Physical Education
B.S., Oregon State College; M.A., Columbia University; Ed.D.,
University of Southern California
- GISOLO, MARGARET (1954)Assistant Professor of
Physical Education
B.S., Indiana State Teachers College; M.A., New York University
- GLICK, CLARIS (1959)Assistant Professor of English
B.A., B.S., Texas Wesleyan College; M.A., Sul Ross State College;
Ph.D., University of Texas
- GOLDIAMOND, ISRAEL (1960)Professor of Psychology
B.A., Brooklyn College; Ph.D., University of Chicago
- GOO, BENJAMIN (1955)Associate Professor of Art
B.F.A., State University of Iowa; M.F.A., Cranbrook Academy
of Art
- GOODWIN, JOHN B. (1948)Assistant Professor of
Industrial Education
B.A., Arizona State University; M.S., Oregon State College
- GOSSICK, BEN R. (1957)Professor of Physics
B.A., Pomona College; M.A., Columbia University; M.S., Ph.D.,
Purdue University
- GRAHAM, MARY ELIZABETH (1955)Assistant Professor of
Physical Education
B.S. in Ed., University of Arizona; M.A. in Ed., Arizona State
University
- GRAVES, RICHARD WADSWORTH (1961)Associate Professor of
Management
B.B.A., M.B.A., University of Texas; D.B.A., Indiana University
- GREEN, SIMON (1960)Professor of Mathematics
B.S., Federal College, Vienna; M.S., University of Vienna; Ph.D.,
University of Pittsburgh
- GREENWOOD, WILLIAM T. (1960)Associate Professor of
Management
B.S., St. Louis University; M.B.A., University of Chicago; Ph.D.,
St. Louis University
- GRIER, MARVIN (1957)Instructor in Physical Education;
Supervisor, Swimming Pool
B.S., Wisconsin State College; M.A., New York University
- GRIFFITH, LEROY H. (1958)Assistant Professor of Education
B.S. in Ed., M.S. in Ed., Drake University; Ph.D., State University
of Iowa
- GRIMES, JOHN O. (1928)Professor Emeritus of Psychology
B.S. in Ed., Ohio University; M.A., Ph.D., University of Michigan
- GROBE, EDWIN P. (1957)Assistant Professor of
French and German
A.B., William Jewel College; M.A., Ph.D., Indiana University
- #GRYDER, ROBERT (1959)Assistant Professor of Office
Administration and Business Education
B.S., Northwestern State College of Louisiana; M.Ed., Louisiana
State University
- GURNEE, HERBERT (1943)Professor of Psychology
A.B., M.A., Wesleyan University; Ph.D., Harvard University
- HAGGERSON, NELSON L. (1961)Associate Professor of Secondary
Education
B.A., Vanderbilt University; M.S.E., New Mexico
Western College; Ph.D., Claremont Graduate School

#On Leave, 1961-62

- HAIGH, GERARD V. (1958)Associate Professor of Psychology
B.S.S., City College of New York; Ph.D., University of Chicago
- HALE, JOHN DOUGLAS (1956)Assistant Professor of Art
B.F.A., M.F.A., University of Southern California; Ph.D., Ohio
State University
- HANNER, LORETTA A. (1957)Associate Professor of Nursing;
Director, School of Nursing
P.N., Michael Reese Hospital School of Nursing; P.H.N., B.S.,
University of Minnesota; M.S., Cornell University
- HANSON, HUGH (1948)Associate Professor of Zoology;
Chairman, Department of Zoology
B.S. in Ed., Kansas State Teachers College; M.S., Ph.D.,
University of Illinois
- HANSON, WARREN W., MAJOR (1959)Assistant Professor of
Military Science
B.A., University of Washington
- HANSEN, ARLENE N. (1960)Instructor in Physical Education
B.A. in Ed., University of Redlands; M.A., Los Angeles State
College
- HARELSON, HARRY B. (1935)Professor of Music
B.Pub.Sch.Mus., M.M., Columbia School of Music
- HARING, LAUREL LLOYD (1959)Associate Professor of Geography;
Acting Chairman, Department of Geography
B.S. in Ed., M.S., Kansas State Teachers College; Ph.D., State
University of Iowa
- HARRIS, WILLIAM H. (1960)Professor of Marketing
B.S., University of Denver; M.B.A., Ph.D., Ohio State University
- HARTER, TOM J. (1937)Professor of Art
B.A. in Ed., Arizona State University; M.F.A., University of
Oregon
- HARWARD, NAOMI (1956)Assistant Professor of Sociology
B.D., Garrett Biblical Institute; B.A., Northwestern University;
M.A. (Rel.Ed.), M.A. (Social Welfare), University of Chicago
- HAWLEY, JOHN B. (1957)Instructor in Engineering
B.S., Colorado School of Mines
- HEADINGTON, ROBERT C. (1953)Professor of Economics
A.B., Kenyon College; M.S., Ph.D., Ohio State University
- HEIMANN, ROBERT A. (1952)Professor of Education;
Counselor Trainer
B.S., Wisconsin State College; M.S., Ph.D., University of
Wisconsin
- HELMSTADTER, G. C. (1959)Associate Professor of Education
B.S., M.S., Iowa State University; Ph.D., University of Minnesota
- HENSHAW, MARJORIE B. (1953)Assistant Professor of English
B.A. in Ed., M.A. in Ed., Arizona State University
- HERMAN, GEORGE R. (1956)Assistant Professor of English
B.S., M.A., University of Kansas
- HERRICK, THOMAS R. (1954)Assistant Professor of
Political Science
A.B., M.A., University of Chicago
- HILKERT, E. J. (1933)Professor Emeritus of Business
Administration; Dean Emeritus, College of Business
Administration
B.S. in Bus.Adm., M.A., University of Southern California; LL.B.,
University of Notre Dame; C.P.A., Arizona and California
- HILL, LOUIS A., JR. (1958)Assistant Professor of Engineering
B.A., B.S.C.E., M.S.C.E., Oklahoma State University; Registered
Professional Engineer in Oklahoma and Arizona (Civil and Structural)

- HILL, ROBERT C. (1961)Assistant Professor of Accounting
B.B.A., M.B.A., Hofstra College
- HINES, HAROLD C. (1952)Associate Professor of Music;
Director of Band
B.S. in Mus.Ed., M.S. in Mus.Ed., University of Illinois
- HINK, HEINZ R. (1958)Associate Professor of Political Science
LL.B., University of Berlin; M.A., Ph.D., University of
Washington
- HOOKE, RALPH C., JR. (1958)Professor of Marketing; Director,
Bureau of Business Services
A.B., M.A., University of Missouri; Ph.D., University of Texas
- HOOVER, HELENE M. (1957)Assistant Professor of
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B.S., M.S., Louisiana State University
- HOOVER, KENNETH H. (1956)Associate Professor of Education
B.S., M.A., Louisiana State University; Ed.D., University of
Washington
- HOPKINS, ERNEST J. (1949)Professor Emeritus of Journalism
B.A., University of Southern California
- HOPKINS, JEAN (1959)Assistant Professor of Art
A.B., University of California, Berkeley; M.A. in Ed., Arizona
State University
- HOROWITZ, DAVID L. (1956)Assistant Professor of English
B.A., Arizona State University; M.A., University of California,
Berkeley
- HOWELLS, EDMUND GIBSON (1960)Instructor in Humanities
B.A., University of Utah; M.A. (Phil.), University of Michigan;
M.A. (English), Middlebury College
- HUBBARD, PAUL G. (1950)Professor of History;
Chairman, Department of History
A.B., Wabash College; M.A., Ph.D., University of Illinois
- HUIZINGH, WILLIAM (1959)Assistant Professor of Accounting;
Assistant Dean, College of Business Administration
B.S.B.A., M.B.A., University of Denver; C.P.A., Colorado
and Arizona
- HUNERYAGER, SHERWOOD G. (1961)Assistant Professor of
Management; Coordinator of Executive
Development Programs
B.S., M.S., University of Illinois
- IMPSON, WELLS F. (1960)Instructor in Physics
B.S., United States Coast Guard Academy; M.S., Arizona State
University
- JACKS, MARY L. (1955)Assistant Professor of Office
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B.A., M.A., Arizona State University
- JACOBSON, ARTHUR (1956)Assistant Professor of Art
B.S., M.S., University of Wisconsin
- JAKOB, JOHN H. (1960)Assistant Professor of Architecture
B.Arch., Ohio State University; M.S. in Arch., Columbia University;
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- JEFFERY, CLARENCE RAY (1957)Associate Professor of Sociology
A.B., Ph.D., Indiana University
- JELINEK, JAMES (1953)Professor of Education;
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B.S., University of Illinois; M.A., Northwestern University; Ed.D.,
Indiana University
- JOHNSON, JAMES E. (1957)Assistant Professor of English
B.S., Northern State Teachers College; M.A., University of
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- JOHNSON, ROSEMARY (1959)Assistant Professor of Nursing
R.N., Milwaukee County General Hospital; B.S., M.P.H., University
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- JOHNSON, ROY M. (1952-53; 1955)Associate Professor of
Microbiology
A.B., M.S., University of Chicago; Ph.D., University of New
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- JONES, DARYL D., CAPTAIN (1960)Assistant Professor of
Military Science
B.S., United States Military Academy
- JOST, HUDSON (1959)Professor of Psychology; Chairman,
Department of Psychology and Philosophy
Ph.D., University of Chicago
- JUDD, B. IRA (1937)Professor of Agronomy
B.S., M.S., Utah State University; Ph.D., University of Nebraska
- KAGY, VIRGINIA L. (1947)Associate Professor of Home
Economics; Director of Nursery School
B.A., Drake University; M.S., Iowa State University; Ph.D.,
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- KAISER, LOUIS HOWARD (1959)Assistant Professor of Education
B.S.E., University of Arkansas; M.A., University of Wyoming;
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- KAJIKAWA, WILLIAM M. (1937)Assistant Professor of
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- KAUFMAN, LUCILE B. (1950)Assistant Professor of
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B.S.M.E., M.S., University of Colorado; Registered Professional
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- KEATING, PATRICIA B. (1948)Associate Professor of Music
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- KEENAN, RUTH (1955)Assistant Professor of English
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- KEITH, MARLOW (1946)Assistant Professor of
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- KEVANE, CLEMENT J. (1956)Associate Professor of Physics
B.S., Ph.D., Iowa State College
- KIESOW, MILTON A. (1957)Assistant Professor of Education
B.S., University of Wisconsin; M.A., Ph.D., University of
Nebraska
- KIGIN, DENIS J. (1958)Associate Professor of
Industrial Education
B.S., State Teachers College, Mankato; M.S., Stout State College;
Ed.D., University of Missouri

- KIRKPATRICK, WILLIAM EDWARD (1959)Instructor in Office
Administration
B.A. in Ed., M.A. in Ed., Arizona State University
- KLANN, MARGARET (1945)Associate Professor of
Physical Education
B.S., University of Illinois; M.A. in Ed., Colorado State College of
Education
- KLASSON, CHARLES R. (1960)Assistant Professor of Management
B.A., M.B.A., Ohio State University; D.B.A., Indiana University
- KLOCK, JOHN WESTON (1960)Assistant Professor of Engineering
B.E., University of Southern California; M.S., Ph.D., University
of California, Berkeley
- KLOSTER, PAULA R. (1931)Professor of Art; Curator,
Collection of Art
B.S. in Ed., University of North Dakota; M.A., Stanford
University
- KRENKEL, JOHN H. (1947)Professor of History
B.S. in Ed., University of Illinois; M.A., Claremont
Graduate School; Ph.D., University of Illinois
- KRUEGER, H. CALVERT (1957)Associate Professor of Accounting
B.S. in B.A., University of Wichita; M.A., University of North
Dakota; C.P.A., Missouri, Arizona, Kansas, and North Dakota
- KUNKEL, JOHN HOWARD (1959)Instructor in Sociology
B.A., Pomona College; A.M., Ph.D., University of Michigan
- KUSH, FRANK (1957)Assistant Professor of Physical Education;
Head Football Coach
B.A., Michigan State University
- **KYRALA, ALI (1960)Associate Professor of Physics
B.Sc., Massachusetts Institute of Technology; M.Sc., Stanford
University; S.M., Harvard University; D.Sc., Technische
Hochschule Wien
- LAKE, ROBERT L. (1958)Instructor in Mathematics
B.S., South Dakota School of Mines and Technology
- LAMBERTS, JACOB J. (1960)Associate Professor of English
B.A., Calvin College; M.A., Ph.D., University of Michigan
- LAMM, ROBERT C. (1959).....Associate Professor of Music and
Humanities
B.M., University of Louisville; M.M., University of Arizona;
Ph.D., Indiana University
- LANCE, ROBERT E. (1960)Instructor in Journalism
B.S., Kent State University; M.S.J., Northwestern University
- LANDERS, JAMES E. (1960)Associate Professor of Zoology
A.B., M.S., University of Wyoming; Ph.D., New York University
- LANDINI, RICHARD G. (1959)Assistant Professor of English
A.B., M.A., University of Miami; Ph.D., University of Florida
- LANG, JOSH M., MAJOR (1959)Assistant Professor of Air Science
B.A., Stanford University
- LAVIK, RUDOLPH H. (1933)Professor of Physical Education
B.A., Concordia College; B.P.E., Springfield College; M.A.,
University of Southern California
- LAVIN, MARY V. (1948)Assistant Professor of Speech
B.A., University of Oregon; M.A., University of Washington
- ##LAW, MARJORIE W. (1957)Instructor in Physical Education
B.A. in Ed., M.A. in Ed., Arizona State University
- LEATHERS, CHESTER RAY (1957)Assistant Professor of Botany
B.S., Eastern Illinois University; M.S., Ph.D., University of
Michigan

##On Leave, First Semester, 1961-62

**Part Time

- LEONARD, T. JAMES (1959)Assistant Professor of Political Science
B.A., University of Chicago; M.A., Columbia University; Ph.D.,
University of Southern California
- LEVY, LEO B. (1959)Associate Professor of English
A.B., M.A., Ph.D., University of California, Los Angeles
- LEWIS, MAURICE S. (1954)Professor of Education;
Assistant Dean, College of Education
B.S. in Ed., M.S. in Ed., Drake University; Ed.D., Colorado State
College of Education
- LINDSTROM, FREDERICK B. (1953)Associate Professor of Sociology
A.B., M.A., Ph.D., University of Chicago
- LISKOVEC, RICHARD F. (1958)Assistant Professor of Mathematics
B.S., M.A., Kent State University
- LITRELL, JOSEPH J. (1958)Associate Professor of
Industrial Education
A.B., Nebraska State Teachers College; M.A., University of
Minnesota; Ed.D., University of Missouri
- LIVERMORE, PAUL E. (1958)Assistant Professor of Mathematics
B.S., M.A., Arizona State University
- LOIR, SONIA (1959)Assistant Professor of Nursing
B.N., Long Island College Hospital; B.S., M.A., New York
University
- LOMBARDI, EUGENE P. (1957)Assistant Professor of Music
B.Mus.Ed., Westminster College; M.A., Columbia University
- LOWE, HOWARD D. (1959)Professor of Accounting
B.S., M.S., Brigham Young University; D.B.A., Indiana
University; C.P.A., Utah
- LOWE, JOHN W. (1956)Associate Professor of Economics
B.S., Arizona State University; M.S., University of Wisconsin;
Ph.D., University of Florida
- LOWENSTEIN, LLOYD L. (1957)Professor of Mathematics;
Chairman, Department of Mathematics
A.B., Ph.D., Cornell University
- LOWENSTEIN, MILTON D. (1959)Assistant Professor of
Architecture
B.A., M.A., Columbia University; Registered Architect in Arizona
- LOWES, WILLIAM J., M/Sgt. (1958)Instructor in Military Science
- LUENOW, PAUL F., JR. (1958)Assistant Professor of Spanish
B.A., M.A., University of Washington; Ph.D., University of New
Mexico
- LUXEMBURGER, JOHN J., JR., CAPTAIN (1958)Assistant Professor of
Military Science
B.S., LaSalle College
- LYLE, MARY G. (1959)Assistant Professor of English
B.A., State University of Iowa; M.A., University of South Dakota
- LYON, ROBERT B. (1938)Associate Professor of Mathematics
B.S., B.M., University of Illinois; M.S., University of Idaho
- MANHART, ROBERT A. (1959)Associate Professor of Engineering
B.S. in E.E., Rose Polytechnic Institute; M.S. in E.E., University
of Illinois; Ph.D., Stanford University; Registered Professional
Engineer in Arizona
- MANHEIM, HENRY L. (1958)Associate Professor of Sociology
A.B., University of California, Los Angeles; M.A., Ph.D.,
University of Southern California
- ## MANNING, DUANE (1951)Professor of Education
B.S., M.A., Ball State Teachers College; Ed.D., Indiana
University

##On Leave, First Semester, 1961-62

- MARKHAM, FRANCIS E. (1958)Assistant Professor of Physical
Education; Freshman Basketball Coach
B.S. in Ed., Kansas State Teachers College; M.S., University of
Washington
- MARTIN, CLYDE V. (1959)Assistant Professor of Education
A.B., University of Redlands; Ph.D., University of Southern
California
- MARTINEZ, JOHN R. (1957)Assistant Professor of History
B.A., Brigham Young University; M.A., Ph.D., University of
California, Berkeley
- MARTINEZ, QUINO E. (1957)Associate Professor of Spanish
B.S., New Mexico Western College; M.A., George Peabody
College; Ph.D., University of North Carolina
- MASON, BRUCE B. (1960)Associate Professor of Political Science;
Director, Bureau of Government Research
B.S., North Texas State College; M.A., Texas Christian
University; Ph.D., University of Texas
- #MATULA, ARTHUR (1958)Assistant Professor of Journalism
B.A., Agricultural and Mechanical College of Texas; M.A.,
Stanford University
- MCCREADY, RICHARD RALPH (1960)Assistant Professor of
Office Administration
B.S., Valley City State Teachers College; M.A., Ed.D., Colorado
State College
- MCGRATH, G. D. (1950)Professor of Education;
Dean, College of Education
A.B., Findlay College; M.A., University of Michigan; Ph.D.,
University of Colorado
- MCINTIRE, E. BERNELL (1959)Instructor in German
A.B., M.A., Brigham Young University
- MCLEOD, DOROTHY L. (1957)Assistant Professor of Nursing
B.N., St. Joseph's Hospital School of Nursing; B.S., St. Louis
University; M.S., Teachers College, Columbia University
- MCPEEK, FRANK D., SGT. (1960)Instructor in Military Science
B.S., United States Military Academy
- MCSPARRIN, BRUCE D., JR. (1959-60, 1961) Associate Professor of
Management
B.B.A., University of Oklahoma; M.B.A., D.B.A., Indiana
University
- MEADOR, BRUCE S. (1959)Assistant Professor of Education
B.A., M.Ed., Ph.D., University of Texas
- MEINERS, ROGER K. (1959)Assistant Professor of English
B.A., Wheaton College; M.A., University of Denver
- MEISTER, ARNOLD G. (1957)Professor of Physics
B.S., Central YMCA College; Ph.D., Illinois Institute of Technology
- MELVIN, JOHN W. (1959)Assistant Professor of Engineering
B.S., M.S., University of Illinois
- MENKE, ROBERT F. (1947)Professor of Education;
Director of Placement Center
B.S., Oshkosh State College; M.A. in Ed., Ph.D., Northwestern
University
- MEYER, NEAL L., CAPTAIN (1958).....Assistant Professor of Air Science
B.S., University of Nebraska
- MICHAEL, JACK (1960)Associate Professor of Psychology
B.A., M.A., Ph.D., University of California, Los Angeles
- MIKULEKY, BEN, M/Sgt. (1957)Instructor in Military Science

#On Leave, 1961-62

- MILLER, IRWIN (1958)Associate Professor of Mathematics
B.A., Alfred University; M.S., Purdue University; Ph.D., Virginia Polytechnic Institute
- MILLER, PAUL T. (1947)Professor of Geology;
Chairman, Department of Geology
B.A., Simpson College; M.S., Ph.D., State University of Iowa
- MILLER, VICTOR J. (1958)Professor of Horticulture
B.S., M.S., Ph.D., University of Illinois
- MOFFIT, INEZ (1953)Assistant Professor of Library Science
B.A., Iowa State Teachers College; B.L.S., University of Minnesota; M.A., University of Denver
- MONOGHAN, THOMAS J., CAPTAIN (1958)Assistant Professor of
Air Science
B.S., Pennsylvania State University
- MONTAGUE, GENE B. (1957)Assistant Professor of English
B.A., Central Washington College of Education; M.A., Ph.D., University of Texas
- MOODY, E. GRANT (1951)Associate Professor of
Animal Husbandry
B.S., University of Arizona; M.S., Kansas State College; Ph.D., Purdue University
- MOORE, CARLETON B. (1961)Assistant Professor of Chemistry and
Geology; Director, Ninninger Meteorite Laboratory
B.S., Alfred University; Ph.D., California Institute of Technology
- MORRIS, MARY SCOTT (1947)Assistant Professor of Education
A.B., Western Kentucky State College; M.A., Northwestern University
- MUNCH, JULIA L. (1959)Assistant Professor of Nursing
R.N., Pitkin Memorial Hospital School of Nursing; B.S., M.A., New York University
- MUNCH, THEODORE WILLIAM (1959)Associate Professor of
Science Education
B.S. in Ed., B.S. in Bacteriology, Ohio State University; M.A. in Ed., Colorado State College; Ed.D., Stanford University
- MURPHY, NINA L. (1924)Professor of Physical Education
B.S. in Ed., University of Arizona; M.A., University of Southern California
- MURRA, WILBUR F. (1958)Associate Professor of Education
B.S., M.A., University of Minnesota; M.A., Harvard University; Ph.D., University of Minnesota
- MYERS, LOUIS M. (1937)Professor of English; Head,
Division of Language and Literature
B.A., St. Stephen's College; M.A., Columbia University; Ph.D., University of California, Berkeley
- MYERS, RICHARD E. (1959)Instructor in Mathematics
B.S., United States Naval Academy; M.A., Arizona State University
- NACZKI, MARGARET V. (1960)Instructor in Nursing
R.N., St. Joseph's Hospital School of Nursing, Chicago; B.S., Incarnate Word College
- NEBEKER, HELEN E. (1958)Instructor in English
B.A., M.A., Arizona State University
- NELSON, PHILIP F. (1958)Assistant Professor of Music
A.B., Grinnell College; A.M., Ph.D., University of North Carolina
- NERING, EVAR D. (1960)Professor of Mathematics
A.B., A.M., Indiana University; A.M., Ph.D., Princeton University

- NEWLIN, CHARLES W. (1961)Associate Professor of Engineering
B.S., Rose Polytechnic Institute; S.M., Harvard University;
Registered Professional Engineer in Pennsylvania
- NIELANDER, WILLIAM A. (1958)Professor of Marketing;
Chairman, Department of Marketing
B.S., University of Pittsburgh; M.S., Ph.D., Columbia University
- NORTHEY, WILLIAM T. (1959).....Assistant Professor of Microbiology
B.A., University of Minnesota; M.A., Ph.D., University of Kansas
- NUTT, MERLE C. (1956)Associate Professor of Engineering
B.S.Chem.E., Illinois Institute of Technology; M.A., State
University of Iowa; LL.D., Illinois Wesleyan University;
Registered Professional Engineer in Arizona
- O'BEIRNE, DONALD E. (1959).....Professor of Education;
Chairman, Department of Elementary Education
B.E., Whitewater State Teachers College; M.A., Ed.D.,
Northwestern University
- O'BRIEN, CARMEN (1959)Assistant Professor of Education
B.A. in Ed., M.A. in Ed., Arizona State University
- OLMSTED, CAMERON B. (1956)Assistant Professor of Education
B.A. in Ed., M.A. in Ed., Arizona State University
- OPPITZ, ROBERT J. (1959)Assistant Professor of Finance
A.B., McKendree College; M.A., Washington University
- OSBORN, GRANT M. (1957)Professor of Insurance
B.S., Brigham Young University; M.B.A., Stanford University;
Ph.D., University of Pennsylvania
- OSENBURG, FREDERICK C. (1946)Associate Professor of English
A.B., M.A., University of Michigan; Ph.D., University of Illinois
- OSTLE, BERNARD (1960)Professor of Engineering
B.A., M.A., University of British Columbia; Ph.D., Iowa State
University
- OSWALT, HOWARD C. (1959)Assistant Professor of Education
B.A., M.A., University of Idaho; Ed.D., University of Southern
California
- OVERMAN, GLENN D. (1956)Professor of Business Administration;
Dean, College of Business Administration
B.S., Central State College; M.S., Oklahoma State University;
D.B.A., Indiana University
- PACKER, MERLE (1959)Assistant Professor of Physical Education
B.A., M.A., Arizona State University
- PADALIS, PRANAS (1959)Associate Professor of Economics
M.A., Ph.D., University of Vytautas The Great
- PALLEY, JULIAN (1959)Assistant Professor of Spanish
B.A., Mexico City College; M.A., University of Arizona; Ph.D.,
University of New Mexico
- PANAS, GEORGE W., CAPTAIN (1959)Assistant Professor of
Air Science
B.A., Arizona State University
- PARKER, ERNEST L. (1950).....Professor of Animal Husbandry
B.S., M.S., University of Halle; Ph.D., University of Leipzig
- PARKER, L. MAYLAND (1955)Associate Professor of
Farm Management
B.S., Brigham Young University; M.S., University of Utah; Ph.D.,
Cornell University
- PATERSON, ROBERT A. (1957)Assistant Professor of Zoology
B.S., University of Michigan; M.S., Ph.D., Ohio State University
- PAULSEN, GEORGE E. (1959)Assistant Professor of History
B.A., Hobart College; M.A., Rutgers University; Ph.D., Ohio State
University

- PAXTON, ROBERT R. (1959)Assistant Professor of
Industrial Education
B.A., College of Emporia; M.A., Arizona State University
- PAYNE, IRA DAWSON (1911)Professor Emeritus of Education;
B.A., M.A., Stanford University; LL.D., Arizona State University
- PEABODY, STANLEY J. (1952)Assistant Professor of
Industrial Education
B.S., M.A. in Ed., Arizona State University
- PECK, GEORGE B. (1958)Assistant Professor of Mathematics
B.S., Arizona State University; M.S., University of Illinois
- PERRIL, LESTER S. (1957)Professor of Sociology
B.A., Ohio Wesleyan University; M.A., Ohio State University;
Ph.D., University of North Carolina
- PETERS, WILLIAM S. (1959)Professor of General Business;
Statistician, Bureau of Business Services
B.A., Dartmouth College; M.B.A., Ph.D., University of
Pennsylvania
- PHILLIPS, WILLIAM W. (1958)Assistant Professor of History
Ph.B., M.A., University of North Dakota; Ph.D., University of
Missouri
- PIAN, RICHARD H. J. (1959)Professor of Engineering
B.S.C.E., Kung Shang University (China); M.S.E., Ph.D., Cornell
University; Registered Professional Engineer in Michigan and
Arizona
- PILLSBURY, KENT (1957)Associate Professor of Education
A.B., University of California, Santa Barbara; M.A., University
of Oregon; Ed.D., Teachers College, Columbia University
- PITTMAN, ANNE (1952)Associate Professor of Physical Education
B.S. in P.Ed., University of Texas; M.A., New York University
- PLANTZ, DON V. (1960)Associate Professor of Economics
B.S., M.B.A., University of Kansas; Ph.D., Indiana University
- PLUMMER, RAMONA F. (1957)Assistant Professor of
Physical Education
B.S., M.A., University of Alabama
- PODLICH, WILLIAM F., JR. (1949)Professor of Education;
Director of Student Teaching
B.S., Maryland State Teachers College, Towson; M.A., Teachers
College, Columbia University; Ph.D., State University of Iowa
- POLLIE, DONALD M. (1959)Assistant Professor of Psychology;
Clinician
B.A., Kalamazoo College; M.A., Ph.D., University of Michigan
- PORTMANN, WALTER O. (1959)Associate Professor of Mathematics
B.S. in Ed., Kent State University; M.S., Ph.D., Case
Institute of Technology
- PORTNOFF, COLLICE H. (1945)Professor of English;
Chairman, Department of English
A.B., M.A., University of California, Berkeley; Ph.D., Stanford
University; F.A.A.R., M.A., American Academy in Rome
- POWERS, DORIS C. (1960)Instructor in English
B.A., Wellesley College; M.A., Occidental College
- PRUST, ZENAS A. (1959)Assistant Professor of
Industrial Education
B.S., Stout Institute; M.A., University of Minnesota
- QUAID, HAZEL HARVEY (1942)Associate Professor of Music
B.A. in Ed., Arizona State University; M.A., Northwestern
University
- QUIRK, DANIEL (1959)Instructor in English
B.A., B.S., Arizona State University

- RADKE, JUDITH J. (1960)**Assistant Professor of French
B.S., M.A., University of Wisconsin
- RAILEY, JIMMY HOWARD (1959)**Instructor in Physical Education;
Assistant Trainer
B.S., Murray State College; M.S., Indiana University
- RALSTON, MACK A. (1956)**Associate Professor of Education
B.S., M.S., Indiana State Teachers College; Ed.D., Indiana
University
- #RANK, HUGH DONALD (1959)**Instructor in English
A.B., M.A., University of Notre Dame
- RANKIN, ROBERT E., CAPTAIN (1959)**Assistant Professor
of Air Science
B.S., University of Maryland
- RANNELLS, JESSIE M. (1939)**Professor of Home Economics
Head, Division of Home Economics
B.S., Iowa State University; M.S., Cornell University; Ph.D.,
University of Wisconsin
- RASMUSSEN, ROBERT D. (1949)**Assistant Professor of
Animal Husbandry
B.S., Iowa State University; M.S., Washington State University
- RATLIFF, JOHN D. (1954)**Associate Professor of English
B.A. in Ed., Arizona State University; M.A., Claremont Graduate
School; Ph.D., Stanford University
- RAWLS, WILLIAM S. (1949)**Associate Professor of Physics
B.S., Murray State College; M.S., Tulane University; Ph.D., Iowa
State University
- REISER, CASTLE O. (1958)**Professor of Engineering;
Chairman of the Chemical Engineering Faculty
B.S., Colorado Agriculture and Mechanical College; Petr.Eng.,
Colorado School of Mines; Ph.D., University of Wisconsin;
Registered Professional Engineer in Idaho and Washington
- RENNER, GEORGE T. (1951)**Associate Professor of Geography
B.A., Stanford University; M.A., Ed.D., Columbia University
- REUTER, VINCENT GEORGE (1961)**.....Associate Professor of
Management
B.S.C., M.A., Ph.D., State University of Iowa
- RICE, ROSS R. (1950)**Professor of Political Science;
Chairman, Department of Political Science
M.A., Ph.D., University of Chicago
- RICE, ROY C. (1946)**Professor of Education; Director of
Summer Session, Extension and Correspondence
B.S., New Mexico University; M.S., Massachusetts State College;
Ph.D., University of Texas
- RICE, WARREN (1958)**Professor of Engineering; Chairman
of the Engineering Science Faculty
B.S., M.S., Ph.D., Agricultural and Mechanical College of Texas;
Registered Professional Engineer in Texas
- RICHARDSON, GRANT L. (1953)**Professor of Agronomy
B.S., M.S., University of Arizona; Ph.D., Oregon State College
- RICHARDSON, H. D. (1940)**Professor of Education; Academic
Vice President; Chairman, Division of Instruction
Ph.B., Ph.M., University of Wisconsin; Ph.D., Northwestern
University
- **RICHARDSON, JOAN (1960)**Instructor in Mathematics
B.S., University of Minnesota

#On Leave, 1961-62

**Part Time

- RICKEL, HARRY P. (1948)Associate Professor of Music
B.M., M.M., University of Arizona
- RIDER, WENDELL J. (1953)Professor of Music;
Chairman, Department of Music
B.S., Iowa State Teachers College; M.M., Eastman School of
Music; Ph.D., State University of Iowa
- RIESE, RUSSELL L. (1957)Professor of Engineering;
Chairman of the Electrical Engineering Faculty
B.S.E.E., University of Washington; M.S., Ph.D., Oklahoma State
University; Registered Professional Engineer in New Mexico
- RIGGINS, L. F. (1956)Assistant Professor of
Agriculture Mechanics
B.S. in Ed., Arizona State College at Flagstaff; M.A. in Ed.,
Arizona State University
- ROBERTS, BYRON D. (1957).....Associate Professor of Mathematics
B.A., M.A., Indiana University; Ph.D., State University of Iowa
- ROBINS, ROLAND K. (1957)Professor of Chemistry
B.A., M.A., Brigham Young University; Ph.D., Oregon State
University
- ROBINSON, DANIEL O. (1950)Professor of Agronomy;
Head, Division of Agriculture
A.B., Brigham Young University; M.S., University of Arizona;
Ph.D., Ohio State University
- ROESSEL, ROBERT A., JR. (1959)Assistant Professor of Education
A.B., M.A., Washington University; Ed.D., Arizona State
University
- ROSS, KENTON EUGENE (1958)Assistant Professor of
Office Administration
B.S., M.S., Oklahoma State University
- ROSS, STANLEY H. (1957)Assistant Professor of Geography
B.A., M.A., University of Colorado
- ROVER, R. CRAIG (1952)Associate Professor of Education
B.A., Upsala College; M.A., St. Lawrence University; Ph.D.,
Cornell University
- RUFF, PAUL F. (1958)Associate Professor of Engineering
B.S.C.E., M.S.C.E., Case Institute of Technology; Registered
Professional Engineer and Land Surveyor in Ohio
- RUPPE, REYNOLD J. (1960)Associate Professor of Anthropology;
Chairman, Department of Sociology and Anthropology
B.A., University of New Mexico; Ph.D., Harvard University
- RUSSELL, FRED D. (1958-60; 1961)Assistant Professor of
Engineering
B.S.E.E., M.S.E.E., California Institute of Technology
- ##RUSSELL, NORMAN H., JR. (1959)Professor of Botany;
Chairman, Department of Botany
B.S., Slippery Rock Teachers College; Ph.D., University of
Minnesota
- RYAN, MARJORIE (1957)Assistant Professor of English
A.B., A.M., University of Michigan; Ph.D., University of
Minnesota
- SALERNO, NICHOLAS ANDREW (1961)Instructor in English
B.A. in Ed., M.A., Arizona State University
- SANDERS, BEVIE T. (1957).....Associate Professor of Accounting
B.B.A., North Texas State College; M.S., Agricultural and
Mechanical College of Texas; Ph.D., University of Texas; C.P.A.,
Texas
- SANDERS, ROBERT W. (1960).....Assistant Professor of Mathematics
B.A., Vanderbilt University; M.S., Stanford University

##On Leave, First Semester, 1961-62

- SANDLIN, ROBERT E. (1959).....Assistant Professor of Speech
B.A., San Diego State College; M.A., Wayne State University
- SANDMEYER, ROBERT L. (1961)Assistant Professor of Economics;
Research Specialist, Bureau of Business Services
B.A., Fort Hays Kansas State College;
M.S., Oklahoma State University
- SAVAGE, NEVIN W. (1959).....Associate Professor of Mathematics
B.S., M.A., Pennsylvania State University; Ph.D., University of
California, Los Angeles
- SCHAUMBURG, DONALD (1953).....Associate Professor of Art
B.A. in Art Ed., California College of Arts and Crafts;
M.F.A., Claremont College
- SCHILLING, DOROTHY C. (1932).....Professor of English and
Humanities; Chairman, Department of Humanities
A.B., M.A., Ph.D., Stanford University
- SCHMIDT, ALFRED H. (1960)Assistant Professor of Marketing
B.S., University of Oklahoma; M.B.A., D.B.A., Indiana University
- SCHROEDER, CLIFFORD M. (1956)Assistant Professor of Physics
B.S., Washington State University; M.A., Ph.D., Ohio State
University
- SCHUTZ, RICHARD E. (1957)Associate Professor of Education;
Director of Testing Bureau
B.A., M.A., University of California, Los Angeles;
Ph.D., Columbia University
- SCOTT, WALTER T. (1961)Professor of Mathematics
B.A., M.A., Ph.D., The Rice Institute
- SCOLAR, DAVID B. (1952)Professor of Music
B.A., Texas Christian University; B.M., Lawrence College; M.A.,
Columbia University
- **SEABURY, CLAIRE C. (1959)Instructor in Mathematics
B.S., United States Naval Academy; C.E., M.C.E., Rensselaer
Polytechnic Institute
- SHAIFER, EDWARD F., JR. (1960)Assistant Professor of
Construction
B.S., United States Military Academy
- #SHAW, LEE (1955)Assistant Professor of English Education
B.S., M.A. in Ed., Arizona State University
- SMITH, CLYDE B. (1952)Associate Professor of Physical
Education; Director of Intercollegiate Athletics;
Head, Division of Health, Physical Education
and Recreation
A.B., Geneva College; M.S., in Ed., Indiana University
- SMITH, L. GEORGE (1959)Assistant Professor of Marketing
A.B. in Ed., Ball State Teachers College; M.B.A., Indiana
University
- SMITH, LEHI T. (1959)Assistant Professor of Mathematics
B.S., M.A. in Ed., Arizona State University; Ed.D., Stanford
University
- SMITH, MARION W. (1952)Assistant Professor of Voice
B.S. in Mus.Ed., Capital University; M.M., American Conservatory
of Music
- SMITH, PAUL, MAJOR (1956)Assistant Professor of
Military Science
- SMITH, SYDNEY R. (1947)Professor of Psychology;
Director of Psychology Clinic
A.B., M.A., Ph.D., University of California, Berkeley

#On Leave, 1961-62

**Part Time

- SNYDER, ERNEST E., JR. (1958)Associate Professor of Science
Education; Chairman, Department of
General Physical Sciences
A.B., M.A., Colorado State College; Ed.D., New York University
- #STAATS, ARTHUR W. (1955)Professor of Psychology
A.B., M.A., Ph.D., University of California, Los Angeles
- #STAATS, CAROLYN K. (1957)Assistant Professor of Sociology
and Psychology
A.B., M.A., Ph.D., University of California, Los Angeles
- STAFFORD, ALFRED B. (1958)Professor of Engineering
E.S.E.E., Carnegie Institute of Technology; M.A., University of
Pittsburgh; Ph.D., University of Chicago; Registered Professional
Engineer in Colorado
- STAFFORD, KENNETH (1957)Associate Professor of Education
B.A., M.Ed., Ph.D., University of Oklahoma
- STAHNKE, HERBERT L. (1941)Professor of Zoology; Head,
Division of Life Sciences; Director,
Poisonous Animals Research Laboratory
S.B., University of Chicago; M.A., University of Arizona; Ph.D.,
Iowa State University
- ##STALZER, FRANK S. (1955).....Assistant Professor of Music
B.M.Ed., University of Kansas; M.M., Eastman School of Music
- STEFFL, BERNITA M. (1961)Instructor in Nursing
B.S. in P.H.N., M.P.H., University of Minnesota
- STEIN, PETER K. (1959)Associate Professor of Engineering
S.B. (Bus.Adm.), S.B.M.E., M.S., Massachusetts Institute of
Technology; Registered Professional Engineer in Arizona
- STEINMANN, WILBUR L. (1959)Associate Professor of Engineering
B.E.E., University of Minnesota; M.S.E.E., State University of
Iowa
- STELLHORN, EDYTHE G. (1960)Instructor in Nursing
B.S., Northwestern University; M.S.N., Washington University
- STEVERSON, NORRIS J. (1932)Associate Professor of
Physical Education
B.A. in Ed., Arizona State University; M.S. in Ed., University
of Southern California
- STEWART, ERNEST I., JR. (1959)Professor of Health Education;
Assistant Dean, College of Liberal Arts
B.S., M.S., Utah State University; Ph.D., Columbia University
- STEWART, KENNETH M. (1947)Professor of Anthropology
A.B., M.A., Ph.D., University of California, Berkeley
- STITES, WILLIAM H. (1954)Associate Professor of Speech
B.A., Louisiana Polytechnic Institute; M.A., Ph.D., University
of Denver
- STOUT, IRVING W. (1953)Professor of Education; Dean,
Graduate College
B.Ed., Platteville State Teachers College; M.A., Ed.D.,
Northwestern University
- STREUFERT, HILDEGARDE (1961)Assistant Professor of
Home Economics
B.S., University of Minnesota; M.S., Iowa State College
- STUDER, RAYMOND GAULT, JR. (1958)Instructor in Architecture
B. of Arch., University of Texas
- STUMPF, ANGELA M. (1959)Assistant Professor of Nursing
R.N., St. Mary's Hospital School of Nursing; B.S.N.E., Marquette
University; M.A., University of Chicago

#On Leave, 1961-62

##On Leave, Second Semester, 1961-62

- SULLIVAN, MILTON D., CAPTAIN (1960)Assistant Professor of
Military Science
B.S., United States Military Academy
- SUMMERS, GEORGE W. (1959)Associate Professor of General
Business Administration
B.S., United States Naval Academy; B.A., M.A., University of
Colorado; Ph.D., Case Institute of Technology
- SUTTON, GEORGE E. (1959)Professor of Engineering
B.S.M.E., West Virginia University; M.S.E., University of Florida;
Ph.D., Michigan State University; Registered Professional
Engineer in Arizona and Florida
- TAMBURO, RICHARD P. (1958)Instructor in Physical Education;
Assistant Football Coach
B.S., Michigan State University
- TARTAR, JOHN (1960)Instructor in Engineering
B.S., M.S., Oklahoma State University
- TATE, DONALD J. (1958)Professor of Office Administration and
Business Education; Chairman, Department of
Office Administration and Business Education
B.S., Kansas State Teachers College; M.A., Ed.D., New York
University
- TAYLOR, JACK JOSEPH (1960)Assistant Professor of Art
B.S. in Art Ed., State Teachers College, Knutztown; M.Ed.,
Pennsylvania State University
- TAYLOR, LOUIS (1949)Assistant Professor of English
B.S. in Ed., M.A., Ohio State University
- TAYSOM, ELVIN D. (1953)Assistant Professor of
Animal Husbandry
B.S., University of Idaho; M.S., Utah State University
- THOMPSON, LEE P. (1955)Professor of Engineering, Dean,
College of Applied Arts and Sciences; Director,
School of Engineering
B.A., Indiana University; M.S., Ph.D., Agricultural and Mechanical
College of Texas; Registered Professional Engineer in Texas
and Arizona
- THOMPSON, TRUET B. (1959)Professor of Engineering
B.S. (Math.), B.S.E.E., Louisiana Polytechnic Institute; M.S.,
Oklahoma State University; Ph.D., Northwestern University;
Registered Professional Engineer in Oklahoma
- THOMPSON, WILMA M. (1959)Instructor in Mathematics
A.B., New Mexico Highlands University; M.S., University of
Wyoming
- THOMSON, RONALD G. (1947)Professor of Health, Physical
Education and Recreation; Chairman, Department
of Health, Physical Education and Recreation
B.S., Springfield College; M.A. in Ed., Arizona State University;
Ed.D., University of Southern California
- TILDEN, ARNOLD (1937)Professor of History; Dean, College
of Liberal Arts
B.A., M.A., DePauw University; Ph.D., University of Southern
California
- TIMMONS, VIRGINIA S. (1960)Assistant Professor of
Home Economics
B.S., Murray State College; M.A., Arizona State University
- TURNBOW, JAMES W. (1959)Professor of Engineering
B.S.M.E., Texas Technological College; M.S. in E.M., Ph.D.,
University of Texas; Registered Professional Engineer in Texas
- TURNER, KATHERINE C. (1946)Professor of English
B.Ed., Illinois State Normal University; M.A., Ph.D., University
of Michigan

- TYLER, D. W. (1961)Associate Professor of Psychology
B.A., M.A., Ph.D., University of Texas
- UHL, RAYMOND (1959)Professor of Political Science
B.A., M.A., University of Virginia; Ph.D., Johns Hopkins
University
- VAN PETTEN, DONALD R. (1942)Professor Emeritus of Political
Science
A.B. in Ed., Arizona State University; M.S. in Ed., University of
Southern California; Ph.D., Stanford University
- VERGIS, JOHN P. (1954)Professor of Education
B.S., M.A., New York University; Ed.D., University of Southern
California
- VICHULES, LEO D. (1961)Assistant Professor of Political Science
A.B., M.A., University of Michigan
- VON DER HEYDT, ALFRED (1950)Associate Professor of German
Diploma, University of Frankfurt-on-the-Main; M.A., Yale
University; Ph.D., Cornell University
- VOTICHENKO, T. ALEXANDER (1956)Assistant Professor of
Philosophy
A.E., Princeton University; M.A., Columbia University
- #WADDELL, JOHN H. (1957)Associate Professor of Art
B.F.A., M.F.A., B.A.E., M.A.E., School of the Art Institute of Chicago
- WAGER, ALAN T. (1949)Professor of Physics;
Chairman, Department of Physics
B.S., Hobart College; M.A., Cornell University; Ph.D., University
of Chicago
- WALDMAN, THEODORE (1961).....Associate Professor of Philosophy
A.B., M.A. (Philosophy), Washington University;
M.A., (Sociology), Ph.D., University of California, Berkeley
- WALKER, JANET F. (1960)Associate Professor of Nursing
B.S., Western Reserve University; M.S., Catholic University of
America
- WALLACE, CHARLES E. (1958)Associate Professor of Engineering
B.S., Lewis and Clark College; M.S., Oregon State University;
Ph.D., Stanford University
- WALLACK, PAUL M. (1959)Assistant Professor of Engineering
B.S., University of Tulsa; M.S., Oklahoma State University;
Registered Professional Engineer in New Mexico
- WALLING, JOSEPH F. (1959)Assistant Professor of Chemistry
A.B., Washington University; Ph.D., University of Washington
- WATT, DEAN D. (1960)Associate Professor of Zoology
B.S., University of Idaho; Ph.D., Iowa State College
- WEED, JANE LARUE (1960)Instructor in Nursing
R.N., St. Mark's Hospital School of Nursing; B.S., University of
Utah; M.S., University of Colorado
- WEGNER, ARTNOLL L. (1957)Professor of Physical Education
B.S., Wisconsin State College; M.S., University of Wisconsin;
P.E.D., Indiana University
- WEISS, THOMAS M. (1956)Associate Professor of Education;
Chairman, Department of Educational Foundations
B.A., M.A., Ph.D., Michigan State University
- WELSH, RICHARD K. (1949)Assistant Professor of English
B.A., DePauw University

#On Leave, 1961-62

- WERNSTEDT, FREDERICK L. (1961).....Associate Professor of Geography
B.A., University of California, Los Angeles; M.A., Syracuse
University; Ph.D., University of California, Los Angeles
- WEXLER, CHARLES (1930)Professor of Mathematics
S.B., Harvard College; A.M., Ph.D., Harvard University
- WHEAT, EUGENE A. (1960)Instructor in English
B.A., M.A., Arizona State University
- WHIFFEN, MARCUS (1960).....Associate Professor of Architecture
B.A., M.A., University of Cambridge
- WHITEHURST, HARRY B. (1959)Associate Professor of Chemistry
B.A., M.A., Ph.D., The Rice Institute
- WILCOX, JOYCE H. (1957)Instructor in Chemistry
B.S., M.S., University of Wichita
- WILCOX, SIDNEY W. (1955)Assistant Professor of
Technical Communications
B.A., Bethany-Peniel College; M.A., University of Oklahoma
- WILLSON, LORETTA L. (1947)Assistant Professor of Speech
B.A., University of South Dakota; M.A., Northwestern University
- WILSON, IRMA (1922)Professor of Spanish
A.B., Montana State University; A.M., Teachers College, Columbia
University; Ph.D., Columbia University
- WINKLES, ROBERT B. (1958)Instructor in Physical Education;
Head Baseball Coach
B.Ph., Illinois Wesleyan University; M.S., University of Colorado
- WIRTZ, DOROTHY (1959)Assistant Professor of French
B.A., State University of Iowa; M.A., Ph.D., University of
Wisconsin
- WOCHNER, RAYMOND E. (1952)Professor of Education;
Chairman, Department of Educational
Administration and Supervision
B.S., York College; M.A., University of Nebraska; Ph.D.,
University of Wyoming
- WOOD, HARRY (1954)Professor of Art; Chairman,
Department of Art
B.A., M.A., University of Wisconsin; M.A., Ph.D., Ohio State
University
- WOOLDRIDGE, CHARLES B. (1959).....Associate Professor of Engineering
A.B., B.S. in C.E., University of Kentucky; M.S., Ph.D., Purdue
University; Registered Professional Engineer in Kentucky
- WOOLDRIDGE, MARY CAROLYN (1959).....Assistant Professor of
Home Economics
B.S., M.S., University of Kentucky
- WOOTEN, WILLIAM W. (1959)Assistant Professor of History
B.A., University of Chicago; M.A., State University of Iowa
- WRIGHT, MARY LAWTON (1960)Associate Professor of
Home Economics
B.S., Iowa State College; M.S., State University of Iowa
- WULK, NED W. (1957)Assistant Professor of Physical
Education; Head Basketball Coach
B.S., LaCrosse State College; M.Ed., Xavier University
- WUNCH, WILLIAM S. (1957)Associate Professor of Mathematics
B.S.E. (Math.), B.S.E. (Aero), M.S.E., University of Michigan;
Ae.E., California Institute of Technology; Ph.D., Stanford
University
- YALE, FRANCIS G. (1952)Associate Professor of
Science Education
A.B., M.A., Colorado State College of Education; Ed.D., Teachers
College, Columbia University

- YEATER, JAMES W. (1958)Assistant Professor of
Speech and Drama
B.A., Baker University; M.A., University of Washington; Ph.D.,
University of Illinois
- #YUEN, GEORGE U. (1957)Assistant Professor of Chemistry
B.S., Arizona State University; Ph.D., University of Utah
- ZACHER, ROBERT V. (1947)Associate Professor of Advertising
B.S. in B.A., M.S. in B.A., University of Alabama
- ZASLOW, BERTRAM (1956)Assistant Professor of Chemistry
B.A., Cornell University; M.S., University of Minnesota; Ph.D.,
Iowa State University
- ZIMMER, CARL R. (1959)Assistant Professor of Engineering
B.E.E., Cornell University; M.E.E., Ph.D., Syracuse University
- ZIMMERMAN, J. EL. (1946).....Associate Professor of English
A.B., M.A., Baylor University
- ZUCHOWSKI, JOHN M. (1958).....Assistant Professor of
Health and Physical Education
B.S., Northwest State College; M.A., Professional Diploma,
Teachers College, Columbia University

Visiting Professors and Lecturers

- BUSBY, DWIGHT L.Lecturer in Architecture
B.S.C.E., State University of Iowa; Registered Professional
Engineer in Arizona
- DAVIS, LEWLecturer in Art
- DIBBLE, BEN T.Lecturer in Architecture
B.S., United States Naval Academy; B.C.E., M.C.E., Rensselaer
Polytechnic Institute; Registered Professional Engineer in Arizona
- FARNSWORTH, STANFORDLecturer in Nursing;
Director, Maricopa County Health Department
B.A., University of California; M.D., College of Medical
Evangelists; M.P.H., Johns Hopkins
- GABRIELSON, ROSAMONDLecturer in Nursing;
Director of Nursing, Good Samaritan Hospital
R.N., Hotel Dieu School of Nursing, El Paso, Texas; B.S., M.A.,
Arizona State University
- GREEN, JOHN R.Lecturer in Biology
B.S., College of Puget Sound; M.B., M.D., Northwestern
University
- KEPPEL, HELEN B.Lecturer in Nursing;
Director of Nursing, Memorial Hospital
R.N., DePaul Hospital, School of Nursing, St. Louis, Missouri;
B.S., Wayne University
- LORENZEN, CLAYTONLecturer in Nursing; Executive Director,
Samuel Gompers Memorial Rehabilitation Center
B.A., Sioux Falls College; M.A., University of South Dakota
- MARLOWE, L. DENNISLecturer in Business Law
A.B. (Soc. Sci.) Otterbein College; A.B. (Bus. Admin.),
Salem College; L.L.B., Ohio State University
- MOKMA, CORNELIA.....Lecturer in Nursing; Chief, Nursing
Service Veterans Administration Hospital, Phoenix
R.N., Presbyterlan Hospital, Chicago; A.B., Central College
- PASTORE, EDWARD W.Lecturer in Physical Education; Director,
Personnel and Training Service—Boys' Clubs of America
B.A., Dartmouth College; M.A., Yale University
- PITTMAN, MARYLecturer in Nursing; Director of Nursing,
Arizona State Hospital
R.N., Theda Clarke Memorial Hospital, Neenah, Wisconsin; B.S.,
Arizona State University

#On Leave, 1961-62

- PRIETO, ROSELYN Y.Lecturer in Nursing; Director of Nursing,
Crippled Children's Hospital
R.N., Hospital of the Holy Family, New York
- PYLE, WILLIAM W.Lecturer in Accounting
B.A., M.S., Indiana State Teachers College
- RICE, MARGARET JANE.....Lecturer in Speech
A.B., M.A., University of Kansas
- SWARTHOUT, GLENDONLecturer in English
A.B., A.M., University of Michigan; Ph.D., Michigan State
University
- TIKKALA, VELLAMOLecturer in Nursing; Director of Nursing,
Maricopa County Hospital
R.N., Burbank Hospital School of Nursing, Fitchburg, Mass.;
B.S., Arizona State University
- WALL, ANNA S.Lecturer in Russian
B.S., University of Idaho
- WILSON, MARYLecturer in Nursing; Director, Public Health
Nursing, Maricopa County Health Department
R.N., Henrotin Hospital, Chicago; B.S., Loyola University,
Chicago

Training School

- DOYLE, ROY P. (1959)Associate Professor of Education;
Director, I. D. Payne Training School
B.A. in Ed., Arizona State University; M.A., Ed.D., Columbia
University
- ASHBY, NANCIE I. (1948)Lunchroom Supervisor
- BRYAN, RUTH D. (1956)Seventh Grade
B.Ed., M.S., Southern Illinois University
- CHRISTINE, RAY ORR (1958)Fifth Grade
A.B., A.M., Colorado State College
- KIRKPATRICK, JANE (1958)School Nurse
R.N., St. Mary's Hospital, Tucson
- LAW, MARJORIE W. (1957)Physical Education
B.A. in Ed., M.A. in Ed., Arizona State University
- MARTIN, EVELYN A. (1960).....Second Grade
B.A. in Ed., M.A. in Ed., Arizona State University
- MOORE, HOPE C. (1956)Shop and Physical Education
B.A. in Ed., M.A. in Ed., Arizona State University
- ROBINSON, DOROTHY F. (1927)Librarian
A.B., M.A., University of Southern California
- SCHALL, MARY H. (1960).....First Grade
B.A., Albion College
- SEARIGHT, ROLAND (1954)Music
B.A., Grinnell College; M.A., The Eastman School of Music of the
University of Rochester
- SMITH, GLADYS ARLENE (1954)Fourth Grade
B.S. in Ed., Ft. Hays Kansas State College; M.S. in Ed.,
University of Kansas
- STANSELL, WILLIAM E. (1956)Sixth Grade
B.S., Milwaukee State Teachers College; M.E., Wisconsin State
College
- STEERE, CARYL J. (1960)Kindergarten
B.A., Albion College
- VERNER, ERVA J. (1959)Eighth Grade
B.A., University of Wisconsin

Matthews Library

- BATCHELOR, HAROLD W. (1943)Head Librarian; Professor of
Library Science
B.A., University of Oregon; B.S. in L.S., M.S., University of
Illinois
- ACKLIN, PAULINE (1955).....Catalog Librarian
B.A., B.S. in L.S., Texas State College for Women
- **ARKO, MARY L. (1958).....Catalog Librarian
B.S. in L.S., University of Minnesota
- ARNHOLD, KATHRYN (1948)Loan Service Manager
B.A. in Ed., Arizona State University
- HILL, GERTRUDE (1960)Special Collections Librarian
B.A., M.A., University of Arizona; B.S. in L.S., University of
Denver
- HOWE, CHARLES EDWARD (1951).....Librarian, Architecture
B.D., Bexley Hall, Kenyon College
- MATCHETT, KATHARINE M. (1960)Catalog Librarian
B.A., University of Colorado; M.A., Western Michigan
University
- MAXWELL, RUTH (1952).....Catalog Librarian
B.A., Arizona State University
- MORGAN, FLORENCE B. (1950)Catalog Librarian
B.A., University of Colorado; B.S. in L.S., University of Illinois;
M.S., Columbia University
- MUELLER, TWYLA WILMA (1959)Acquisitions Librarian
B.A., University of Toledo; M.S.L.S., Western Reserve University
- **MURRA, MARION M. (1959)Catalog Librarian
B.A., University of Minnesota; B.S. in L.S., Columbia University
- NATION, JAMES ROBERT (1960)Head Reference Librarian
B.S., Mississippi State College
- PALAIS, ELLIOT S. (1959)Reference Librarian
B.A., Bowdoin College; A.M.L.S., University of Michigan
- PHILLIPS, RUTH F. (1948)Catalog Librarian
B.A., Cornell College; Certificate in L.S., University of Wisconsin
- RAWSON, RUTH P. (1958)Reference Librarian
B.S., University of Colorado; Certificate in L.S., University of
Minnesota
- RUSSELL, ISABEL (1953).....Administrative Assistant to Librarian
A.B., Butler University
- RUSSELL, JESSIE C. (1954)Manager, Curriculum Laboratory
A.B., M.S., Butler University
- SCHNEIDER, FRANK A. (1960)Assistant Librarian
B.A., University of Dubuque; B.S. in L.S., University of
Minnesota; M.A., Arizona State University
- **SEGNER, JOYCE J. (1959)Reference Librarian
B.A., Hiram College; M.S. in L.S., Western Reserve University
- SIEDENTOPF, MARIE (1953)Head Acquisitions Librarian
B.A., University of Montana; Library Certificate, Riverside
Library School
- WURZBURGER, MARILYN Jo (1960)Catalog Librarian
A.B., MacMurray College

Student Health Service

- McFARLAND, ELAINE, M.N., C.P.H.N.Director, Student
Health Service
- **SUTHERLAND, L. C., M.D.....Physician, Student Health Service
- **AXEL, BENJAMIN J., M.D.....Physician, Student Health Service
- **SCHRAMMEL, JOHN E., M.D.Psychiatrist, Student Health Service

**Part Time

UNIVERSITY ADMINISTRATIVE PERSONNEL

Academic Affairs

Academic Vice President HAROLD D. RICHARDSON

Colleges

Liberal Arts ARNOLD TILDEN, Dean
Education G. D. MCGRATH, Dean
Business Administration GLENN D. OVERMAN, Dean
Applied Arts and Sciences LEE P. THOMPSON, Dean
Graduate IRVING W. STOUT, Dean

Schools

Architecture JAMES W. ELMORE, Director
Engineering LEE P. THOMPSON, Director
Nursing LORETTA A. HANNER, Director

Divisions

Agriculture DANIEL O. ROBINSON, Head
Behavioral and Social Sciences KARL H. DANNENFELDT, Head
Health, Physical Education and
Recreation CLYDE B. SMITH, Head
Industrial Education WALTER E. BURDETTE, Head
Home Economics JESSIE M. RANNELLS, Head
Fine Arts
Language and Literature LOUIS M. MYERS, Head
Life Sciences HERBERT L. STAHNKE, Head
Physical Sciences GEORGE M. BATEMAN, Head

Departments

Accounting A. R. BURTON, Chairman
Air Science ALEXANDER W. BRYANT, Chairman
Art HARRY WOOD, Chairman
Botany NORMAN H. RUSSELL, Chairman
Chemistry LEROY EYRING, Chairman
Economics ROBERT C. CAUTHORN, Chairman
Educational Administration and
Supervision RAYMOND E. WOCHNER, Chairman
Educational Foundations THOMAS M. WEISS, Chairman
Educational Psychology and
Guidance SANDFORD S. DAVIS, Chairman
Educational Services WILLARD ABRAHAM, Chairman
Elementary Education DONALD E. O'BEIRNE, Chairman
English COLLICE H. PORTNOFF, Chairman

Foreign Languages	RUSSELL K. BOWMAN, Chairman
General Business Administration	JOEL J. DAUTEN, Chairman
General Physical Sciences.....	ERNEST E. SNYDER, JR., Chairman
Geography	LAUREL L. HARING, Acting Chairman
Geology	PAUL T. MILLER, Chairman
Health, Physical Education, and Recreation	RONALD G. THOMSON, Chairman
History	PAUL G. HUBBARD, Chairman
Home Economics	JESSIE M. RANNELLS, Chairman
Humanities	DOROTHY C. SCHILLING, Chairman
Library Science.....	HAROLD W. BATCHELOR, Chairman
Management	KEITH DAVIS, Chairman
Marketing	WILLIAM A. NEILANDER, Chairman
Mass Communications	MARVIN H. ALISKY, Chairman
Mathematics	LLOYD L. LOWENSTEIN, Chairman
Military Science	PALMORE A. FERRELL, Chairman
Music	WENDELL J. RIDER, Chairman
Office Administration and Business Education	DONALD J. TATE, Chairman
Physics	ARNOLD G. MEISTER, Chairman
Political Science	ROSS R. RICE, Chairman
Psychology and Philosophy	HUDSON JOST, Chairman
Secondary Education	BILL J. FULLERTON, Chairman
Sociology and Anthropology	REYNOLD J. RUPPE, Chairman
Speech and Drama	ROBERT W. ALBRIGHT, Chairman
Zoology	HUGH HANSON, Chairman

Business Affairs and Physical Plant

Vice President for Business Affairs	GILBERT L. CADY
Comptroller	TILMAN T. CRANCE
Associate Comptroller	ELMER R. HUNTER
Purchasing Agent	GEORGE W. MORRELL
Office Manager.....	CLARE W. MUNRO
Bookstore Manager	TONY BUSTAMENTE
Director of Physical Plant	JOHN R. ELLINGSON
Plant Engineer	GEORGE ZELENSKI
Superintendent of Buildings and Grounds	FENN HARRIS
Foreman of Custodian Service	WILLIAM E. HENRIE
Supervisor of Motor Pool	ANDREW P. MILLS
Director of Campus Security	IRVEN GAYLE SHUMAN

Student Affairs

Dean of Students	WELDON P. SHOFSTALL
Associate Dean of Students	CATHERINE G. NICHOLS
Dean of Men	GARY R. ANDERSON
Assistant Dean of Students	HERMAN SCHMIDT
Assistant Dean of Students	RUTH E. KILBOURNE

Admission and Registration

Director of Admissions and Registrar	ALFRED THOMAS, JR.
Assistant to the Registrar and Director of Admissions	KATHRYN K. GAMMAGE
Associate Director of Admissions	ROSS A. OWENS
Associate Registrar	GALEN H. CASSITY
Assistant Director of Admissions	ANN J. KOLBERG

Research and Service Agencies

Bureau of Broadcasting	RICHARD H. BELL, Director
Bureau of Business Services	RALPH C. HOOK, Director
Bureau of Educational Research and Services	JOHN B. BARNES, Director
Bureau of Government Research	BRUCE B. MASON, Director
Bureau of Publications.....	DEAN E. SMITH, Director
Audio-Visual Center	JOEL A. BENEDICT, Director
Engineering Research Center	LEE P. THOMPSON, Director
Extension Division	ROY C. RICE, Director
Institutional Studies	JOHN L. FORBES, Director
Intercollegiate Athletics	CLYDE B. SMITH, Director
News Bureau	JOSEPH E. SPRING, Chief
Placement Center	ROBERT F. MENKE, Director
Poisonous Animals Research Laboratory	HERBERT L. STAHNKE, Director
Student Health Center	ELAINE McFARLAND, Director
Summer Session	ROY C. RICE, Director
University Testing Service.....	RICHARD E. SCHUTZ, Director

Library

Librarian	HAROLD W. BATCHELOR
Assistant Librarian	FRANK A. SCHNEIDER

Memorial Union

Director of Memorial Union	CECELIA SCOULAR
Assistant Director of Memorial Union	ELLEN M. BELL
Assistant to the Director of Memorial Union	TRUDY THOMAS

Residence Halls

Director of Housing	EDWARD M. HICKCOX
Adelphi Cooperate No. 1	BEATRICE B. ADAMS, Housemother
Adelphi Cooperate No. 2	FRANCES N. MYERS, Housemother
Adelphi Cooperate No. 3	MARGARET SCHROEDER, Housemother

Adelphi Cooperate No. 4	FRANCES A. BUCKMAN, Housemother
Adelphi Cooperate No. 5	VIVIAN M. CORKILL, Housemother
M. O. Best "A"	KEN CALBECK, JR., Head Resident
M. O. Best "B"	CLARA N. PARKER, Head Resident
East Hall	ANNA FRANCES MEASON, Head Resident
Dixie Gammage Hall	NANCY L. DAVIS, Head Resident
Haigler Hall	SYLVESTER H. CAIN, Head Resident
Hayden Hall	ESTHER WILSON, Head Resident
Irish Hall	DANIEL J. STELLER, Head Resident
McClintock "A" Hall	ELSIE W. PHILLIPS, Head Resident
McClintock "B" Hall	President of Hall
North Hall	DOROTHY H. SHUMWAY, Head Resident
Palo Verde Residence Halls	MARGARET MCCANDLESS, Director
Palo Verde Hall	ALICE M. MARTINY, Administrative Assistant
Sahuaro Hall	C. FREDERICK SNIDER, Head Resident
South Hall	BEATRICE E. GREGORY, Head Resident
West Hall	MARGARET MARY WALSH, Head Resident
Wilson Hall	IRENE M. HANNEY, Head Resident

Arizona State University

Organization

Arizona State University, established in 1885 as the Arizona Territorial Normal School, is one of three major institutions that comprise the system of higher education maintained by the State of Arizona. Governed by a Board of Regents appointed by the Governor of the State, the University of Arizona (Tucson) and Arizona State College (Flagstaff) constitute the other institutions of the system.

Arizona State University is organized into five colleges, embracing nine divisions and three schools, an extension division, a summer session, and some 40 departments of instruction, research and service.

The Graduate College administers programs of work offered in the colleges of the University leading to the degrees of Master of Arts, Master of Science, Master of Science in Engineering, Master of Arts in Education, Master of Business Administration, Master of Fine Arts, Master of Music, Master of Natural Sciences, Master of Public Administration, Education Specialist, Doctor of Education, and Doctor of Philosophy.

The College of Liberal Arts offers courses in the arts and sciences leading to the degrees of Bachelor of Arts and Bachelor of Science. The Bachelor of Science in Nursing is offered through the School of Nursing, which is currently assigned for administrative purposes to this college.

The College of Education offers courses in kindergarten-primary, elementary, secondary, and special education leading to the degree of Bachelor of Arts in Education.

The College of Business Administration offers courses in economics and the various fields of business leading to the degree of Bachelor of Science.

The College of Applied Arts and Sciences offers courses in agriculture, architecture, engineering, and industrial education, leading to the degrees of Bachelor of Architecture, Bachelor of Science, and Bachelor of Science in Engineering.

The Extension Division administers programs of undergraduate and graduate courses in campus residence centers, in the Phoenix metropolitan area generally, and other Arizona communities. Courses are also available by correspondence.

The Summer Session provides extensive graduate and undergraduate programs from the various schools and colleges during two 5-week summer terms.

History

Centuries before the white man came, an Indian culture of significance flourished in Central Arizona. A short distance from the campus are remains dating back to the eighth century. Here, a people known to us as the Ho-Ho-Kam tilled the desert soil. An intricate system of brush dams and laboriously constructed canals distributed the waters of the nearby Salt River.

Among the earliest Europeans to visit the region was Fray Marcos de Niza, who came from Mexico in 1539. De Niza was followed by the expeditions of Coronado and others.

Almost three centuries passed before the European newcomers became established along the streams and in the mountains. In 1848 the region became part of the United States. By 1863, sufficient Americans had gathered within the borders to form the Territory of Arizona. President Lincoln appointed the first territorial governor, John N. Goodwin, who raised an American flag, marking the beginning of the new territorial government, December 29, 1863.

Education in this frontier land progressed slowly until 1885. On March 12, the Thirteenth Legislative Assembly made provision for the establishment at Tempe of a Normal School. The same session established the University of Arizona at Tucson. "Opening day" for the institution now known as Arizona State University came on February 8, 1886. Thirty-three students met in a single room under the supervision of Hiram Bradford Farmer. Thus instruction began at the first institution aspiring to higher learning to be opened in Arizona.

The institution thus founded has had a variety of names, starting with Arizona Territorial Normal School. In 1925, through the activities of the Alumni Association, the Seventh State Legislature approved a bill enlarging the program to a 4-year college curriculum. The Ninth Legislature changed the name to "Arizona State Teachers College at Tempe" and authorized the College to grant the degree of Bachelor of Arts in Education. In March, 1937, the Thirteenth Legislature authorized the College to grant the advanced degree of Master of Arts in Education. This degree was first conferred on May 31, 1938.

A complete revision of the system of governing the state institutions of higher learning took place on March 9, 1945, when the legislature established a Board of Regents of the University and State Colleges of Arizona, changed the name to Arizona State College and enlarged the scope of the institution toward broader university lines. By vote of the people on November 4, 1958, the name "Arizona State University" was conferred.

The Board of Regents has broad powers to govern the Universities and State College of Arizona. Recent authorizations include the degree of Doctor of Education, May 19, 1952; the degree of

Education Specialist, December 17, 1954; the degrees of Master of Arts and Master of Science, May 21, 1956; the degree of Bachelor of Science in Engineering, July 2, 1956; the degree of Bachelor of Science in Nursing, February 24, 1957; the degree of Master of Science in Engineering, May 12, 1958; the degrees of Bachelor of Architecture, Master of Fine Arts and Master of Public Administration, March 9 1959; the degree of Master of Natural Sciences, April 30, 1960, and the degrees of Bachelor of Music, Master of Music, Master of Business Administration, and Doctor of Philosophy, February 28, 1961.

To serve this educational program, from the original single-building campus has grown a campus containing 66 buildings on 314 acres. The original attendance of 33 has expanded to the 12,183 individuals who enrolled for the autumn semester of 1960-61.

Purposes

Arizona State University aims to educate for leadership and responsible citizenship in the United State of America and other free societies. Increased competence, improved moral and ethical standards, expanded cultural horizons, and enhanced ability to seek answers to the fundamental questions of the broadest human concern, are the goals sought by the University.

The resources of the institution are organized:

- (1) To provide a basic program of general education.
- (2) To provide programs of work in the arts and sciences at the undergraduate level which broaden and extend the basic program of general education and provide the beginning specialization necessary for advanced graduate and professional education.
- (3) To provide programs of graduate and professional work in the fields of the arts and sciences, education, business administration and engineering.
- (4) To provide programs for the selection and preparation of teachers and administrators for the elementary and secondary schools.
- (5) To provide the atmosphere and facilities for research by both faculty and students. Research, the hub of graduate study, helps fulfill the obligation of the University in the quest for new knowledge.
- (6) To provide programs of pre-professional training in accepted professional fields.
- (7) To provide a rich and balanced program of activities through the residence halls, student government, professional and special interest groups, organizations, fraternities and sororities, that provide opportunity for the development of wholesome individual personalities, refined social living, training in leadership and effective citizenship.
- (8) To provide a program of help, guidance, and personal counseling that reaches all students.

(9) To provide a program of cultural and educational leadership and service in the community and the State as a whole. These professional and community services are provided through special evening courses, resident credit centers, correspondence courses, summer sessions, educational conferences, dramatic performances, musical concerts, speech clinic services, published bulletins, radio and TV features, placement services, alumni organizations, school visitation, speaker, consultant and other services.

Academic Recognition

Arizona State University is accredited by the North Central Association of Colleges and Secondary Schools. Professional programs in the various colleges, schools, divisions, and departments are accredited by the corresponding professional bodies. Students transferring from this University to other colleges and universities are given the same recognition with respect to transfer of credits, graduate study, and other privileges as are enjoyed by other universities and colleges of the country.

The University and its colleges have institutional membership or other affiliations in or with the Association of American Colleges, the American Council on Education, the Western College Association, the American Association of University Women, the Western Interstate Commission for Higher Education, the American Association of Colleges for Teacher Education, the National Commission on Accrediting, the National Association of Business Teacher Education, the Associated University Bureaus of Business and Economic Research, the Society of Industrial and Applied Mathematics, the Council on Social Work Education, the Council of Member Agencies for the Baccalaureate and Higher Degree Programs of the National League for Nursing, the Western Council for Higher Education in Nursing, the Association of Collegiate Schools of Architecture, and the National Association of Schools of Music.

University Setting

Environment

Location. Arizona State University is located in the heart of metropolitan Phoenix in the city of Tempe. Within a few minutes' drive of the campus are the municipalities comprising the fast-growing Phoenix area—Scottsdale, Mesa, Chandler, Gilbert, Glendale, Litchfield Park, Peoria, and several smaller communities. Population of the metropolitan Phoenix area now exceeds 650,000. Tempe is located near Sky Harbor Airport, which provides frequent services via Trans-World Airlines, American Airlines, Frontier Airlines, Western Airlines, Bonanza Airlines and others. There is regular metropolitan bus service to Phoenix and adjacent communities. Southern Pacific's main line runs through Tempe, and

connections with the Santa Fe Railway are available at Phoenix. Four transcontinental highway systems traverse the University grounds, affording easy access to all parts of the country.

Climate. Here is the nation's most perfect climate. Cloudless skies and constant sunshine permit much activity to be conducted outdoors. There is virtually no snow, rain is seldom, and high winds are infrequent.

Historical and Scenic Features. Within easy reach are found such landmarks as Apache Trail, Canyon Lake, Roosevelt and Coolidge Dams, Hieroglyphic Canyon and the Casa Grande Ruins National Monument. Somewhat distant are the internationally famous Grand Canyon of the Colorado, Glen Canyon Dam, scenic Oak Creek Canyon and other famed western beauty spots.

The Navajo, Apache, and Hopi Indian Reservations are near enough for occasional visits. Smaller tribal groups—the Pimas, Maricopas and Yaquis—live but a few miles from the campus. At the Heard Museum in Phoenix and in the original excavations at Pueblo Grande, five minutes from the campus, the superb art of the ancient basket-weavers and sun-worshipping Ho-Ho-Kams may be studied.

Majestic mountains fringe the horizon — Camelback, Four Peaks, South Mountain and the Superstitions being the most prominent. Papago Park, a natural scenic attraction retaining much of the original desert flora, lies north of the campus. This beauty spot and its 1,200-acre park is an ideal center for hiking, horseback riding, picknicking, and painting.

Grounds

The campus proper, arranged in a most attractive setting with broad, shady lawns, dotted by a profusion of orange, olive, fig and palm trees, presents a veritable oasis in this desert land. Interestingly arranged hedges and a variety of shrubs combine with gaily blooming flowers to give an inviting vista of restful color.

Consistent with a master plan adopted several years ago, all recently completed buildings and those now under construction are finished complementary to the natural colors of the Southwest. Classrooms and laboratories are designed with large window areas to take full advantage of the winter sunshine, and are decorated in soft, pleasant pastels.

The prospective student must see the tropical fruit and nut trees surrounding the buildings, marvel at the desert's rare coloration, visit the fabulous mountains nearby, and bask in the warm, comfortable climate to appreciate the campus and its setting.

University Farm. The model farm of 360 acres is located six miles southeast of the campus. It is used for experimental and practical work in various phases of agricultural science pertaining to modern farm management.

University Buildings

Administration

Administration Building (1951). The administrative offices of the University are in the north wing of this structure. In it are located the offices of the President, the Vice Presidents, Dean of the Graduate College, the Registrar, the Business Office, the Coordinator of Research Activities, the News Bureau, and other administrative sections. It is especially noted for a magnificent entrance mural in fresco done by Jean Charlot.

University Libraries

Matthews Library (1930). This fire-proof, air-conditioned building provides a growing collection of materials to meet the needs of undergraduate and graduate students and the faculty. Remodeled and enlarged in 1951 at a cost of more than one-half million dollars, the functional plant and the decor make the Library an attractive, comfortable and efficient place for study. Included are special reading rooms for Education, Humanities, Science and Technology, and the Social Sciences. In addition, there are General Reference Rooms and a current periodicals reading room. A music room, a gift of Mrs. Mary Redewill, permits students to listen to the finest in classical recordings and FM radio programs. There are 140 individual study carrels available in the stacks. The collection of American Art is hung in the Library's gallery and reading room.

Curriculum Laboratory. The Curriculum Laboratory, housed in Annex IV, adjacent to the I.D. Payne Training School, is a functional part of the teacher education program of the University. It is designed to serve teachers in training and Arizona teachers in service by maintaining extensive collections of teaching materials and curricula.

Audio-Visual Library. Arizona's largest film library is housed in the Audio-Visual Center (see Educational and Service Facilities) in Matthews Hall. It includes 3,700 films.

Bureau of Broadcasting Library. An extensive recording library is located in the Bureau of Broadcasting (see Educational and Service Facilities) in the Engineering Center.

Technical Research Service Center, Association for Applied Solar Energy. More than 4,000 papers on applied solar energy, written by scientists from all over the world, are on file in this facility, located in the Engineering Center.

I. D. Payne Training School Library. A children's library in the training school contains more than 5,000 carefully selected juvenile books. The collection is supplemented by pamphlets, pictures, juvenile periodicals, and a textbook collection for the enrichment of directed teaching, as well as for the children's use. Students in elementary education find the library especially valuable.

Classrooms and Laboratories

Agriculture Building (1950). The Agriculture Building provides facilities for the Division of Agriculture and the Departments of Geology and Geography, as well as the Rocky Mountain Forest and Range Experiment Station of the U.S. Forest Service.

Arts Building (1914). This fire-proof building of concrete construction, faced with brick, houses the Departments of Art and Music.

Business Administration Building (1951). This facility, the south wing of the building which houses University administrative offices, contains the classrooms, laboratories, and offices of the College of Business Administration.

Drama Workshop (1939). Located on Forest Avenue on the west side of the campus, this building has a small auditorium and associated facilities used by the Department of Speech and Drama.

College of Education Building (1961). The new four-story College of Education Building is located near the Administration Building, on Forest Avenue at 11th. The building includes College of Education classrooms, offices, special laboratories, and special purpose centers. It is one of the finest educational structures in the State of Arizona, and is the result of several years of careful planning for the special functions which it serves.

Engineering Center (1955). The Engineering Center is a series of integrated unit wings occupying nearly one full block. Housed here are the schools of Engineering and Architecture, and the Division of Industrial Education. The building includes shops, laboratories, a three-story wing for classrooms and offices, and the Arizona State University Computer Center. The Computer Center is one of the largest electronic data-processing systems installed on any college or university campus.

English Building (1909). Classrooms and offices for English and speech are housed in this attractively remodeled structure.

Home Economics Building (1951). A completely equipped structure which houses the Department of Home Economics has been constructed at the north edge of the campus, adjacent to the Arts Building, and in close proximity to the Home Management House and Nursery School. This structure provides the latest facilities for technical courses in homemaking.

Home Management House and Nursery School (1939). Students majoring in home economics live for a part of a year in the Home Management House. A modern nursery school is also housed in this building.

Life Sciences Center (1959). This classroom and laboratory building contains 188 rooms, ranging from laboratories and lecture halls to graduate research facilities. A unique feature is an ecological laboratory where desert life is maintained at the level of natural surroundings. Botany, zoology, biology, microbiology, and

entomology are taught in this building. The Center also includes the internationally recognized Poisonous Animals Research Laboratory.

Old Main (1894). The early traditions of the University cluster about Old Main, with its three stories of ivy-covered brick. Erected in 1894, the building has been completely remodeled inside, and new entrance ways have been installed. It is devoted to classrooms and offices for academic work.

I. D. Payne Training School (1914). The campus laboratory school occupies four buildings on a ten-acre site on the west central portion of the campus. In addition, its library occupies half the area of Annex IV nearby. This school serves many functions as a laboratory and research center for the College of Education.

Physical Sciences Center (1959). This new instructional facility will eventually cover a full city block. The building has four floors which provide space for chemistry and physics classrooms, laboratories, research facilities, and a spacious lecture hall, in addition to many general-purpose classrooms.

Social Sciences Building (1960). Classrooms, laboratories, and offices of the Division of Behavioral and Social Sciences surround a beautiful patio in this new four-story structure at mid-campus on College Avenue. In the building are the anthropological Museum, Fine Arts Museum, Psychological Clinic, and offices of the Dean of the College of Liberal Arts.

Physical Education and Recreation

Men's Physical Education Building (1952). The Men's Physical Education Building contains a gymnasium, classrooms, offices, and many other features. The basketball area will ultimately provide seating for 6,000 spectators. The classrooms and offices of the Division of Health, Physical Education and Recreation and the Department of Military Science are located in this building.

B. B. Moeur Activity Building (1939). This is the instructional center for women's physical education. The building was named in honor of the late Governor Moeur.

Goodwin Stadium (1936). This stadium was named after the late Garfield A. Goodwin, an early graduate of the Territorial Normal School, and a member of the Board of Education for many years. This stadium is used for track and field events and campus outdoor activities. Haigler Hall, a residence hall for men, is in the east portion of the stadium.

Sun Devil Stadium (1958). The new stadium seats 30,000 spectators. Located between two beautiful buttes on the north end of the campus, it overlooks Tempe to the south and the Salt River to the north. With excellent parking space and press facilities, the stadium is an outstanding addition to the University's athletic facilities. Provision for eventual expansion to as many as 78,000 seats was made in the original plans.

Swimming Pool (1957). The swimming pool is located east of the Men's Physical Education Building. Of heavy concrete construction, it is equipped with modern high-volume water filtering and purification systems. Dressing facilities for men and women are adjacent. Spacious concrete deck areas surround the pool.

Residence Halls

Adelphi Housing (1954). Located on a 15-acre site three blocks southeast of the campus, this facility provides small group housing. Each of the five units houses 30 students and contains a living-dining room and kitchen.

North Hall (1914). This women's hall is located on the north side of the residence hall quadrangle.

South Hall (1913). South Hall accommodates women. It is located on the south side of the residence hall quadrangle.

Dixie Dees Gammage Hall (1941). This is a modern structure for women. The hall was named in honor of Dixie Dees Gammage.

James H. McClintock "A" Hall (1951). McClintock "A" was the first half of this women's residence hall to be constructed. It provides accommodations for 96 women.

James H. McClintock "B" Hall (1956). The newest section of McClintock Hall "B" provides accommodations for 128 women. The hall features a central patio, living room, kitchen, and sunbathing area.

George W. Wilson Hall (1956). Wilson Hall provides tasteful modernity with a home-like atmosphere for 148 women. It is located directly west of Danforth Chapel in mid-campus.

Palo Verde Hall (1958). Palo Verde accommodates 600 women, and features modern facilities for on-campus living. The hall is located at the north end of the campus. It offers separate cafeteria and parking facilities.

East Hall (1903). This residence hall for men is located at the center of the campus.

Irish Hall (1940). This is a 3-wing unit located just west of Goodwin Stadium and houses 153 men.

M. O. Best Hall (1956). Two hundred men are housed in this completely modern, 2-wing unit. The units face a park area and are located west of Irish Hall.

Sahuaro Hall (1958). This modern men's residence hall accommodates 450 men. It is located three blocks southeast of the main campus and features a self-contained cafeteria unit.

Charles Trumbull Hayden Hall (1951). A men's residence hall accommodating 146 students has been constructed on the south edge of the campus. It contains many conveniences and facilities for pleasant living.

Charles A. Haigler Hall (1940). This dormitory provides accommodations for 80 men and is located underneath the east section of Goodwin Stadium.

Student Services

Memorial Union (1956). The center of student life on campus is the Memorial Union. Located on the southeast corner of the main campus intersection, College Avenue and Orange, the Union is convenient to classrooms, residence halls, and all activity centers. A large part of the financing which made the Union possible came through contributions from faculty, alumni, students, and friends of the University. Formally opened and dedicated in the spring of 1956, the Union provides space and modern facilities for recreational, cultural, and social activities of the students and faculty.

On the ground floor of the Memorial Union are located the spacious University Cafeteria, the snack room, known as the "Devils' Den," an efficient, self-service University Bookstore, a campus post office, and a comfortable lounge. Recreation rooms providing space for table tennis, billiards, bowling, and hobbies and crafts are located in the basement. On the second floor is the luxurious main ballroom opening onto the Starlight Terrace, as well as a student lounge, several banquet and committee rooms. A well-equipped soda bar, offices of the Associated Students of Arizona State University, and the editorial and advertising offices of the State Press are also adjacent to the ballroom.

The Memorial Union was designed to reflect the social, cultural, and recreational life at Arizona State, to enrich all students generally and individually. A constantly growing program of activities and events is supervised and administered by the Union director, working with the Cultural Affairs Committee, the Social Committee, and the Committee on Traditions. The Memorial Union Program is alert to the needs of students and is receptive to requests and suggestions. The Memorial Union is a living tribute expressed in its dedication: "To Students, Faculty, and Alumni who served in defense of our country."

Student Health Center (1954). An expanded and reconstructed University Health center, located in a quiet section on the east side of the campus, provides excellent facilities to care for the health needs of University students.

Danforth Meditation Chapel (1948). This chapel for devotions by individuals and small groups was made possible by a gift of \$5,000 by William Danforth, supplemented by gifts from numerous students, faculty, and friends of the University.

Educational Resources and Services

The Arizona State University Collection of American Art. The Collection of American Art is on permanent display in Matthews Library. It includes more than one hundred original paintings in oil, water color, and tempera, numerous works of sculpture, a division of ceramics, and an extensive print collection. The collection is constantly being increased. It now lists 225 catalogued works valued at approximately a half million dollars.

Oliver B. James (1896-1955), distinguished citizen in service to his country and to the State of Arizona, was the original donor and founder of the Arizona State University Collection of American Art. The worth of his generous gift has since attracted many contributions and valuable acquisitions. The Collection now has superb works by Gilbert Stuart, Sully, West, Audubon, Morse, Eakins, Ryder, Homer, and other American masters of the 18th and 19th centuries. Representative works by modern artists such as O'Keefe, Hartley, Marin, Speicher, Rattner, Shahn, Tamayo, Tanguy, Roszak, Lipchitz, Calder, Rebay, Gertrud and Otto Natzler, and others are also displayed.

The Lewis and Lenore Ruskin Collection. In 1958 the nucleus of a collection of Renaissance and 17th century painting valued at a quarter million dollars was presented to Arizona State University by Lewis and Lenore Ruskin of Scottsdale, Arizona. Three Flemish, two Dutch, and two Italian masterpieces are included. Hanging temporarily in the Regents Room in the Administration Building, these paintings are already becoming a shrine for students, artists, and tourists. Most famous of the group is a Nativity by Ambrosius Benson, the Flemish artist of whose work only 11 other examples exist.

Audio-Visual Center. The Audio-Visual center provides a resource pool of audio-visual equipment, materials, and professional consultants for strengthening the teaching and learning process; supporting special education, training and research functions; assisting and interpreting the purposes, programs and accomplishments of the University to the public; and providing professional leaders within the service area of the University.

The Center is housed in Matthews Hall. The Audio-Visual Library, valued at more than \$250,000, is the largest library of films in the state of Arizona. The 3700 films are cooperatively owned by the 77 member schools, by Arizona State University, and by a number of government agencies and industries which deposit films in the Audio-Visual Library. These films are available on a rental or free-loan basis to any responsible organization or school in Arizona.

A Graphic Arts Section produces charts and graphs for instructional purposes.

The Audio-Visual Center maintains all projection and sound equipment on campus. The Center provides equipment operation instruction for faculty and students, and provides projection service for special events and large group meetings.

Modern electronic film inspection equipment is used for film maintenance.

The Photographic Service produces photographic instructional materials for faculty and students. These include slides, filmstrips, sound or silent motion pictures, multilith negatives, Polaroid slides and photocopies, as well as news and activity pictures for the Sahuaro, State Press, and University service bureaus.

A Portrait Studio is available for exclusive service to students and faculty.

Bureau of Broadcasting. The Bureau of Broadcasting is charged with responsibility for educational broadcasting and dissemination, through the broadcast media, of information concerning the University.

Radio Facilities: The Bureau operates a professionally equipped broadcasting unit located in the Engineering Center. Three studios, master control room, and sub-control room are used for recording and direct program originations. A portion of the facilities are used by KASN, the campus carrier current radio station for teaching radio skills. More than 100 program units per week originate on tape from these studios for broadcast over commercial stations by the Arizona State Radio Network. In addition, the facilities are used in the preparation of recordings for individuals and organizations connected with the University.

Television Facilities: Arizona State University operates KAET, a non-commercial, educational television station on Channel 8. This station covers Maricopa County and beyond with regular programs of educational interest to children, young people, and adults. KAET is operated from a completely equipped television studio, control room, film room, and video taping center. These facilities are also used by the Bureau for the training of students in the television skills.

Both the radio and television facilities are used to extend the University resources to the people of the State.

Alumni House (1907). The former President's home, a two-story residence adjoining Old Main on the east, has been remodeled for use as a center for Alumni Association activity on the campus. The first floor is used for alumni group meetings and social events, and the upper floor houses Alumni Association offices.

News Bureau. A service agency for the dissemination of information about the University to state and national news media is located on the second floor of the Administration Building.

Bureau of Publications. The University's academic publications are edited and prepared for dissemination in this service bureau, located in Annex VIII in the north portion of the campus on College Avenue.

Maintenance

Maintenance Building (1951). Located north of the Men's Physical Education Building is the center for the receiving, storage, and disbursement of all supplies and equipment. The switchboard and the mimeograph office are also located here.

Central Plant (1960). This facility, located east of East Hall, provides a central source of heating, refrigerated cooling, and other services for the campus.

Entrance Information

Admission

General Requirements

Age. All applicants for admission to Arizona State University must be at least 16 years of age.

Character. All new students are required to furnish satisfactory evidence of good character as evidenced by a certificate of graduation or of honorable dismissal from the school last attended.

Health. Prior to registration, every new student or former student who has not been in attendance at Arizona State University for a year or more must furnish the Student Health Service with a record of physical examination. For details, see page 89 under heading "Health Service."

Aptitude Test. All entering lower-division students are required to take the aptitude tests given each fall during Freshman Week and at other specified times, and all entering students are required to take such other tests as may be recommended by the appropriate dean or required by the testing service of Arizona State University.

Arizona State University reserves the right to deny admission or cancel registration of an individual whose attendance at Arizona State University, in the opinion of the appropriate administrative officer and the President, would not be mutually beneficial to himself and to the institution.

Admission to Arizona State University

The first phase of admission is admission to the institution. The second phase is admission to freshman standing in a curriculum of a particular college, school, division, or department within the institution.

Application For Admission. Inquiry regarding application for admission should be directed to the Registrar and Director of Admissions. To make formal application for admission, a student should submit a completed application blank to the Admissions Office, and should have his high school registrar or principal forward to the Admissions Office a transcript of his high school record. Out-of-state applicants may file a preliminary report any time during the second semester of their senior year, with provision to file a supplementary report following graduation.

Graduates from an Approved Secondary School

All applicants for admission to the institution must have graduated with satisfactory scholarship from an accredited secondary school and must have completed a 4-year secondary-school

course or the equivalent with a minimum of sixteen units in acceptable subjects. The definition of a unit is that used by the North Central Association of Colleges and Universities.

Scholarship Requirements

Regular Admission. Students must offer an acceptable program of secondary school subjects and must have ranked in the upper three-quarters of their graduating class.

Provisional Admission. Students offering an acceptable program of subjects but ranking in the lower one-fourth of their high school graduating class may apply for provisional admission. Such applicants will be granted provisional admission at the discretion of the institution to which they apply only after pre-admission counseling and testing in which they give evidence of ability to carry college work successfully.

Non-resident Admission. Applicants for admission from accredited secondary schools will be considered for admission if the transcript shows that the applicant has been graduated and has completed an acceptable program of secondary school subjects (as recommended below) and has ranked at least in the upper two-thirds, preferably the upper one-half, of his graduating class. Satisfactory College Entrance Examination Board scores (Scholastic Aptitude Test) are an acceptable substitute for rank in the graduating class.

Advanced Placement. Students who have taken college level courses in secondary schools and have taken the Advanced Placement Examination will be considered for advanced placement and for the granting of college credit to count towards degree requirements.

Recommended Secondary School Subject Units

English	4	(from Group I)
or English 3 and one foreign lang- uage	2	5 (from Groups I and II)
Mathematics	2	(from Group III)
American History & Social Studies	2	(from Group IV)
Laboratory Science ..	2	(from Group V)
Electives or	6	(from Groups I through VI)
depending upon English option		5
	16	16

Additional Subject Units Recommended

The recommended pattern of subjects is that which on the basis of experience can reasonably be expected to provide satisfactory preparation for college when these subjects have been

completed with better than average grades. *Academically talented students are strongly urged to take additional courses from Groups I through V beyond those recommended above.*

Classification of Acceptable Secondary School Subjects

- Group I. English: only courses with major emphasis upon grammar, composition and literary analysis.
- Group II. Foreign Language: a classical or modern foreign language. Less than one unit is not accepted. Two units or more are strongly recommended.
- Group III. Mathematics: one unit of algebra and one unit of mathematics other than arithmetic, business mathematics or general mathematics.
- Group IV. Social Studies: history, civics, economics, sociology, geography, and government (including United States and Arizona constitution).
- Group V. Laboratory Science: only courses in biology, chemistry, and physics, in which at least one regular laboratory period is scheduled each week.
- Group VI. Art, agriculture, bookkeeping, general science, home economics, arithmetic, business arithmetic, general mathematics, journalism, industrial arts, music, drama and speech, secretarial training, and other subjects commonly offered for credit by secondary schools, except physical education and military science.

Admission to Freshman Standing

The recommended program of secondary school subject units meets the requirements for admission to freshman standing in the Colleges of Liberal Arts, Education, Business Administration, and Applied Arts and Sciences except in the Schools of Engineering and Architecture.

In the School of Engineering $3\frac{1}{2}$ units are required in mathematics. Included must be: advanced algebra, geometry, and trigonometry. Calculus is recommended. The two units of required laboratory science are one in chemistry and one in physics.

In the School of Architecture, mathematics must include algebra, advanced algebra and geometry for a total of $2\frac{1}{2}$ units; laboratory sciences must include one unit of physics and one unit of chemistry; additional units recommended include geometry, trigonometry, art and drawing.

Provisions for Admission of Secondary School Graduates Who Have Not Completed the Recommended Subject Units

Applicants who lack no more than two units of the recommended program may be admitted with deficiencies. Credit for college courses applied to deficiencies is not applicable to degree requirements.

Approved Arizona High Schools

The high schools of the state are classified in four divisions—North Central Association high schools, Class A high schools, Class B high schools, and private schools acceptable to the University of Arizona and Arizona State University. Graduates of these schools are accepted without examination under the foregoing provisions governing admission.

Admission with Advanced Standing

Application for Admission. Inquiry regarding application for admission must be directed to the Registrar and Director of Admissions. To make formal application for admission, a student should submit a completed application blank to the Admissions office.

Transcripts. Before any student may register for work in the regular sessions of Arizona State University, and be admitted to advanced standing and classification, his transcripts of high school and previous college work must be on file in the Office of the Registrar and Director of Admissions. Students should request the high school principal and each college registrar to mail their transcripts directly to the Registrar and Director of Admissions. Transcripts should be in the hands of the Registrar and Director of Admissions at least thirty days in advance of the registration date. Transfer students whose transcripts are not received by this date may experience difficulty in planning course programs with curriculum advisers. Transcripts are not required at the time of registration of those taking work in the summer session, in extension, or by correspondence.

All transcripts or credentials submitted from other institutions become the property of Arizona State University. Neither the originals nor copies will be released from the files. When duplicates are required students should obtain new transcripts from the issuing institution. At the discretion of the administration of Arizona State University admissions credentials and transcripts will be destroyed.

Transfer of Credit. Credentials presented for admission may be rejected in whole or in part and examinations required in any or all of the subjects offered. Applicants who have failed to maintain a satisfactory scholarship record acceptable to the University will not be admitted. However, students who have been disqualified in another college because of scholarship, conduct, or other reasons, where there may have been extenuating circumstances or where there has been a time lapse of a year since previous college or university attendance, may be admitted after review and approval by the University Admissions and Standards Committee.

Students from approved institutions of higher education ordinarily will be given credit, hour for hour, for work done in these institutions insofar as it applies to the requirements of the curriculum pursued at Arizona State University. Arizona State

University does not accept credit on transfer for courses in which lowest passing grades (D) were received. Grades and scholastic honor points earned at other colleges and universities are not recorded on the student's permanent record.

Students who have registered in other colleges and universities may not disregard their records in such institutions in order to make application for admission solely on the basis of their high school records.

Failure to report previous college attendance at the time of registration is sufficient cause for cancellation of the student's enrollment, of any credits earned, or both.

Credits from Junior Colleges. Credits transferred from an accredited junior college will be accepted up to a maximum of 63 semester hours. Additional credit may be accepted only upon authorization of the standards committee of the college in which the student is enrolled at Arizona State University.

Junior college students planning to transfer to Arizona State University at the end of their first or second year should plan their junior college courses to meet the requirements of the curriculum selected. Loss of time often results from failure to do this. Junior college transfer students will be permitted to follow the degree requirements specified in the Arizona State University catalog in effect at the time they began their junior college work providing their college attendance has been continuous and normal progress has been made. Ordinarily, courses transferred from junior colleges will not be accepted as upper division credit at Arizona State University.

Credits from Tempe Religious Conference. Courses offered by the Tempe Religious Conference, Tempe, and approved for transfer are accepted for general elective credits by Arizona State University.

Credit for Military Service. For active service terminated under honorable conditions in the Army, Navy, Marine Corps, Air Force, or Coast Guard for a period of at least six months and less than a year, the University allows two units of military science; for one year or more of active service, four units of military science, and for a commission earned in the service, twelve upper-division units of military science.

Veterans must submit their records of service in the Armed Forces (photostatic copy of discharge and/or separation notice) to the Admissions Office as a part of their admissions credentials. Advanced standing credit will be granted on the basis of these records only if application is made at the time of admission to Arizona State University.

Special Information for Veterans

Arizona State University is fully accredited by the Veterans Administration. Veterans will follow the procedures outlined above under the heading, "Admission to College." In addition, veterans will observe the following special procedures:

1. Veterans not previously in training under the G.I. Bill will obtain from the Veterans' Administration, Regional Office, Phoenix, Arizona, a Certificate of Eligibility and Entitlement to attend Arizona State University.

2. Veterans previously in training under the G.I. Bill will obtain from the Regional Office nearest the institution which he last attended a supplemental Certificate of Eligibility and Entitlement.

3. Korean Veterans must enroll within three years after being discharged from active service. Enrollment during the third year period sets up a new period of one year. Veterans must be enrolled when the end of the twelfth month occurs to keep their eligibility. By using entitlement in this manner, veterans could be qualified for a period of eight years from the date of discharge or 1965, whichever comes first. Korean Veterans and veterans' children will enter the same registration line. This is a special line where all who get veterans' benefits must register if they are using the G.I. Bill. All new veterans must turn in their certificates of eligibility when they register or to Veterans Accounts as soon as possible after registration, as this form is required before the University can clear them with the Veterans Administration for any benefits. Veterans must visit Veterans Accounts for instructions regarding applying for veterans' benefits, signing the payroll, and other important information regarding starting a program or changing it.

4. Veterans desiring to obtain commissions through the ROTC programs of this institution should contact the Professor of Military Science or the Professor of Air Science prior to registration regarding program requirements and service commitments after graduation.

Admission of Special Students—Unclassified

Persons 21 years of age or over who wish to enroll for six semester hours or less per semester of undergraduate course work may register as special students unclassified. Such special students are not required to file transcripts or a residence classification form. These students must however file a special student admission application form. Persons registering under the special provisions are not candidates for any degree but may elect to take such courses as they are prepared to take with profit. Students disqualified or otherwise not eligible for regular admission may not attend as Special Students.

Admission of Foreign Students

Foreign students seeking admission to Arizona State University in addition to meeting the requirements for regular admission either as a freshman or as a transfer with advanced standing credit must have the American Consul office in the vicinity in their home country forward to the Admissions Office at Arizona State University a certified statement that the student's English reading, speaking, and comprehension ability is

such that the student can reasonably be expected to succeed in a university program here. Foreign students must also provide a personal data sheet in duplicate in addition to the application for admission. Foreign students are urged to be certain that their passport and visas are in order before coming to the United States.

Arizona State University has very limited scholarship resources for foreign students. In most instances, financial assistance will not be available. Before a foreign student leaves his home country he should have a certificate of admission from Arizona State University and a United States Department of Justice Immigration and Naturalization Service Form I-20 from Arizona State University. Arizona State University cannot provide on-campus employment to aliens because a state law provides that non-citizens cannot be on the Arizona State payroll.

All foreign students are required by Arizona State University to have insurance coverage against illness and accident before being permitted to register. The insurance must be maintained throughout the student's enrollment in the University. The cost of this insurance must be provided by the student. Group insurance with a recognized American insurance company is available through the Registrar's Office. Information and application forms are supplied with admission material. Comparable insurance with a reputable American insurance company is acceptable. Canadian students may be insured by recognized Canadian insurance agents.

Re-Admission to the University

Any former student, graduate or undergraduate, who has not been in attendance at Arizona State University for one or more regular semesters must obtain an application for re-admission from the records section of the Office of Registrar and Director of Admissions. This application should be submitted at least one month prior to the beginning of the semester the student plans to re-enter. Official transcripts of any additional work taken elsewhere must be sent from the Office of the Registrar at the institution where such credit was earned direct to the Office of the Registrar and Director of Admissions at Arizona State University.

Admission to Summer Session

Excepting those who plan to complete the degree requirements in summer sessions only, students will be admitted to the summer session without presentation of transcripts.

Registration

Registration Dates. Students should register on the registration dates announced in the University calendar. New students cannot complete the required aptitude and health examinations and

finish registration in one day. Students registering late will be charged a late registration fee. Residence halls will be open to students on the dates scheduled in the University calendar.

Prerequisites to Registration. Before registering in the regular sessions, all students seeking admission must file transcripts of high school or college work, or both, and take the aptitude and health examinations required under the heading, "Admission to Arizona State University." In addition, students must meet special requirements given hereafter. Undergraduate students file applications for admission and transcripts in the Office of the Registrar and Director of Admissions. Graduate students file theirs in the office of the Director of Graduate Study.

Classification of Students. Freshmen are those students who at the beginning of the academic year have less than 30 semester hours of credit; sophomores, those with 30 or more semester hours, but less than 60; juniors, those with 60 or more, but less than 90; seniors, those with 90 or more; graduate students, those holding a bachelor's degree from Arizona State University, or any other recognized institution. Students retain their class designation during the academic year. No changes in classification are made between the semesters of the academic year.

Curriculum Advisers. Before entering the University, a student should study the curriculums outlined in order to determine the curriculum best suited to his interests and needs. Before registering, each student must select, tentatively at least, a curriculum. The designated curriculum adviser will counsel with the student regarding his proposed curriculum, his choice of courses, and approve both. He advises him as needed throughout his stay in the University.

Course Loads. Students carrying twelve or more semester hours of work are classified as full-time students for University classification purposes. *Students attending the University under the benefits of Public Laws 346 or 16 must be registered for a minimum of 12 semester hours for G.I. benefit and subsistence purposes. Students attending under the Korean G.I. Bill of Rights must be registered for a minimum of 14 semester hours to be classified as a full-time student for G.I. benefit and subsistence purposes. Male students to qualify as full time college students for Selective Service classification purposes must be registered for and complete, each semester, one-eighth of the number of semester hours required for a degree. Thus, male students subject to the draft must be registered for and complete sixteen semester hours each semester.* Students may not be registered at any other college or university or in a Residence Center when in regular attendance here unless approval has been granted by the University Admissions and Standards Committee.

The maximum load for which a student may register is 18 semester hours, except for students enrolled in engineering programs. The maximum load for engineering students is 19 semester

hours. Students who wish to register for more than these maximums must petition the standards committee of the college in which they are registered. Freshmen and lower division transfer students attending Arizona State University for the first time will not be permitted to carry an overload. Students having a low scholarship record may be required to carry a light load. Students carrying a full-time school job will be asked to carry a light load unless their previous records in scholarship and on aptitude tests are high. During the semester in which a student is registered for student teaching, the load should not exceed 16 semester hours.

Planning the Schedule. The schedule of classes covers both morning and afternoon hours, Monday, Tuesday, Wednesday, Thursday, and Friday, and morning hours only on Saturday. Full-time students are expected to devote both mornings and afternoons to their program of studies. They should not plan to take classes mornings only, or afternoons only, or less than five days per week.

Course Restrictions. Freshmen may not register for courses numbered "200" and above unless they have met the designated prerequisites. Honors freshmen may register for "200" courses on approval of the instructor.

Auditors. Persons wishing to audit courses will register in the regular manner and pay the regular fees. Audited courses carry no credit. Courses audited count toward the student's load. Students once registered for "audit" are not permitted to change to "credit" (and vice versa) after the close of the drop-add period.

Comprehensive Examinations. The purpose of the Comprehensive Examination is to permit the student an opportunity to establish credit in a course in which he has had adequate preparation or experience, but in which he has not received academic credit.

Policies and regulations governing the establishment of college credit by means of a Comprehensive Examination may be obtained from the office of the dean of the college in which the student is registered. Exceptions to these policies and regulations may be made only upon written recommendation of the student's adviser and approval of petition by the student to the standards committee of the college in which the course is offered.

The student who wishes information regarding policies and procedures should consult his adviser and make application through the office of the dean of the college in which he is registered.

Proficiency Examinations. A Proficiency Examination may be required for the waiver of a course requirement or for the validation of transfer credits in professional programs.

Information regarding policies and regulations governing the waiver of course requirements, or validation of transfer of credits in professional programs may be obtained from the office of the dean of the college in which the student is registered.

Late Registration. Late registration fees are charged beginning the day class instruction begins. Registration for the first semester is closed Monday of the second week of classes. Registration for the second semester is closed Thursday of the second week of classes.

Incomplete Registration. Registration is not complete until all fees have been paid and all required examinations have been taken. Failure to satisfy any of the admission or registration requirements is sufficient cause for dropping a student from all classes.

Changes in Registration. Programs should be carefully planned under the guidance of the curriculum adviser so that changes in registration will not be necessary. After a student has completed his registration, changes may be made only through the Registrar's Office by means of a Drop-Add card. Changes may be made as late as Monday of the second week of the first semester. Changes may be made as late as Monday of the second week of the second semester.

Dropping Courses After the Close of Registration. The courses for which a student is registered at the close of the late registration period constitutes his official registration and semester load. A student who officially withdraws from a course during the first six weeks of a semester receives the mark of W. After the first six weeks a student may not drop courses from his official semester load. To drop a course during the first six weeks of the semester the student will obtain from the Office of the Registrar and Director of Admissions an Authorization for Dropping Course Form and complete it.

Withdrawal from the University. Students who find it necessary to withdraw from the University should withdraw officially by obtaining and completing an official withdrawal card from the Office of the Registrar and Director of Admissions.

Until a student withdraws officially, he is registered in all courses and he will receive E grades in all subjects at the end of the semester unless he withdraws officially from the University. A student who officially withdraws from the University during the first six weeks of a semester receives the mark of W in all courses for which he is registered. Students who officially withdraw from the University later than the sixth week will receive a mark of W or E, depending upon the quality of the work at the time of the official withdrawal. No student will be permitted to withdraw during the week in which final exams begin. If a student is unable personally to withdraw officially as prescribed above because of illness or other reasons, he should notify the Registrar and Director of Admissions in writing without delay and request that he be officially withdrawn from the University.

Retention

Dropping Course at Instructor's Request. A faculty member will drop a student from his class with a mark of W or grade of E whenever, because of absence or other reason, he thinks the work of the student is such as to justify it. (See Attendance, page 67).

Disqualification. All students classified as *freshmen* who have a cumulative grade point index of less than 1.25 at the end of the academic year are disqualified. All students classified as *sophomores* who have a cumulative grade point index of less than 1.50 at the end of the academic year are disqualified. All students classified as *juniors* who have a cumulative grade point index of less than 1.75 at the end of the academic year are disqualified. Any student who fails to meet the cumulative scholarship index required for graduation and who after completing 15 additional semester hours has not met this requirement is disqualified. Students who are disqualified are not eligible to attend summer sessions. This regulation is effective for all freshman students enrolled first semester 1959-60 and thereafter; for all freshman and sophomore students enrolled first semester 1960-61 and thereafter; for freshman, sophomore, and junior students enrolled first semester 1961-62 and thereafter, and for all undergraduate students enrolled first semester 1962-63 and thereafter. Students enrolled prior to the dates covered above are subject to the disqualification regulations in effect in the catalog under which they entered. Students below the index requirement for good standing will be disqualified at the end of the second semester. There is no disqualification at the end of the first semester.

Reinstatement. A student who has been disqualified may file an application for reinstatement with the Dean of the College in which he was registered. A student who is disqualified is not permitted to file an application for reinstatement for either of the succeeding summer terms. After a review of his case by the Dean of the College and upon recommendation by the standards committee of the college in which the student was registered, he may be reinstated on probation. A disqualified student has the right to be heard by the respective standards committee.

Scholarship Probation. Students who have been reinstated by action of the Admission and Standards Committee are on scholarship probation during the semester following reinstatement.

University Regulations

Conduct of Students

Standards. It is the policy of the University to give students the largest degree of liberty consistent with good work and orderly conduct. Students of a state supported University have an important responsibility to the citizens who help pay for their education, and to each other; and their conduct, both on and off the campus, should reflect this responsibility.

Specifically, each student is expected to conduct himself in such a manner as to uphold, not detract from, the good name of the University and fellow students by conforming to the law and accepting the moral and social practices of the community, state, and nation.

These standards apply to all students as long as they are enrolled in the University, both on and off the campus, and the University assumes that the act of registering as a student implies full acceptance of these standards of conduct. Failure to conform to these standards may be considered sufficient cause for dismissal from the University. The authority of the University is exercised over all students individually and over all student groups or organizations bearing the name of the University, or representing or purporting to represent the University, in any student enterprises to the extent necessary to safeguard the good name and well-being of the University.

Among the circumstances which indicate possible dismissal from the University, if the student is found guilty, are whenever a student:

1. Endangers or seriously threatens the life or physical safety of others or self.
2. Leads or participates actively in destructive group action.
3. Has serious or repeated difficulties with law enforcement authorities.
4. Commits sexual immorality.
5. Does not respect public and private property.
6. Does not meet his just financial obligations in relations with others and the University.
7. Refuses to cooperate with efforts made to help him adjust to University responsibilities.
8. Persists in conduct which, though perhaps less serious than violations listed above, eventually would serve to discredit the University and/or its students.

Any proposed enterprises by students or organizations bearing the name of the University, or representing or purporting to represent the University, must receive the official sanction of the University before announcements are made of such enterprises.

The possession, serving or use of intoxicants of any kind whatsoever is prohibited on the campus, at all social functions held under the auspices of University-sponsored organizations or groups, wherever held, or at any other event in which University students participate where such possession, serving or use may reflect on the good name and reputation of the University.

Appropriate dress is expected of students on the campus and in all campus buildings. In accordance with Associated Women Students' regulations, women students are expected to wear street clothes such as sweaters and skirts, dresses, or suits, unless they are going to or from a sports activity. For further details on dress in the Memorial Union and women's residence halls see "Co-ed Cues."

Attendance

The University has no uniform system of cuts. The loss incurred by a student for absences depends upon the nature and the amount of work missed, of which the instructor is the sole judge. The instructor will recommend that a student be dropped from class whenever, in his opinion, the student's continuation in the course seems unprofitable to the student or detrimental to the class, and will send a memorandum to the Registrar and Director of Admissions who will initiate the "Authorization for Dropping Course" form. All *veteran students* are to be reported to the Office of the Registrar and Director of Admissions when absent for three or more consecutive class periods or when the instructor considers the total number of absences excessive, whether consecutive or not.

No excuses for absence from class are granted either by the administration or by instructors. This applies to any absence occasioned by a student leaving early for, or returning late from, a scheduled vacation period as announced in the University calendar. The student alone assumes full responsibility for all absences. Instructors will permit students to make up tests and other work missed when the absence was due to causes beyond the control of the student or on account of activities assigned by the University. The instructor is the judge of the validity of reasons given by the students for absence. Students absent from classes because of a confining illness in the infirmary, may request a statement from the Director of the Student Health Service which will give the dates the student was confined as a patient. Students absent from classes because of a confining illness at home, may request a similar statement from the Dean of Students or Associate Dean of Students.

Fees, Deposits, and Expenses

Changes in Fees. The Board of Regents reserves the right to change fees and charges from time to time without notice when necessary.

Extending Credit. The University cannot extend credit, therefore, students must have on hand when registering sufficient funds to pay for non-resident tuition, registration, incidental fees, books, and board and room for one month.

Definitions. *Regular fees* are those paid by all students. *Special fees* are those paid by certain students only, and under the conditions indicated. *Deposits* are made to cover certain contingencies. All or part of the deposit may be returned depending upon the charges incurred by the student.

General Summary

Summary of minimum annual expenses:

General University fees	\$ 207.00
Laboratory and incidental fees	20.00 (approx.)
Books and supplies	80.00 (approx.)
Total minimum cost to Arizona resident residing off campus	\$ 307.00
Room and Board	600.00 ¹ (approx.)
Total minimum costs to Arizona resident residing on campus	\$ 907.00
Non-resident tuition	600.00
Total minimum cost to out-of-state resident residing on campus	\$1,507.00

All students should add to this list incidental personal expenses as needed plus special fees and deposits.

¹Rates vary depending on the dormitory in which a student resides and on the basis elected for meals in the University cafeteria. Above figures based on a five day meal ticket.

Regular Fees

These fees are paid each semester by all students with the exception of those registering for Extension and Correspondence courses.

General University Fee.....\$103.50
(Covers registration for more than six (6) semester hours)

This includes fees covering registration, student activities, student union, recreation, library, college series, stadium, alumni association and health service. (Please note Special Fees and Deposits are in addition to these fees.)

Registration Fee.....\$11.50 per semester hour
(Registration for six (6) semester hours or less)

Special Fees

Special fees are paid by certain students under the conditions given below:

Non-resident Tuition Fee (per semester).....\$300.00

All students classified as non-residents, who register for twelve (12) or more semester hours, pay the full non-resident tuition fee, except graduate students who have been awarded graduate fellowships or teaching assistantships.

Students classified as non-residents who register for less than twelve (12) semester hours, but more than six (6) semester hours, are required to pay a non-resident tuition fee of \$20.83 per semester hour. Those students registering for six (6) or less semester hours pay no tuition.

A student to be considered a legal resident of Arizona for the purpose of registering at the Arizona State University must present evidence as follows:

(1) **If under 21 years of age**—that the supporting parent (or guardian having legal custody) has been a legal resident of the State of Arizona for at least 1 year next preceding registration.

In the event that a legal resident of Arizona is appointed as the guardian of a non-resident minor, such minor does not become a resident until the expiration of 1 year from the time of appointment and then only upon a proper showing that such appointment was not made to avoid the non-resident fee.

(2) **If over 21 years of age**—that legal (*) residence in the state has been established for at least 1 year next preceding registration, and that he is eligible to become a registered voter. (Sec. 3 of Art. 7, Constitution of Arizona, provides, "For the purpose of voting, no person shall be deemed to have gained or lost a residence . . . while a student at any institution of learning . . ." Sec. 6, Art. 7 provides, "No soldier, sailor or marine . . . shall be deemed a resident of this State in consequence of his being stationed at any military or naval place within this state.")

(3) **If an alien who has taken out first naturalization papers**—that residence has been maintained in the state for at least 1 year previous to registration, and that he has filed with the United States Immigration and Naturalization Service an application for such citizenship or a declaration of intention to make such application when eligible.

The student must have the question of his legal residence passed upon previous to registration and payment of fees. The responsibility of registration under proper residence is placed upon the student. If there is any possible question as to the legal residence, the student is responsible for obtaining a blank from the Registrar's Office; filling it out completely; taking it to a notary public in the Business Office, and making a sworn statement concerning the facts given, and returning the blank to the Registrar's Office. Any student found to have made a false or misleading statement as to his residence shall be subject to dismissal from the University.

In all cases where the records indicate that the student's home is outside of Arizona, the non-resident fee shall be assessed. Claims for refund may, however, be filed at any time within 30 days.

Non-resident graduate students also pay the tuition fee.

Private Music Instruction

In addition to the usual University Registration Fees, the following fees are charged for Private Music Instruction:

- 1 hour credit—\$27.00
- 2 hours credit— 40.00
- 4 hours credit— 75.00

Music majors registered for not more than 2 hours credit in any one applied music field will pay a flat fee of \$40.00 per semester for all private instruction; those enrolled for 4 hours credit in any one applied music field will pay a flat fee of \$75.00 per semester for all private instruction.

Class Lessons—Music.....\$9.00 or \$12.50

The fee for two (2) one-hour piano lessons a week is \$12.50 per semester. For two (2) class lessons of one (1) hour each in all other music classes, the fee is \$9.00 per semester.

(*) The attention of students who have not attained the age of 22 years and whose parents do not live in the state of Arizona is directed to the fact that presence in the state of Arizona for a period of more than 1 year immediately preceding the opening day of the semester during which it is proposed to attend the Arizona State University does not, of itself, entitle the student to classification as a resident.

Rentals—Musical Instruments

The rental for school-owned solo instruments is \$2.50 a semester. Students using University-owned instruments are held financially responsible for damage done them from the time received until returned and inspected at the close of the semester.

Rental on the Hammond organ is \$5.00 per semester, for one hour daily practice. Rental on practice pianos is \$5.00 per semester, for one hour daily practice; \$7.50 per semester, for two hours daily practice.

School of Nursing Examination Fee.....\$8.00

To cover cost of National Qualifying Examination in Nursing.

School of Nursing Laboratory Fee (per semester)

(NU 211-12, 302-03, 307-08 excepted)

Six semester hours or less.....\$10.00

Seven semester hours or more..... 15.00

To provide special equipment, manuals, additional tests and transportation to hospitals and health agencies for observation and clinical practice. Paid by all students registered in clinical nursing courses.

Transcript Fee

There is no charge for the first transcript. For each additional transcript there is a fee of \$1.00. Requests for transcripts should be in the hands of the Registrar and Director of Admissions one week in advance of the time needed.

Senior Check-Out

Each senior is entitled to one official check-out, at the time application for graduation is filed, without charge, under the curriculum designated in his application for graduation. A fee of \$1.00 will be charged for any additional check-outs.

Absentia Fee\$7.50

Students who are granted permission to receive their degree in absentia pay this fee.

Auditor's Fees

Those taking courses for record purposes register and pay the regular fees.

Laboratory Fees.....See course descriptions

With few exceptions such fees are not returnable.

Graduate Entrance Examination Fees\$3.50 to \$10.00

Not required of all applicants. When applicable the prospective student will be notified by the office of the Dean of the Graduate College.

Master's Thesis Binding Fee.....\$5.00

Education Specialist Report Binding Fee.....\$10.00

Doctoral Dissertation Binding Fee.....\$10.00

Doctoral Dissertation Registration Fee\$20.00

Upon completion of all course work, and while pursuing work on a dissertation, the student is required to pay each semester a minimum registration fee of \$20.00. Students are also required to be registered for dissertation the semester in which the degree is conferred.

This fee extends to the registered student full library privileges and access to the student's advisory committee. This fee is not required in any semester in which the student is enrolled for any course work and pays an on-campus registration or full University fee. In order to secure full student privileges, the student must pay the full University fee.

Doctoral Dissertation Micro-Film Fee.....\$30.00

Special Examination Fee.....\$1.00

When, because of absence, or for any reason, it becomes necessary for a student to request a special examination in any course, a fee of \$1.00 may be required for this special privilege.

Comprehensive Examination Fee.....\$7.50 per semester hour

Paid by all students seeking to establish credit by examination.

Test Fees—Vocational.....\$0.50

A nominal fee is charged to pay the cost of test materials only.

Graduation Fees\$5.00

A graduation fee in the amount of \$5.00 applies if paid on or before the dates specified in the section of the catalog headed **Graduation Requirements**. After that date, the fee is \$10.00. If a student is granted permission to receive a degree in absentia, he shall pay an additional fee of \$7.50.

Cap and Gown Rental Fee.....\$4.00 to \$9.25

Bachelor's cap and gown for baccalaureate and commencement exercises, \$4.00. Master's cap, gown, and hood, \$8.75. Education Specialist cap, gown, and hood, \$9.25. Doctor's cap, gown, and hood, \$9.25. These are approximate amounts and subject to change.

Fee for Dropping Course.....\$0.50

Charged following last day of registration.

Late Fees

Late Registration\$10.00

All students registering on the date specified for the beginning of classes, or thereafter, pay this fee.

Late Aptitude Tests\$2.00

Paid by students taking the aptitude tests on the date specified for the beginning of classes or thereafter.

Late Physical Examination.....\$1.00 to \$3.00

Charged beginning at noon of the last day scheduled for registration.

Late X-rayActual Cost

Charged all students who fail to take the X-ray on the date specified by the University.

Deposits

Deposits are required of those students wishing certain privileges or services. The deposits are returnable less any charges which may have been incurred during the term of the service being rendered.

Science Breakage Deposits

In the following courses students are required to purchase a \$6.00 or \$8.00 deposit card. When their breakage exceeds this amount, they will be required to purchase additional deposit cards.

CH 101, 102, 111, 113, 114, 115, 121, 225, 231, 300, 327, 331, 332, 341, 421g, 431g, 435g, 443g, 444g, 446g, 448g, 452g, 465g, 466g, 525, 526, 527, 531.

Women's Gymnasium Deposit (per semester).....\$5.00

This deposit will be required of all freshmen women students. This deposit will be refunded if the towels, leotard and lock are returned in good condition.

Military Uniform Deposit (returnable).....\$25.00

Room Reservation Deposit\$10.00

Reservations for rooms are obtained by filing an application and the \$10.00 deposit with the Housing Office. Deposits are refundable upon withdrawal, less any damages or other charges assessed.

General Expenses

Board and Room

The Memorial Union Dining Hall offers meals on a 5-day or 7-day meal ticket basis with as many additional portions as the student desires served at no extra cost. Individual meals are also available on an a la carte basis at regular prices. The meal ticket costs per semester are \$165.00 for 5-day or \$225.00 for 7-day meal tickets. This breaks down to a daily cost of \$2.00 for three meals.

Rooms are available in college residence halls at rates listed below:

Men's Residence Halls	Semester Rate	School Year
East, Haigler, and Irish B Unit	\$115.00	\$230.00
Irish, A & C Units	125.00	250.00
Hayden	140.00	280.00
Best	150.00	300.00
Sahuaro (including 5-day meal ticket)	312.00	624.00

Women's Residence Halls	Semester Rate	School Year
North, South, West, and Gammage	120.00	240.00
McClintock-A	140.00	280.00
Wilson	150.00	300.00
McClintock-B	157.00	314.00
Palo Verde (including 5-day meal ticket)	319.00	638.00

No refund of any part of a current period's rent will be made unless a move is requested by the University.

Payment and Refund of Fees

Payment of Fees

The payment of fees cannot be deferred. By regulations of the Board of Regents based on a ruling of the Attorney General, registration and other university fees are payable on the day of registration.

Method of Payment

Checks, drafts, and post office or express money orders should be made payable to the Arizona State University.

Refunds

Activities and Other Fees Including Laboratory

Students withdrawing from school or dropping classes will receive a refund based on a percentage of the total semester fees paid, in accordance with the following schedule:

1 thru 14 days	80%
15 thru 21 days	60%
22 thru 28 days	40%
29 thru 35 days	20%
After 36th day	None

The days referred to are calendar days, beginning with the first day college classes begin.

Exception: In case an applied music course is dropped, because of actual illness, or other emergency beyond the control of the student, not more than half of the semester fee paid may be refunded.

Forfeiture of Refunds

All refunds and deposits due students for any reason whatsoever will be forfeited unless called for on or before June 30 of the college year in which they are due. Should June 30 fall on Sunday or on a day when the Business Office is closed, the refund will be made on the next business day.

Grading System

Scholarship Grades. Scholarship grades on the student's report card and on his permanent record card are indicated by the letters and explanations given below:

A—Highest.	D—Lowest passing.
B—Above average.	Y—Credit.
C—Average.	E—Failure.

The following marks designate the situations concerning the student's academic program:

W—Withdrew (without penalty).
X—Audit.

I—Incomplete, given and removed as specified below.

The Mark of Incomplete. A mark of I, is given only when a student is unable to complete a course because of illness or other conditions beyond the control of the student. Negligence or in-

difference are never accepted as reasons for giving an I. It is the sole responsibility of each student receiving a mark of incomplete to contact the instructor or Dean of the College in cases where the instructor is no longer available, and complete the course not later than the middle of the following semester. If an I is not removed by the middle of the following semester, the grade of E will be reported and entered on the student's permanent record unless an extension of time is granted by the Dean of the College in which the course was offered. Incompletes received in summer session courses must be removed by December 31 next following unless an extension of time is granted by the Dean of the College in which the course was offered.

Grade of E. Students receiving grades of E must repeat the course in the regular class if they desire credit. Both the E and the new grade remain as a part of the student's permanent record.

Mark of W. The mark of W is given under the following condition: Withdrawal from a course during the first six weeks of the semester. The mark of W may also be given under either of the following conditions: (1) Official withdrawal from the University after the first six weeks of the semester if the quality of work at the time of withdrawal justifies it. (2) When dropped from class at the request of the instructor because of circumstances beyond the control of the student.

Repetition of Course. Students may repeat a course in which a low grade has been received. When a course is repeated, the original grade remains on the student's record and is included in his cumulative scholarship index.

However, upon formal application by the student to the Registrar, a student may request that a grade of E received during his freshman or sophomore year not be included in his cumulative index after he has repeated the course in residence with a passing grade.

Change of Grade. A grade once reported to the Registrar's Office may be changed only upon the authorization of the faculty member issuing the original grade and the approval of the Dean of the College concerned.

A change of grade is made by filing an Authorization of Change of Grade Form with the Registrar's Office. The reason for the change of grade shall be entered on the form and signed by the faculty member and by the Dean of the appropriate college.

Grade Points. For the purpose of computing the scholarship index, grade points are assigned to each of the grades as follows: A, 4 points for each semester hour; B, 3 points; C, 2 points; D, 1 point; and E, 0 points.

Scholarship Index. The scholarship index is obtained by dividing the total number of grade points earned by the number of semester hours in the student's course load. Courses in which marks of

W (withdrew), I (incomplete), Y (credit) and X (audit) are received are not included in determining the number of semester hours in the course load.

Reports to Students. Each student receives a Deficient Scholarship Report at the mid-semester for courses in which his grades are D or E.

Reports to Parents. The grade reports of all unmarried students under twenty-one showing their standing in each class is mailed to the parent at the close of each semester. Report cards of other students are mailed to their home address unless the Office of the Registrar and Director of Admissions is notified prior to final examination week.

Reports to High Schools. A copy of the semester grade report of each student is sent to the high school from which he graduated.

Air Science

General. The Arizona State University offers courses in basic and advanced Air Force military training. The Basic Course is designed to develop an understanding of the Air Force, its organization, problems, and techniques. The purpose of the Advanced Course is to train selected prospective graduates in a balanced course of officer training, both theoretical and practical, which will qualify them to perform the duties of a commissioned officer of the United States Air Force. Students who successfully complete the Advanced Course receive a commission as Second Lieutenant in the Air Force Reserve.

Requirements for Admission. All physically fit male students, who are citizens of the United States, entering the University as freshmen or sophomores and carrying more than 6 semester hours of work, are required to complete two years of basic ROTC training. Students are required to register in basic ROTC each successive semester until this requirement is met. However, a student will not be enrolled initially or be allowed to re-enroll in the AFROTC after a period of nonparticipation in AFROTC training, if his age is such that he will be unable to complete all requirements for appointment as a Reserve of the Air Force prior to reaching his 28th birthday. The two years of basic ROTC training are a prerequisite for graduation unless the student is properly exempt. The Advanced Course is available as an elective to men who have completed the Basic Course. On the basis of previous honorable active service in the Air Force, Army, Navy, Marine Corps, or Coast Guard, a student may request from the chairman of the department a waiver of the Basic Course, or any portion thereof, as a requirement for entrance into the Advanced Course. Veterans entering at freshman or sophomore level who desire a commission through AFROTC will be required to take, in phase with non-veteran contemporaries, the portion of the basic program which remains. The Advanced Course, when elect-

ed by the student, becomes a prerequisite for graduation unless, for good reason, the requirement is waived by competent authority. Students electing the Advanced Course must be physically fit for military duty and within the age limit set forth above.

Exemptions. Exemptions from AFROTC training will be granted to only the following: (a) aliens; (b) those certified as physically unfit by the university physician; (c) those presenting evidence of at least one year of military service; (d) those transferring sufficient credit for military training from an accredited institution; (e) those disqualified by age; (A student will be disqualified if his age is such that he will be unable to complete the Advanced Course and the requirements for a degree prior to reaching his 28th birthday.) (f) those students who transfer with junior or senior standing from institutions not offering or requiring ROTC Training; (g) active members in good standing of a Reserve or National Guard unit; (h) those offering other reasons acceptable to the Admissions and Standards Committee. Students requesting exemption will present the evidence to the Registrar on which they claim exemption at the time of registration.

Attendance and Credits. Basic Course students receive 1.5 semester hours of credit for two hours of class and one hour of drill per week or 0.5 semester hours of credit for one hour of drill per week. Advanced students spend 4 hours in class and one hour in drill each week, and receive 3 semester hours of credit. Regular attendance in class and drill is required. Advanced students are required to attend one summer training unit for approximately 4 weeks, normally at the end of the first year of the Advanced Course. The military training requirement does not excuse students from any of the physical education requirements.

All Air Sciences. A Military Ball is scheduled annually to provide Military Social Training.

Pay and Deferments. Advanced students receive pay for subsistence at the rate of \$.90 per day while attending the two year course. The total pay for subsistence will not exceed 637 days less those days while in attendance at a Summer Training Unit. In addition to the subsistence allowance, the student will receive pay at the rate of \$78.00 per month during attendance at the summer encampment. Travel pay, uniforms, housing and dining facilities are provided at camp without cost to the student. Draft deferments for Freshmen, Sophomores, Juniors and Seniors are available to those qualified students who desire to take or who are taking the Advanced Course.

Deposit. All students registering for Air Force ROTC will make a deposit of \$25.00 at the University Business Office.

Students will present the deposit receipt to the Military Property Custodian as the basis for the issue of the prescribed uniform, text books, other authorized materials, and to cover certain authorized social activities. This deposit less deductions to defray the

above costs or loss or damage of uniforms or text books through personal neglect, may be refunded at the end of each semester by the Business Office upon approval of the Military Property Custodian.

Military Science

General. Arizona State University offers senior division ROTC basic and advanced courses in General Military Science. These courses have the dual purpose of training college students for positions of leadership in the Army and of strengthening their educational foundation for intelligent citizenship. The subjects presented in both the basic and advanced courses are common to all branches of the Army. The successful completion of the two-year advanced course program satisfies military requirements for commissioning as a second lieutenant in any one of the various branches of the United States Army Reserve. Students designated as Distinguished Military Graduates are eligible for appointment in the Regular Army Officer Corps.

Requirements for Admission. All physically fit male students, who are citizens of the United States, are under 23 years of age, and who enter the University as freshmen or sophomores and carry more than 6 semester hours of work, are required to complete successfully the two years of basic ROTC training. Students are required to register in basic ROTC each successive semester until this requirement is met. This requirement is a prerequisite for graduation unless the student is properly exempt. Students without previous active service in the armed forces will not be admitted initially into the Basic Course after reaching their twenty-third birthday. Veterans who have completed one year or more of continuous active service and who desire to take the Basic Course must enroll initially prior to their twenty-fifth birthday.

Students having successfully completed the Army ROTC Basic Course at this or other accredited institutions, and veterans who have completed one year or more of continuous active service in the armed forces may, with the consent of the Professor of Military Science, enroll in the Army ROTC Advanced Course, provided that such training or service was completed within five years of the date of enrollment in the Advanced Course. However, no student will be accepted for initial enrollment in the Advanced Course if he is unable to complete requirements for graduation prior to reaching his twenty-eighth birthday.

Exemptions. Students having successfully completed three years of junior division ROTC training or one year of senior division ROTC at an accredited institution, and armed forces veterans who have completed not less than six months nor more than twelve months of active service may, with the consent of the Professor of Military Science, and provided that such training or service was completed within five years of the date of initial enrollment

at this institution, be exempt from the first year of the Basic Course. Students receiving credit under these provisions will be enrolled in the Military Science II in their first year at this institution.

Students requesting exemptions must present the evidence upon which their requests are based to the Registrar at the time of registration. In addition to the one-year exemption indicated above, full exemption from the ROTC requirement will be granted to the following: (a) aliens; (b) those certified as physically unfit by the University physician; (c) those disqualified by age; (d) those presenting evidence of at least one year of continuous active service in the armed forces; (e) those who have successfully completed senior division ROTC Basic Course training, or its equivalent, at an accredited institution; (f) those entering the University with junior or senior standing; (g) active members in good standing of a Reserve or National Guard unit; (h) those offering other reasons acceptable to the Admissions and Standards Committee.

Attendance and Credits. Basic Course students receive 1.5 semester hours of credit for two hours of class and one hour of drill per week or 0.5 semester hours of credit for one hour of drill per week. Advanced Course students receive three semester hours of credit for four hours of class and one hour of drill attendance per week. In addition, Advanced Course students are required to attend one summer camp for approximately six weeks, normally at the end of the first year of the Advanced Course.

Unexcused absences from Military Science classes and drill may be reflected in semester grades.

Physical education requirements are not satisfied by completion of ROTC courses.

Subsistence Allowances. Advanced Course students receive a subsistence allowance of approximately \$27 per month, except for the six-weeks summer camp training period, during which students are paid at the rate of \$78 per month plus travel pay. Unauthorized absences from Military Science instruction are reflected in pay deductions.

Deferments from Induction. Deferment from induction is granted on a competitive basis to those Basic Course students who apply for and are conditionally selected for Advanced Course training. Regularly enrolled Advanced Course students meeting the criteria of their Local Selective Service Board are granted deferment from induction.

Annual Military Ball. A Military Ball is scheduled annually to provide Military Social Training.

Deposit. All students registering for Army ROTC will make a deposit of \$25 at the University Business Office. Students will present the deposit receipt to the Military Property Custodian as the basis for the issue of the prescribed uniform, text books, other authorized materials, and to cover certain authorized social activi-

ties. This deposit less deduction to defray the above costs or loss or damage of uniforms or text books through personal neglect, may be refunded at the end of each semester by the Business Office upon approval of the Military Property Custodian.

General Education

Requirements. Completion of a pattern of general education courses is required of all students who are candidates for a bachelor's degree in any curriculum. The general program of courses is given below. Since requirements under this program vary somewhat from one curriculum to another, the student should select from indicated courses only after consultation with his adviser. Students from approved institutions of higher education ordinarily will be given credit, hour for hour, for work done in those institutions insofar as it is equivalent in content to courses in this program.

Objectives. The purposes of general education at Arizona State University are expressed in the following objectives, adopted by the faculty in 1954.

1. To develop the individual's awareness of, and esteem for, the privileges and responsibilities of citizenship in a democratic society, and to motivate effective participation in endeavors for the common good.
2. To so improve the individual's ability to think, that he will reach valid conclusions and build a system of critically examined values by which to guide his life.
3. To so improve the individual's ability in the basic arts of communication, that he will express himself effectively, and read and listen with understanding and discernment.
4. To introduce the individual to the major problems of philosophy, and to develop a discriminating appreciation of art, music, and literature, and encourage a satisfying avocational interest in these fields.
5. To develop sufficient understanding of the biological and physical sciences, and of mathematics, so that the individual will comprehend the roles they play in our civilization and appreciate the scientific approach to many problems of human experience.
6. To develop the individual's understanding of human society, and of his cultural heritage, and to motivate application of this understanding to the social issues of the time.
7. To help the individual achieve sufficient understanding of himself, to maintain physical and mental health, and to develop his abilities for his own and the common good.

Program. Courses which are accepted as meeting general education requirements are indicated in the program below. A total of 40 semester hours is required for graduation in any curriculum, with minimums in each field as specified. Juniors and seniors should not take a freshman course in general education except where there is no alternative.

I. Communications.

For all curriculums leading to a bachelor's degree, a minimum of 6 semester hours.

EN 101, 102 First Year English-3, 3 is required of all students; except that students who have had four years of English in high school may be excused from one or both of these courses upon such evidence of exceptional proficiency as the Department of English may require.

The following courses may be used as general education electives: SE 200 Elements of Speech-2, SE 300 Principles and Methods of Discussion-2, EN 211 Advanced Composition-3, ES 400 Technical Communications-3, or one year of a foreign language at the elementary or intermediate level.

II. Humanities.

For all curriculums leading to a bachelor's degree, a minimum of 8 semester hours.

Option I

HU 101, 102 Ideas and Values in the Humanities-4, 4 or HU 201, 202 The Humanities in the Western World-4,4.

Option II

HU 301, 302 The Humanities in Modern America-3,3 and one course from those listed in Option III.

Option III

Eight semester hours from the following courses, with at least three of the subject fields represented. This option is intended for students who wish to distribute humanities through four years.

First year courses: AC 100 Introduction to Architecture-2; AH 102 Introduction to Art-2; EN 103 Introduction to Literature-3; FL 100 Introduction to Foreign Languages-2; MU 105 Music in Living-2, MU 107 Introduction to Music-2; PI 101 Introduction to Philosophy-3.

Second year courses: AH 211 Western Art to the Renaissance-3, AH 212 Renaissance Art-3; EN 201 World Literature—The Classical and Medieval Periods-3, EN 202 World Literature—The Renaissance and Modern Periods-3, EN 204 Literature of Today-3; PE 280 History and Philosophy of Dance-2.

Third and Fourth years: AC 301 American Architecture-3, AC 311 Historical Architecture-3; AH 312 Baroque to Realism-3, AH 313 Contemporary Art-3, AH 321 American Art-3; EN 341, 342 American Literature-3,3, EN 355 History of the Drama-3;

FR 321, 322 Survey of French Literature-3,3; GR 321, 322 Survey of German Literature-3,3; SP 321, 322 Survey of Spanish Literature-3,3; MU 355 Survey of American Music-2, MU 356 Survey of the Musical Theater-2; PI 301 Philosophies of the Western World-3, PI 328 Recent Idealist and Existentialist Philosophies-3.

III. Behavioral and Social Sciences.

For all curriculums leading to a bachelor's degree, a minimum of 8 semester hours, with at least two subject fields represented.

First and second years: AN 111 Elementary Anthropology-3; EC 201, 202 Principles of Economics-3,3; GB 101 Introduction to Business-3; HI 101, 102 Survey of Western Civilization-3,3, HI 103, 104 History of the United States-3,3; PS 101 Modern Politics and Government-3, PS 102 American Government-3; PY 100 Elementary Psychology-3, PY 112 General Psychology-3; SO 101 Sociology-3.

Third and Fourth years: HI 301, 302 Ancient Orient and the Classical World-3,3, HI 305 European Civilization-6, HI 303, 304 American Cultural History-3,3; ES 320 Man and Machine-2; PS 310 Federal Constitution and Government-2, PS 311 Arizona Constitution and Government-1, PS 313 Problems of American National Government-3, PS 331 Western Political Thought-3; AN 331 Prehistory-3; SO 301 Principles of Sociology-3, SO 313 Modern Social Problems-3.

IV. Sciences and Mathematics.

For all curriculums leading to a bachelor's degree, a minimum of 8 semester hours, with at least two groups represented.

Group 1. Physical Sciences.

CH 101, 102 Introduction to Chemistry-4,4, CH 111 College Chemistry-5 or CH 113, 114 General Chemistry-4,4 or CH 115 General Chemistry and Qualitative Analysis-5; GE 111 Elements of Geography-4, GE 112 World Geography-4, GE 411 Principles of Physical Geography-3; GL 111 General Geology-4, GL 113 Physical Geology-4, GL 114 Historical Geology-4; PL 110 Physical Universe-4, PL 360 Science and Man-4, PL 410 History of the Physical Sciences-3; PH 101 Introduction to Physics-4, PH 111, 112 General Physics-4,4, PH 121 Descriptive Astronomy-2, PH 251 Sound and Optics-3, PH 361 Modern Physics-3.

Group 2. Life Sciences.

BI 100 The Living World-4, BI 300 Biogenetics of Man-4; BO 100 General Botany-4; ZO 100 General Zoology-4.

Group 3. Mathematics.

MA 205 Mathematics for General Education-4, MA 116 Intermediate Algebra-3, MA 117 College Algebra-3, MA 118 Trigonometry-3, MA 119 Algebra and Trigonometry-4, MA 120, 121 Analytic Geometry and Calculus-4,4, MA 226 Introduction to Modern Statistics-3.

- V. Physical Education and Health.
PE 101, 102 Freshman Physical Education- $\frac{1}{2}$, $\frac{1}{2}$ is required of all students. The following courses may be used as general education electives: HE 100 Healthful Living-2; PY 114 Mental Hygiene-2; SO 321 Marriage and the Family-3; HE 360 School-Community Health-3; and any physical education activity courses up to two semester hours.
- VI. General Education Electives.
To complete the total requirements of 40 semester hours, the student shall select from the courses listed in any of the areas above, except that the courses selected may not be in his major field or field of specialization. These courses should be chosen with the approval of the adviser, to correct evident inadequacies in the general education background of the student.

Graduation Requirements

The University grants the following degrees: Bachelor of Arts, Bachelor of Science, Bachelor of Architecture, Bachelor of Science in Engineering, Bachelor of Science in Nursing, Bachelor of Arts in Education, Bachelor of Music, Master of Arts, Master of Science, Master of Arts in Education, Master of Science in Engineering, Master of Fine Arts, Master of Public Administration, Master of Natural Sciences, Master of Business Administration, Master of Music, Education Specialist, Doctor of Education, and Doctor of Philosophy. To obtain a second bachelor's degree, the student must do an additional 30 hours of work or more and meet all of the requirements of the particular degree.

Requirements for the Bachelor's Degrees

The Unit of Credit. The semester-hour is the unit of credit. It represents one fifty-minute class exercise per week per semester with two hours of outside preparation or the equivalent in laboratory work.

Credit Requirements. A minimum total of 126 semester hours is required for graduation with a bachelor's degree. Forty per cent of the semester hours required for graduation must be in upper division courses numbered 300 or 400.

Curriculum and Course Requirements. Alternate courses may not be substituted for required generalization courses under a particular curriculum, nor may any such courses be waived without approval of the respective College Standards Committee or for honors students, without the approval of the adviser. Alternate courses may not be substituted for required courses, in the major, minor or field of specialization under a particular curriculum, nor may any such courses be waived without the approval of the curriculum adviser in the department in which such major, minor or field of specialization is offered.

Meeting New Course Requirements. Students who continue their college work without interruption may graduate under the curriculum and course requirements as stated in the catalog for the year the student first registered.

When enrollment is not continuous, the student will be required to meet the curriculum requirements and regulations for graduation as stated in the catalog for the year the student registers for final continuous residence prior to graduation. Any exceptions must be recommended by the student's adviser and approved by the appropriate college Standards Committee.

Military and Air Sciences. All male students entering the University as freshmen or sophomores, unless properly exempt, are required to complete two years of basic military or air science. Male students who elect advanced military or air science, unless properly exempt, shall complete that course as a prerequisite for graduation.

Physical Education. All students who are under 25 years of age at the date of entrance and who are classified as freshmen are required to register for PE 101-102, and to continue registration therein until they have completed one semester hour of credit in physical education. Exemption from this requirement may be made only because of physical disability or health factors by the University physician. Students enrolled for six semester hours or less need not register for physical education during their first two semesters of residence, but must complete one semester hour for credit prior to graduation.

Scholarship Requirements. In order that a student may be eligible for graduation, his cumulative scholarship index must be 2.00 or better for all work taken while a student at this University. This regulation applies to all students entering Arizona State University in September, 1959 and after. Students who entered Arizona State University from September, 1957 to September, 1959 will be permitted to graduate with a 1.80 cumulative index providing they have been in continuous attendance.

Graduation With Distinction. Students who have a cumulative scholarship index of between 3.00 and 3.49 graduate "With Distinction." Students who have a cumulative scholarship index of between 3.50 and 4.00 graduate "With High Distinction." Students to qualify for graduation with honors must have completed at least 60 semester hours in residence at Arizona State University. However, if a transfer student's scholarship for work completed at the previous college or university was of the same high standing as is required for graduation with distinction at Arizona State University, then the distinction will be based on a minimum of 30 semester hours of residence. Arizona State University does not transfer honor points for work completed at other colleges and universities. The cumulative scholarship index is based only upon the quality of work done at Arizona State University.

Graduation With Honors. Students in the Honors Program of the College of Liberal Arts who have a cumulative scholarship index between 3.20 and 3.49 and are approved for scholarly achievement by the Honors Council will graduate "magna cum laude." Those in the index range of 3.50 to 4.00, on approval of the Honors Council, will graduate "summa cum laude."

Residence Requirements. A minimum of one year residence as a regular student is required of every candidate for the bachelor's degree, and the final 12 semester hours immediately preceding graduation must be taken in residence. For purpose of record, a year in residence is defined as 30 semester hours of credit earned either in on-campus courses or in established residence centers of Arizona State University. It has no reference to living in residence halls or in Tempe.

Credit earned in correspondence courses cannot be used to meet residence requirements. The 12 semester hours of final residence may be taken during a semester of the regular academic year or during the summer terms. Exception to the final 12-semester hour regulation may be made by the University Admissions and Standards Committee. Petitions for an exception must be made in writing and addressed to the Registrar and Director of Admissions.

Application for Graduation and Teaching Certificates. Students who plan to complete requirements for graduation at the end of either summer term or the first semester should pay the Application for Graduation fee and file their application for graduation with the Registrar and Director of Admissions before registering for their final term or semester. Those planning to complete degree requirements during the first semester must file an Application for Graduation prior to April first of the preceding academic year. Those planning to complete requirements for graduation in May should pay the Application for Graduation fee and file their applications for graduation with the Registrar and Director of Admissions before November 15. A \$5.00 late fee is charged students planning to graduate in May who do not file the application for graduation by the November 15th deadline. The filing of late applications for May commencement extends from November 16 to the last day of late registration for second semester. Students cannot change their application from one degree to another after the beginning of the final semester's work.

Application blanks are obtained in the Office of the Registrar and Director of Admissions. Candidates who fail to pay the Application for Graduation fee and file applications at the times specified are required to pay the late fee, and may be scheduled for graduation at a later date. Upon filing an application for graduation, a final check on graduation requirements is made by the Office of the Registrar and Director of Admissions. A check sheet showing the remaining requirements for graduation under the curriculum designated in the application is furnished the student as a guide to his final semester's registration.

Applications for teaching certificates should be obtained at the Office of the Registrar and Director of Admissions at the time of filing Applications for Graduation. Applications should be filed promptly after taking the oath of allegiance.

Graduation Fees. A graduation fee in the amount of \$5.00 applies if paid on or before the dates specified in the preceding paragraphs. After that date, the fee is \$10.00. If a student is granted permission to receive a degree in absentia, he shall pay an additional fee of \$7.50.

Attendance at Commencement Exercises. Candidates for degrees are required to be present at the commencement exercises in the prescribed academic costume. Exceptions to this rule will be made only in extreme cases, and upon petition to the Registrar. The \$7.50 absentia fee is to be submitted at the time the petition is filed. If the petition is not accepted, the fee will then be refunded.

Financial Clearance. Before a student may participate in the commencement exercises or receive his diploma, he must obtain financial clearance at the Business Office. Financial clearance indicates that the regular fees, library, dining hall, and all other fees have been paid.

Requirements for the Master's Degree and the Doctor's Degree

See the section of the catalog headed "The Graduate College."

University Services

University Guidance Program

Excellent instruction is one of the chief responsibilities of a progressive university. Instruction is excellent to the extent that it fits the abilities, interests, and personality traits of the students. The purpose of the guidance and counseling program of the University is to help teachers and students discover and develop those traits possessed by each student in order that he may carry out such a program of education, both in class and out, as will best fit his individual needs, and will inspire him to complete it with genuine satisfaction, and with the highest degree of achievement possible.

Orientation. An orientation program, under the supervision of the Associate Dean of Students in the Division of Student Affairs, is provided for new students at the beginning of the fall term. It includes placement testing, health examinations, social events, introduction of student and administrative officers, explanations by individuals and groups of university services, curricula, and the guidance program. Throughout the year students are aided in adjustment to university life through group programs, individual counseling, work, organizations and clubs, student government, residence hall programs, faculty assistance and special emphasis in courses.

The Counseling and Testing Program. A student's success in college is to a large degree dependent on his ability to adjust to the total university environment—personality, socially, and emotionally. The Division of Student Affairs, through work with individuals and with groups, is established to assist in these areas. Personal counseling is directed by the Associate Dean of Students. Personal counseling of women is carried on by the Associate Dean of Students and her staff, and of men by the Dean of Students and his staff. In some cases, problems of students are referred to other faculty members or to the agency or service best qualified to help. Likewise, the counseling often begins with the faculty or agency and is referred to the Deans for assistance.

The University Testing Service located in the new College of Education Building administers and scores group tests for orientation and guidance purposes, provides a research service for the University, and scores examinations administered by the academic departments. Tests are also administered to individuals by the Research and Testing Service, the Guidance and Counseling Center, The Reading Clinic, and the Psychological Clinic in connection with individual counseling.

Choosing a Curriculum. During Freshman Week a number of programs are held to assist students in deciding wisely upon a curriculum. Students who are uncertain as to the curriculum they desire to follow may register for a first year program of basic studies. This program may be changed at any time the student definitely decides upon a curriculum and major or field of specialization. At this time, each student will be assigned an adviser and have conferences with him concerning his proposed choice of curriculum. Choosing a curriculum is an exceedingly important decision for a student. This choice may be postponed until later in his freshman year, but not later than the beginning of the sophomore year. Ultimately, his happiness and success in college depend, in part, upon a selection suited to his abilities, interest, and personality.

The Psychological Clinic. The Psychological Clinic is part of the program of the Department of Psychology. The clinic has a two-fold purpose: (a) that of providing a laboratory situation in the training of advanced students in intelligence and aptitude testing, vocational advisement, and problems of adjustment, and (b) of making its services available to the university student, the Training School, and to the public schools, and agencies that need such services to the extent that is practicable. A nominal fee for services will be charged.

The Guidance Center. The Guidance Center of the College of Education has two main functions: (a) to provide laboratory experiences for graduate students in guidance and counseling and to provide them with supervised experiences in using tests and conducting counseling interviews; (b) to provide a counseling service for university students, Training School students, high school students upon referral by their high school counselors, and other members of the community who request vocational and educational guidance.

Other College of Education Service Centers. The College of Education maintains a Reading Center, an Educational Measurements and Testing Center, a Rehabilitation and Special Education Center, a School Administration Center, and an International Education Center. In each center, two main functions are served: (a) to provide laboratory experiences for students in professional education classes; (b) to provide special services for schools of the state and region insofar as resources permit.

Curriculum Advisers. When the student has chosen a curriculum and a major or field of specialization, he will then be assigned a permanent adviser whose function is to assist the student in the selection of courses. The student remains under the same adviser as long as he continues under his original curriculum and major or field of specialization. Should the student change his curriculum and major or field of specialization, a new adviser in that field will be appointed. Students are urged to take the initiative in seeking counsel regarding the adequacy of their programs of studies.

Honors Advisers. In each department within the College of Liberal Arts there is an honors adviser to help those whose proven ability and stated intention is such that they will do outstanding work.

Housing

Residence Halls for Women. There are eight halls occupied by women students. These are: Gammage Hall, McClintock "A", McClintock "B", North Hall, South Hall, West Hall, Wilson Hall, and Palo Verde Hall. Gammage Hall is a residence hall for freshmen women the quadrangle halls — North Hall, South Hall, and West Hall are also primarily freshmen halls. McClintock "A" is for upperclass women, and McClintock "B" is an honor hall with special requirements for residency. Palo Verde and Wilson are general halls.

Residence Halls for Men. There are seven halls ordinarily occupied by men: East, Hayden, Irish, M. O. Best "A" and "B", Haigler, and Sahuaro Halls.

Reservations. Application materials mailed out from the office of the Registrar and Director of Admissions will include forms to be completed by prospective students desiring living quarters in University Residence Halls. The housing application includes a Housing Agreement form and Room Reservation card. In signing the Housing Agreement, applicants pledge to accept living quarters in University Residence Halls for an entire semester, together with the financial responsibilities for said period of occupancy. Exceptions to this requirement are outlined in the agreement form.

Housing applicants must forward the completed Room Reservation card and Housing Agreement form together with a \$10 room deposit, to the Housing Office. Room reservations will not be confirmed until the applicant has been cleared for admission to the University by the Admissions Office.

Preferences of residence halls may be stated at the time of making reservations. Assignments to halls are made by the Housing Office in line with policies established in the Division of Student Affairs. Assignments to the honor hall are made through the office of the Associate Dean of Students. Room assignments are made by the Head Residents under the supervision of the Dean of Men in the men's halls and the Associate Dean of Students in the women's halls.

Residence in halls, sorority or fraternity houses is restricted to students registered for 12 or more units of regular work. Any exception must be approved by the Associate Dean of Students or the Dean of Men. The University reserves the right to change the residence of any student or to deny or cancel residence accommodations of any students in cases where such action is deemed desirable.

Occupancy. Housing accommodations are available for occupancy one day preceding Freshman Week. Students are expected to vacate accommodations by noon Saturday of the last week of school.

Hall Facilities. All student rooms are provided with electric light, steam heat, and are furnished with a study table, a dressing table or chest, and chairs. In some halls, sleeping porches are used the year round; others have suites which include sleeping quarters. There is a laundry room in each residence hall furnished with ironing boards.

Residence Regulations. No single university influence may contribute more to the development of the personality and character of a student than that of residence hall life. The halls are so equipped and managed as to secure the maximum values at a minimum cost. No cooking of any kind is permitted in students' rooms. Electrical appliances such as irons, TV sets, percolators, grills are to be used only in lounges, kitchens, and utility rooms. *Vocal or instrumental music may not be practiced in any of the halls.* Arrangements for such practice may be made through the Music Department. If radios are used, they must be adjusted so as not to interfere with the rights of others. No pets are permitted in the halls. Nominal dues are collected in each hall by the respective Hall Councils. This fee may not be refunded.

Residence Regulations for Women Students. Young women may be absent from the halls overnight only with the written consent of their parents, which must be on file with the Associate Dean of Students and the head resident at the time of departure. On these occasions residents sign out, indicating where they may be reached in case of emergency. Other regulations for women students appear in Associated Women Students' Handbook, "Co-ed Cues."

Personal Equipment. The following list of equipment is the minimum which students should bring with them when entering a hall: blankets and comforts for a single bed, one bedspread, dresser scarf, bathrobe, soft-soled slippers, and washable laundry bag. All should be clearly marked with the name of the student. *The University provides and launders sheets and pillow slips.* Personal property is not covered by college insurance.

Regulations Concerning Guests. Guests may be accommodated in residence halls when space is available under the following conditions: (a) that the permission of the head resident has been secured; (b) that guests do not accept invitations from residents for the first four nights of the week or during examination time unless absolutely necessary; (c) that guests do not ask for accommodations for more than a three-day period. Visiting student groups may be accommodated if space is available, when previous arrangements are made in the Housing Office. A nominal rental fee is charged for these accommodations.

Care of Halls. The University attempts to furnish comfortable and attractive living conditions for students. Students are expected to cooperate by keeping them so. Should any damage, beyond the usual wear, occur to the decorations and furniture of a room, the cost of redecoration or repair will be charged to the occupants of the room.

Housing Regulations for Undergraduate Women Students Under 23 Years of Age. Undergraduate women students under 23 years of age are required to live in the University residence halls and are expected to carry an academic load of at least 12 semester hours. Exceptions are made for those women who live with their parents, guardians, or close relatives, or who work in a private home for their room and board.

In the event that all women's residence halls are filled, upper class students may obtain permission to arrange for off-campus housing which meets with their parents' approval by filling out the appropriate forms in advance in the office of the Associate Dean of Students. Such off-campus housing is not officially under University inspection or supervision; therefore, the University can not assume responsibility for students living off-campus. However, the University reserves the right to move students whose conduct or quarters are found to be undesirable.

Graduate students and women over 23 may live in the residence halls if space is available, providing they conform to all regulations of the residence units in which they live.

Married women may live in the residence halls only with special permission of the Associate Dean of Students. Students in women's residence halls must report changes in marital status immediately.

Health Service

Student Health Service. This service is maintained for the purpose of constant supervision over the health of students. It is administered under the office of the Associate Dean of Students, Division of Student Affairs. A dispensary and infirmary are staffed by physicians and registered nurses.

A physical examination, done within six months by a practicing physician and surgeon and recorded on a form provided by the University, is required of all new students before registration can be completed. A chest x-ray is required as a part of the physical examination, but if a report of one is not enclosed, the student may have an X-ray made at the Student Health Service on three dates announced during the summer, or during Orientation Week.

Former students who have not been in attendance at the University for a year or more will meet the same requirements as new students.

Students are urged to have all immunizations brought up to date, and all remediable defects, such as in eyes, ears, teeth, tonsils,

etc., corrected in advance of matriculation to prevent possible loss of time from studies. The Student Health Service makes recommendations concerning activities of students in which health may be a factor.

Dispensary and Infirmary Treatment. Dispensary services are available during regularly posted hours and at any hour for emergencies to all regularly registered students. No illness will be cared for in the residence halls, nor will any prescription be made for a student not reporting in person to the Health Service. Bed-side care will be given in the Infirmary for one week per semester without charge. A very nominal charge is made after that time, should further care be needed. Students who do not have meal tickets at one of the University dining halls will pay for meals served while in the Infirmary. There is no limitation on number of clinic visits. Contagious illness will be cared for in the Infirmary whenever possible, but diseases requiring long periods of isolation must be treated either at home or in a local hospital at the student's expense.

Illness or Injury Must Be Reported. Any illness or injury must be reported to the Student Health Service without delay. A campus resident is required to report illness immediately to the head resident of his or her hall. Failure to do so may result in one being asked to leave the hall. Health reports are sent to the family physician upon request of the student. Parents will be notified at once of any serious illness or need for hospitalization; however, they are not routinely notified of all admissions to the Infirmary.

Financial Responsibilities. With the payment of the General University Fee each semester, all regularly registered students are entitled to student health service care according to established policies. Students may be referred to consultant specialists when the University physicians consider it advisable, but such fees must be borne by the student. When hospitalization is considered necessary, the University assumes no financial responsibility. Parents are consulted in advance of hospitalization if at all possible.

Placement Center

The Placement Center is maintained to assist undergraduates, graduates, and alumni in obtaining employment according to their training, ability, and experience. It is the purpose of the Center to serve the State, region, and nation by providing adequately trained personnel for business, industry, government, and education. Although the Placement Center does not guarantee placement, every effort is made to aid students and those in the field who desire placement assistance. Candidates may enroll by filling out the appropriate blanks. Upon enrolling, candidates receive full information and instructions relative to securing employment. Complete records are kept on file in the Placement Center. *Yearly renewal keeps credentials in active file.*

Student Placement. The Placement Center aids students attending the University in securing part-time employment, both on and off the campus, which tends to supplement their income and educational goals. All students who are interested in on or off campus placement should register with this office.

Approximately ninety outstanding high school seniors, who have need of financial assistance, are awarded a job opportunity under our Selected Student Placement Program. This award provides student employment on a part-time basis, with earnings usually between \$200 and \$500 per academic year.

Educational Placement. The Placement Center assists graduating students and alumni in obtaining teaching and administrative positions in elementary schools, secondary schools, and in institutions of higher education. It seeks, at the same time, to serve the best interests of these institutions by referring candidates adapted to their particular needs.

Commercial Placement. The Placement Center also serves graduating students and alumni who are interested in commercial, industrial, and governmental placement. Effort is made to place students in their chosen fields, and at the same time, aid employers to obtain properly trained personnel.

All correspondence should be addressed to the appropriate division in the Placement Center.

Alumni Association

Membership. The Alumni Association was organized under the leadership of President E. L. Storment in June, 1894. Keeping pace with the tremendous growth of the University, the Association employed a full-time executive secretary in September, 1947, and has embarked on a broad program of activities with a permanent staff of five members and a distinguished board of officers and directors. There are about 18,500 graduates including the class of 1961. All students become active members when they graduate. Those students who have attended the University at least one semester may become associate members.

Alumni House. The campus center for alumni of the University is Alumni House, situated just east of Old Main. Formerly the presidents' home, Alumni House was renamed on Dec. 2, 1960, by the Board of Regents.

Three Arizona State University presidents lived there since it was built in 1907: A. J. Matthews, Ralph W. Swetman, and Grady Gammage.

The Association maintains Alumni House as a home where alumni, students, and faculty may see, hear, and touch the history of their University. It is a center of student and alumni activity, and preserves the tradition of a fine home in the center of the bustling campus.

Alumni House includes offices of the Association's executive secretary, the editor of the alumni magazine, and alumni records offices, as well as meeting rooms and tastefully appointed living room and reception areas. Alumni, students, and faculty are encouraged to visit Alumni House.

Memorial Student Union Campaign. The Alumni Association sponsored a fund drive to raise \$350,000 in public contributions toward the \$1,300,000 Memorial Student Union Building for the University. Total proceeds from the campaign were \$439,322.06. This building was dedicated in February, 1956, and Charles A. Stauffer, '01 was general chairman of the campaign.

Endowment Fund. Under the leadership of the late Clarence M. Paddock, '03, and Leona M. Haulot, '02, the Association raised an endowment fund of \$10,000 for the assistance of worthy students. The fund has now increased to more than \$30,000, and more than 500 students have received aid from the fund. Loans are made only to juniors, seniors, or graduate students.

Alumni Magazine. The Association's official magazine, the *Arizona Statesman*, is published quarterly for all active members. Present circulation is 18,000.

Alumni Induction Ceremony. This ceremony is held annually during the Commencement ceremony. Members of the graduating class are inducted by the President in an impressive ceremony and receive alumni membership cards.

Alumni Register. The Alumni Association maintains a card file of the names and addresses of all its active members. Since it is difficult to keep up with address and name changes, alumni and friends can be of real service by sending a post card to the Alumni Secretary giving changes.

Officers of the Alumni Association 1960-61:

Wayne E. Legg, '52, President.....	Mesa
Edward M. Carson, '51, First Vice President.....	Phoenix
Ray Haire, '49, Second Vice President.....	Scottsdale
Wayne Hall, '41, Third Vice President.....	Phoenix
Margaret (Spain) Hollar, '39, Secretary.....	Phoenix
George Morrell, '41, Treasurer.....	Tempe
Marvin N. Palmer, '38, Director.....	Casa Grande
C. William Laing, '38, '42 MA, Director.....	Phoenix
Jim Garrett, '47, Director.....	Coolidge
Bernard Vitek, '46, Director.....	Phoenix
Harry Mehrtens, '50, Director.....	Phoenix
C. J. (Joe) DeWitt, '35, '47 MA, Director.....	Phoenix
John R. Sandige, '14, Trust Officer.....	Phoenix
Sidney B. Moeur, '14, Legal Adviser.....	Phoenix
James W. Creasman, '35, Executive Secretary.....	Tempe

Financial Assistance and Awards

Scholarships and Fellowships

Arizona State University Scholarships

The Board of Regents of the Universities and State College of Arizona has created a number of scholarships which are awarded annually by Arizona State to new and currently enrolled students who meet the qualifications established by the Regents. The financial need of applicants will be one of the factors considered in selecting recipients of many Arizona State University at Tempe Scholarships. These scholarships limited in number, include the following:

Academic Scholarships. These scholarships are available to students who give promise of high scholastic achievement. They provide for the remission of regular registration and class fees and, in the case of out-of-state students, non-resident tuition.

Reservation Indian Scholarships. Two four-year scholarships are awarded annually to Arizona Reservation Indians who have demonstrated ability in the fields of scholarship and leadership. These scholarships cover regular registration and class fees for four years.

Art Scholarships. Two scholarships, covering regular registration and class fees and, in the case of out-of-state recipients, non-resident tuition, are awarded by Arizona State each year through National Scholastic Art Awards to high school seniors who win this honor at the national competition held annually following forty-one regional exhibitions, to which students submit their portfolios. Application forms may be obtained by writing (not later than January of the year of graduation from high school) to National Scholastic Art Awards, 33 West 42nd Street, New York 36, New York. These scholarships are renewable annually for four years on the basis of continued achievement.

Foreign Student Scholarships. Graduate and undergraduate scholarships are available to qualified students from foreign countries who have previous satisfactory scholastic records and show promise of achievement in promoting good international relations. These scholarships cover regular registration and class fees and non-resident tuition. The ability to read and speak the English language is required.

Activity Scholarships. These scholarships are available to new and currently enrolled students who give promise of satisfactory scholastic achievement, of outstanding success for skills or talent in the institution's program of approved activities, and of develop-

ing desirable qualities of character and leadership. Freshmen must have graduated in the upper two-thirds of their high school classes in order to be considered for these scholarships. The scholarships listed immediately below make up the category, "activity scholarships." Although the promise of superior performance in extra-curricular activities is one of the factors considered in awarding these scholarships, the recipients must, nevertheless, have met the fundamental requirement of academic ability.

Athletic Scholarships. These scholarships provide for the remission of regular registration and class fees and, in the case of out-of-state students, non-resident tuition. In addition, recipients of these scholarships may qualify for room and board awards under the Sun Angel Scholarship Fund listed elsewhere in this section.

Band Scholarships. These scholarships provide for the remission of regular registration and class fees and, in the case of out-of-state students, non-resident tuition. A limited number of them also provide for the remission of fees for private music lessons. In addition, recipients of these scholarships may qualify under the Phoenix Junior Chamber of Commerce Band Scholarship Fund or the Sun Angel Scholarship Fund for awards to help defray the cost of room and board.

Choral Scholarships. These scholarships provide for the remission of regular registration and class fees and, in the case of out-of-state students, non-resident tuition.

Orchestra Scholarships. These scholarships provide for the remission of regular registration and class fees and, in the case of out-of-state students, non-resident tuition. In addition, they may provide for the remission of fees for private music lessons.

Voice and Piano Scholarships. These scholarships provide for the remission of fees for private music lessons. Two of them may also remit the non-resident tuition fee.

Women's Physical Education Scholarships. These scholarships provide for the remission of regular registration and class fees.

All the **Arizona State University Scholarships** listed above may be renewed annually upon re-application by the student and approval by the Scholarship Committee.

Sponsored Scholarships

The scholarships listed below have been created by sources other than the Board of Regents but are offered through the University.

Lee Ackerman Engineering Scholarship. This \$200 scholarship is awarded annually to an incoming freshman who plans to major in engineering. Scholastic aptitude, active and constructive citizenship, financial need, extra-class activities and the potential to become an outstanding engineer are considered in awarding this scholarship.

Ruth C. Ackerman Memorial Scholarships. These scholarships, established by Mr. Lee Ackerman in memory of his mother, Mrs. Ruth C. Ackerman, are available to students in any fields of interest, in variable amounts. Awards are based on academic performance, character, and financial need.

Advertising Club Scholarship. The Phoenix Advertising Club awards a \$200 scholarship annually to an outstanding junior or senior student majoring in advertising. Selection is made on the basis of demonstrated ability, promise of future success in the field, and the need of financial assistance in completing the student's education.

AiResearch Manufacturing Company Scholarships. Several scholarships of \$500 each are awarded annually to senior students enrolled in Mechanical Engineering at Arizona State University. Basis for the awards are scholarship, future promise in the field of mechanical engineering, and financial need.

Steve Allen ASU Mass Communications Scholarship. This is a \$100 first semester cash award given by Steve Allen to an entering freshman majoring in Journalism or Radio-Television. Recipient is selected on the basis of scholastic achievement, financial need, and interest in, and aptitude for, the study of mass communication.

Harold A. Alpert Art Scholarship. A \$100 scholarship is awarded annually by Harold H. Alpert to an outstanding junior or senior art major. Selection will be made by the faculty of the Art Department on the basis of demonstrated ability and need for financial assistance.

Alpha Sigma Alpha Scholarship. An amount of \$800 to \$1,000 is offered annually by Alpha Sigma Alpha Sorority for special study on the Graduate level. Recipient must be preparing to qualify as a teacher of mentally retarded children. The scholarship funds may be used for the regular semesters or for summer sessions.

Elenore Altman Scholarship. One scholarship is given each year by the Arizona Federation of Music Clubs to an ASU student majoring in piano. The scholarship defrays all fees for one year's study of piano.

Altrusa Home Economics Scholarship. The Chandler-Mesa-Tempe branch of Altrusa International presents yearly a \$100 scholarship to an outstanding high school graduate from Chandler, Mesa or Tempe enrolling in home economics at Arizona State. Selection is made on the basis of need, scholarship, character, and leadership.

American Institute For Foreign Trade Scholarship. The American Institute for Foreign Trade awards annually a tuition-free scholarship to a male graduate of Arizona State University for a full year at the American Institute for Foreign Trade. In making the award, the following qualifications will be given consideration: (a) quality of scholarship throughout the undergraduate

years, (b) personality and character, (c) genuine interest in living and serving abroad, (d) professional background, (e) business experience, and (f) financial need. Preference is given to men who are from 25 to 32 years of age.

Architecture Scholarships. A number of scholarships are provided each year through the Architecture Foundation which administers the supporting contributions of the Central Arizona Chapter, American Institute of Architects, and other private associations, firms, and individuals.

Arizona Association of Independent Insurance Agents Scholarship. This scholarship is available to a junior or senior student majoring in insurance at Arizona State University. This annual scholarship is for \$200, payable \$100 per semester. Applicant must be a resident of Arizona and enrolled in the College of Business Administration.

Arizona Bankers Association Scholarship. This is an annual award of \$500 to an Arizona student in the College of Business Administration. The basis of the award is scholastic achievement, campus and/or community activities and future promise. This award is restricted to senior or graduate students only.

Arizona Broadcasters Association Scholarship. This is a \$500 annual scholarship available to Radio-TV majors during their junior or senior year at ASU. Applicants must have carried a minimum of 12 semester hours each semester completed, must have a minimum cumulative index of 2.0 (preference will be given to applicants with higher grade averages), must show promise in the field of the broadcasting profession, and must have financial need. Qualified sophomores may apply for their junior year.

Arizona Congress of Parents and Teachers Scholarships. Scholarships of \$200 are awarded by the Arizona Congress of Parents and Teachers to graduates of Arizona high schools planning to enter Arizona State in the teacher training program. Primary consideration in awarding these scholarships are promise of a successful teaching career, above average scholarship and financial need.

Arizona Dairy Technology Society Scholarship. The Arizona Dairy Technology Society annually awards a \$225 scholarship to an outstanding Arizona State University full-time junior or senior student enrolled in the Division of Agriculture with a primary interest in dairying. The award is based on interest in the field of dairy manufacturing, scholarship, leadership, character, and financial need. Preference will be given to residents of Arizona.

Arizona Dietetic Association Scholarship. An annual award of \$150 is given to an outstanding senior majoring in Foods and Nutrition who plans to take an internship following graduation.

Arizona Education Association Scholarships. The Arizona Education Association annually makes available two scholarships of

\$350 each to junior or senior Arizona State education students. Recipients must be legal residents of Arizona. To be considered in the selection are professional attitude and leadership, character, financial need, and general worthiness.

Arizona State Federation of Garden Clubs Scholarship. This annual scholarship of \$200 is awarded through the Arizona State Federation of Garden Clubs. The recipient must be a resident of Arizona, and must be enrolled in horticulture or its related fields. Preference will be given to applicants in their junior or senior year, and will be based on general ability and promise in the field of horticulture, cognizance of community needs in this field, and financial need.

Arizona State University Foundation Scholarships. The Arizona State University Foundation provides a Scholarship Fund for a limited number of Arizona residents. Outstanding students in any field of interest may apply for these scholarships, which are available in varying amounts, dependent on need.

Arizona State University Nursing Scholarship Fund. This fund has been established for the purpose of giving scholarship aid to students interested in a career in nursing and who are enrolled in the School of Nursing at ASU. Selection is made on the basis of character, high ability and promise in the field of nursing, and financial need. Amount of the award may vary, depending on need and availability of funds.

Arizona State University Unrestricted Scholarship Fund. This fund is maintained by contributions from donors who desire to remain anonymous. Criteria used in selecting recipients are high scholastic achievement, extra class activities, and financial need. Awards may vary in amount. There is no restriction as to field of study.

Associated Women Students Scholarship. This \$150 scholarship is awarded by the Associated Women Students of Arizona State to an Arizona high school senior girl, outstanding in scholarship, personality, and extra-curricular activities.

Blue Key Scholarships. The Arizona State University Chapter of Blue Key awards several scholarships to male graduates of Arizona high schools. These scholarships are for \$200 annually and are made on the basis of scholarship, character, participation in extra-curricular activities and need. The scholarships may be renewed for the sophomore year.

Borden Agricultural Scholarship. An annual scholarship of \$300 is provided by the Borden Company Foundation, Incorporated, to the senior student in agriculture who has achieved the highest average grade of all similarly eligible students in all college work preceding their senior year. To be eligible, the student must have included in his curriculum at least two dairy courses in the period of his studies prior to the beginning of the scholarship.

British Marshall Scholarship. In gratitude for Marshall Plan Aid, the British Government annually offers 12 scholarships at British universities to graduates of U. S. colleges and universities. Arizona State students are eligible to apply in their senior year. Selection is made on the basis of distinction of intellect and character. The scholarships are valued at from 550 to 800 pounds a year.

Civitan Club of Phoenix Scholarships. The Civitan Club of Phoenix awards annually one or more scholarships in the amount of \$150 to handicapped Arizona students. Awards are based on scholarship, character, and ability. Financial need is a primary consideration.

Construction Scholarships. A number of scholarships are provided each year through the Construction Fund which administers the supporting contributions of the Associated General Contractors (Arizona Building and Engineering Chapters), Phoenix Association of Home builders, and other private associations, firms, and individuals.

Creighton Scholarship. The Creighton Teachers annually offer a \$125 scholarship to a graduate of the Creighton Schools in Phoenix who is preparing for the teaching profession at Arizona State. The recipient must be a junior or senior and will be selected on the basis of professional attitude and leadership, character, financial need, and general worthiness.

Danforth Graduate Fellowships. Approximately 50 fellowships for study at accredited graduate schools in the U. S. are awarded yearly by the Danforth Foundation to young men preparing for careers in college teaching. Senior men at Arizona State may apply for these fellowships, which carry maximum annual grants of \$1800 for single fellows and \$2400 for married fellows, with an additional stipend for children. The Foundation is looking for men with outstanding academic ability, personalities congenial to the classroom, and integrity and character, including serious inquiry within the Christian tradition.

Delta Nu Alpha Transportation Fraternity Scholarship. Arizona Alpha Chapter No. 73 of Delta Nu Transportation Fraternity awards a \$100 scholarship annually to an outstanding student majoring in transportation. Selection is made from Arizona residents on the basis of scholarship, future promise, and financial need.

Dumos Club Agriculture Scholarship. The Dumos Club offers a \$500 scholarship to an incoming male freshman at Arizona State who will major in agriculture with an interest in farming. The recipient must be a resident of Maricopa County, Arizona. Primary basis for selection is financial need.

Eastern Star Scholarship. The Grand Chapter of the Order of the Eastern Star of Arizona awards annually a \$200 scholarship to a graduate of an Arizona high school. The Scholarship is awarded to a junior or senior in college. The recipient must be a member

herself, or the daughter of a member, of a regularly chartered chapter of the order of Eastern Star in Arizona. In selecting the recipient, character, leadership and scholarship will be given primary consideration.

Eastern Star Scholarship in Nursing. The Grand Chapter of the Order of the Eastern Star of Arizona awards annually a \$200 scholarship to a junior or senior enrolled in the School of Nursing. Recipient must have graduated from an Arizona high school, must be a member herself or the daughter of a member of a regularly chartered chapter of the Order of the Eastern Star in Arizona. In selecting the recipient, character, leadership, and scholarship are given primary consideration. Application forms are available in the Scholarship Office. Deadline for application on campus is May 1.

Engineering Opportunity Awards. These scholarships are available to students majoring in Engineering. Scholastic aptitude, the potential to become an outstanding engineer, and financial need are the criteria for selection. Amount of the award may vary, depending on financial need.

David Epstein Agricultural Scholarship. This award provides \$100 annually for a student in the Division of Agriculture. Basis for the award is academic standing with need a primary consideration. This scholarship is not restricted to residents of Arizona.

Executives' Secretaries Incorporated Scholarship. This \$300 annual scholarship is available to an Arizona woman resident majoring in secretarial and business administration who has completed one or more years of college work.

Florists Telegraph Delivery Association Scholarship. This \$150 annual scholarship is made possible by Unit 10-G of Arizona, and is available to graduating high school seniors who plan a career in nursing. Recipient of this award must be a resident of Arizona and must enroll in the School of Nursing.

Fulbright Scholarships. These are awards made by the U. S. Government for graduate study in 31 foreign countries. Arizona State seniors are eligible to apply. The awards cover the cost of transportation, tuition, books, and maintenance for one academic year's study abroad. Selection is made on the basis of applicant's personal qualifications, academic record, value of the proposed graduate study or research, and suitability for placement in an institution of higher learning abroad. Most, but not all, of the awards require that applicants speak the language of the country for which they apply.

Grady Gammage Scholarship Award. This \$1,000 annual scholarship fund has been established by Mr. Lee Ackerman "in recognition of outstanding service by Dr. Grady Gammage to Arizona State University, to the State Legislature, and as a private citizen." Scholarship awards from this fund may vary in amount. Selection is based on scholarship, leadership, future promise and ability, participation in extra-class activities, and financial need. Applicants must be residents of Arizona.

General Electric Computer Department Honor Program in Engineering. The Computer Department of the General Electric Company's Industrial Electronics Division provides funds to assist several outstanding junior or senior computer engineering students at Arizona State. The awards may vary in amount but will include the cost of the recipient's tuition and laboratory equipment. Recipients should agree to work for the G.E. Computer Department during the summer of their junior year and will be paid standard co-op rates. Applicants should be planning to do graduate work in computer engineering.

General Electric Fellowships. Thirty-four fellowships for pre-doctoral study at the graduate school of the recipient's choice are offered by the General Electric Educational and Charitable Fund. Arizona State seniors who need financial assistance and who have shown that they could, with advantage, continue their education are eligible to apply. Fellowships are offered in the physical sciences, engineering, industrial management, arts and sciences, law, and business. Stipends vary from a single fellow's minimum grant of \$1750 to a minimum grant for a married fellow with dependent children of \$2500. In addition, the fellowships cover tuition and fees.

Kemper Goodwin Scholarship. Kemper Goodwin, Tempe architect, has established this \$800 scholarship to be awarded each year to a graduate of Tempe Union High School. Financial need will be the primary consideration in selecting the recipient, although the ability to do at least average college work will be required. The scholarship will be disbursed to the recipient at \$100 a semester for four years.

Goodyear Scholarship. Annually the Goodyear Foundation awards a \$1,000 scholarship to a student at Arizona State University. Applicant must be (a) a male citizen of the United States; (b) be acceptable as a junior or senior student; (c) desire to enter business or industry upon graduation; and (d) require financial assistance. Criteria used in selection of the recipient is high academic standing, character and leadership qualities, and financial need. Applicants for this scholarship will be interviewed by the Scholarship Committee. There is no obligation on the part of the recipient or the company with respect to employment following graduation.

Willard LeBlonde Groene Piano Scholarship. This scholarship, covering a year's expenses at Arizona State, with the exception of room and board, is offered by Willard LeBlonde Groene to a student majoring in piano. Selection of the recipient of this renewable scholarship is based on general scholastic ability and musical talent.

Eleanore Hall Merit Scholarships. Mrs. Eleanore Hall provides several \$800 scholarships each year. These awards are payable \$100 per semester, and are renewed annually for four years, pro-

vided the student maintains at least average grades. There is no restriction as to field of study. These merit awards are based on character, scholarship, and financial need.

Arthur Emery Harvey Scholarship in Applied Music. A scholarship in applied piano is given yearly by Hazel Harvey Quaid to the freshman ranking highest in piano sight-reading, repertoire and general musicianship. Examinations are given during Freshman Week.

Heath Scholarships. These annual awards, given by the Heath Bench Advertising Company, cover registration and class fees. The awards are not restricted to students in any specific field, and are awarded on the basis of academic standing and financial need.

Hiram Club Scholarship. The Hiram Club No. 1 of Phoenix annually makes available a \$50 scholarship for a junior or senior student enrolled in the kindergarten-primary curriculum. Qualifications for this scholarship, which is for the second semester of the academic year, are financial need and the potential of becoming an outstanding teacher.

Irish Hall Scholarship. The residents of Irish Hall, men's residence hall, present this annual \$200 scholarship, preferably to an upperclassman who has resided in the hall at least one semester. Selection is based on financial need.

Kiwanis Scholarships. Scholarships provided by the Kiwanis Clubs of the greater Phoenix area are available in varying amounts to Arizona residents who are scholastically in the upper half of their classes, are deemed worthy of assistance, and show proof of need of financial assistance to gain a college education.

Alfred Knight Scholarship Endowment Fund. This fund provides for several scholarships annually to outstanding graduates of Arizona high schools who have indicated a desire to continue their education in pure or applied mathematics and the sciences. Recipients will be selected primarily on the basis of scholarship, character and future promise. The amount of the award will be dependent on the financial need of the student as well as scholarship.

Dr. A. L. Krohn Scholarship. Dr. A. L. Krohn annually offers a \$250 scholarship to an incoming Arizona State freshman whose field of interest is literature. Financial need is a primary consideration in selecting the recipient.

Maricopa County Society of Osteopathic Physicians and Surgeons Scholarship in Nursing. A \$136 scholarship is presented annually by the Maricopa County Society of Osteopathic Physicians and Surgeons to a graduating Arizona high school senior in the upper one-third of her class who plans to major in nursing. Selection is made on the basis of character, personality, leadership, high ability and promise, and need.

Freedra Marks Scholarship. This is a \$250 scholarship offered annually by the Phoenix Section, National Council of Jewish Women. It is available to a junior or senior student in any field of study. Student must do at least average work and have financial need.

Howard Martindale Scholarship. This \$1,000 scholarship award is available to graduating seniors of Arizona high schools. Selection is based on high scholastic ability, worthy character, and financial need. This scholarship is renewed annually for three additional years on the basis of continued academic performance. Applicants must be residents of Arizona.

Metropolitan Phoenix Broadcasters Scholarship. This is an annual scholarship of \$500, available to qualified juniors and seniors enrolled in the ASU Radio-Television Curriculum. Applicants must have carried at least 12 hours each semester completed, have a minimum grade index of "C" (preference will be given to applicants with higher grade averages), give evidence of enough ability to be reasonably successful in the broadcasting profession following graduation, and must have financial need. Qualified sophomores may apply for this scholarship for their junior year.

Music Camp Scholarships. These scholarships, providing one academic year's applied music lesson fees (not to exceed \$40 a semester) are awarded annually by the University to gifted members of the Music Camp—one each in voice, piano, and instrument. Applicants are selected on the basis of auditions given at the University.

National Association for Retarded Children Inc. Scholarship. The Phoenix Council, NARC has established a \$350 scholarship, available primarily to students preparing to become teachers of retarded children. Application must be filed with the Scholarship Committee. Awards will be made on recommendation of a special committee through the College of Education and the Phoenix Council, NARC. Recipient will be selected on the basis of interest in this field, aptitude, and maturity.

National Secretaries Association International, Valley of the Sun Chapter, Scholarship Award. A \$150 scholarship is provided by the National Secretaries Association International, Valley of the Sun Chapter, to a second, third, or fourth-year woman student studying for the secretarial profession at Arizona State. Scholastic attainment, citizenship, and need will be considered in making the selection. The recipient of this award must be a resident of Arizona.

Noontimers Business and Professional Women's Club. This is an annual award of \$100 for a girl graduate of an Arizona high school interested and enrolling in some phase of Business Administration at Arizona State University. The scholarship is payable at \$50 per semester.

Billie Loy Pearce Scholarship. This is an annual \$200 scholarship awarded to a graduate of an Arizona high school. Primary criterion

ion for selection is financial need, although the student must have earned at least average grades. This scholarship is renewable annually provided the recipient maintains a "B" average.

Phelps Dodge Scholarships. The Phelps Dodge Corporation annually provides \$4,000 in scholarship funds to Arizona State University. A \$1,000 scholarship is awarded annually to a graduating high school senior of Arizona. This scholarship is renewable annually, depending on continued scholastic qualifications of the recipient. One thousand dollars is awarded annually to a sophomore, junior, and senior. Awards are made on the basis of high scholarship, high ability and promise, personality, character and leadership. Applicants are required to take the test given at Arizona State University and must be interviewed.

Phoenix Blue Print Company Scholarships. This is an annual \$500 Scholarship fund designated for awards to students in Architecture or Engineering, and available to graduate or undergraduate applicants. Recipients will be selected on the basis of scholarship, character and promise of success in their fields. Amount of scholarship may vary depending on financial need.

Phoenix Junior Chamber of Commerce Band Scholarship Fund. The Sun Devil Band performs annually at the Phoenix Junior Chamber of Commerce World Championship Rodeo, and in return the J.C.'s contribute \$2,000 to the Band's scholarship fund each year. Cash awards, to defray part of the cost of room and board, are made from this fund to ASU Band scholarship recipients who qualify.

Phoenix Sales Executive Club Fellowship. A fellowship of \$300 is provided annually by the Phoenix Sales Executive Club of Phoenix, Arizona, to a student in the field of Marketing (Sales). This fellowship is to be awarded on the basis of need, interest in selling, leadership, character, scholarship and fitness to do sales research.

Phoenix Symphony Orchestra Guild Scholarships. The Phoenix Symphony Orchestra Guild provides a fund annually for cash awards to graduate and undergraduate students enrolled in full-time studies at ASU. The cash stipend may vary in amount. Recipients are required to audition for membership in the Phoenix Symphony Orchestra.

Phoenix Symphony Orchestra Scholarships. Two scholarships are provided annually by Arizona State University to full-time students registered under a four-year curriculum. These scholarships provide for the remission of registration and class fees, non-resident tuition fee, and private music lessons fee. Aptitude and proficiency in music as shown by performance on a musical instrument, promise of further growth and development in musicianship, and good character will receive primary consideration. Recipients must audition for membership in the Phoenix Symphony Orchestra.

Kathryn Barron Pickrell Scholarship. This award is for \$300, payable \$150 at the beginning of each semester, and is designated for a graduating senior of South Mountain High School who plans to attend ASU. This scholarship is donated by Mr. and Mrs. W. W. Pickrell of Phoenix. Basis for selection is academic honors, general ability and promise, and financial need.

Producers Life Insurance Company Scholarship. This is a \$250 annual scholarship available to an upperclassman majoring in Life Insurance at ASU. This award is based on scholastic ability and financial need.

Justine Ward Riseling Memorial Scholarship. The Salt River Valley Branch of the Association for Childhood Education International offers, in memory of Justine Riseling, who was a teacher in the Phoenix School system, a scholarship of \$50 annually to a second semester junior or senior student enrolled under the Kindergarten-Primary or Elementary Curriculum. In making this award, scholarship, character, leadership, and financial need will be given primary consideration.

A. B. Robbs Trust Company Merit Scholarships. These non-renewable scholarships are available to seniors graduating from Arizona high schools who are interested in pursuing study in the specific fields of Business Administration and Real Estate. One thousand dollars is awarded annually on the basis of high scholarship, demonstrated financial need, character and promise, as follows: (1) A maximum of \$150 annually to a student with high scholastic standing and no financial need; (2) a maximum of \$500 annually to a student with high scholastic ability and great financial need.

Rhodes Scholarships. These are competitive scholarships for which Arizona State junior and senior men are eligible to apply. The scholarships are for study at Oxford University, England, and carry a stipend of 600 pounds a year. They may be held for three years. Qualities considered in making selection are: (1) literary and scholastic ability and attainments, (2) qualities of manhood, truthfulness, courage, devotion to duty, sympathy, kindness, unselfishness and fellowship, (3) exhibition of moral force of character and of instincts to lead and take an interest in his fellows, (4) physical vigor, as shown by fondness for and success in sports.

St. Augustine's Episcopal Church Scholarship. This award is for \$200 annually to an Arizona State University student who is a member in good standing of the Episcopal Church. Basis for consideration is given to the applicant's scholastic ability, which must be at least average, and financial need.

Scottish Rite Fellowships. Applicants must have an A.B. or B.S. from an accredited college or university and at least a "B" average scholastically. This award is for \$1,800 annually for study at George Washington University in Washington, D.C. This fellowship may be applied for by a graduate of Arizona State Uni-

versity. The purpose is to educate students for leadership in government, federal, state or local. Final selection to be made by the Arizona Consistories Educational Committee.

Sigma Delta Chi-Pulliam Scholarship. This annual \$1,000 scholarship is given by Mr. Eugene Pulliam, Publisher of the Arizona Republic and Phoenix Gazette. This award is available to a journalism student for his junior year, with preference given to a member of Sigma Delta Chi who plans a career in the newspaper field. Application must be made through the scholarship office. The candidate must be recommended by a committee of selection composed of the Chairman of the Department of Mass Communications, members of Sigma Delta Chi and the Scholarship Committee. This scholarship is renewable for the recipient's senior year provided he maintains at least average grades and continues to demonstrate promise to develop a strong commitment to go into newspaper work.

Sun Angel Foundation Scholarship Fund. The Sun Angel Foundation, an organization of civic and business leaders dedicated to assist in the growth of Arizona State University, each year contributes scholarship funds to the University. In selecting the recipients of scholarships provided by this fund, priority will be given by the ASU Scholarship Committee to students who: (a) want a college education; (b) have the scholastic aptitude to profit from a college education; (c) preferably have demonstrated ability in one or more recognized extra-class activities; (d) have been active and constructive citizens; (e) lack the financial resources to cover all or any part of tuition, fees, books, room and board. The Foundation has designated that these funds shall be used to provide:

- (A) **Engineering Scholarships.** Five (5) for freshmen, \$200 each.
- (B) **Agricultural Scholarship.** One (1) for a freshman, \$300.
- (C) **Activity Scholarships.** Provide funds to help defray room and board costs for a limited number of ASU Activity Scholarship recipients, the amount of the award to be determined by financial need.
- (D) **Other Scholarships.** Scholarships covering all or any part of tuition, fees, books, room and board, the amount of the award depending entirely on the extent of financial need. Application for one of these scholarships may be made by any student who feels he meets *all five* of the criteria of selection listed above. These awards are not limited to holders of Arizona State University Scholarships. The number of awards provided, however, is limited by the amount of funds available.
- (E) **Academic Scholarships.** The number of awards and the amount may vary, but the average award is \$200 annually. These are renewable if satisfactory grades are maintained.

Tempe Boy Scouts Scholarship. This is a \$250 scholarship to a graduating senior of the Tempe Union High School who has had a minimum of three years in Boy Scouting, and who has attained at least First Class rank in scouting. Applicant must be a resident of Arizona. Scholastic achievement, extra class activities, and financial need will be the criteria for selection.

Tempe Kiwanis Club Scholarship. A scholarship of \$150 is awarded annually by the Tempe Kiwanis Club to a handicapped Arizona student. Preference will be given to a local student and need will be given primary consideration. Other qualifications include: ability, scholarship, and character.

E. A. Thomas—Arizona Wholesale Supply Company Scholarships. These scholarships are available to students whose parent or parents are employed by the Arizona Wholesale Supply Company, and who have financial need to obtain a college education. These awards will be made in varying amounts according to need, but will not exceed \$900 per student in any academic year. These scholarships are renewable provided the student maintains a satisfactory grade average of "B" or better.

Root Tilden Law Scholarships. National competition for these 20 fellowships, valued at \$6,900 each, is open to senior men at Arizona State who wish to study at the New York University School of Law. Candidates will be chosen on the basis of high scholarship, active extra-curricular participation and potential capacity for unselfish public leadership.

Valley National Bank Scholarships. The Valley National Bank offers annually 16 scholarships at \$250 each, payable \$125 per semester. Applicants may be registered in any field, must be enrolled for a full course of study, and must be residents of Arizona. Selection will be made on the basis of scholarship, character, personality, leadership, and financial need. These scholarships will usually be awarded four to each class, (freshman, sophomore, junior and senior) but are renewable provided the recipient maintains the required standards.

Valley of the Sun Kiwanis Club Agriculture Scholarships. The Valley of the Sun Kiwanis Club, Phoenix, as one of its service projects, sponsors an Agriculture Scholarship Fund from which scholarships are provided annually to students at Arizona State University who are registered under the four-year agriculture curriculum. These scholarships provide for a cash stipend of \$300 payable \$150 each semester. Recipients must be residents of Arizona and be full-time students registered under the four-year agriculture curriculum. In making the awards, the primary factors to be considered will include: scholarship, ability and promise, personality, character, leadership, and financial need.

Vegetable Growers Association Memorial Foundation Scholarships. This Foundation makes available annually six scholarships of \$500 each for worthy students of Arizona State University who are majoring in, or plan to major in, Horticulture or its related fields. Applicants must be residents of Arizona.

Vesta Club Scholarship. The Vesta Club gives each year a scholarship of \$800 to a worthy Spanish-speaking high school graduate of Arizona. This scholarship will be used to help defray the student's school expenses for four years, and will be given at the rate of \$100 each regular school semester. The recipient will be given the choice of attending the Arizona State University, Arizona State College at Flagstaff or the University of Arizona. This award is made on the basis of character, need, scholarship, and promise of future success.

Western Electronic Manufacturers Association Scholarships. The Western Electronic Manufacturers Association has established a fund for scholarship awards to junior and senior students in Electrical Engineering. Amount of the award depends on the financial need of the applicant.

John A. Whitsoe Memorial Scholarship Foundation. The John A. Whitsoe Memorial Scholarship Foundation of the Church of Jesus Christ of Latter-day Saints provides a \$500 graduate scholarship, a \$200 junior scholarship and a \$200 freshman scholarship to active members in good standing of chapters of Delta Phi, returned missionaries honorary fraternity. Scholarship and character will be the basis for selection.

Woodrow Wilson Fellowships. Faculty members at Arizona State are each eligible to nominate candidates for the Woodrow Wilson Fellowships, of which 200 are given annually. The fellowships are designed to attract to the college teaching profession young men and women who possess the highest qualities of intellect, character and personality. The minimum stipend is \$1,250 plus tuition for single fellows. Married fellows will receive special consideration.

Applications. All applications, except for music or athletics, must be filed with the Scholarship Office on or before March 1. Application forms may be obtained by writing to the Scholarship Committee, Arizona State University, Tempe, Arizona.

Loan Funds

Included in the financial aids available to students at Arizona State are small short-term loans for necessary emergency expenses. Funds for this purpose are administered by the University and include the *John W. Allen Loan Fund*, the *Marshall Charitable Foundation Student Aid Fund*, the *Tempe Rotary Loan Fund*, the *Rosenzweig Student Loan Fund*, the *Apfel-Carson-Wilson Memorial Fund*, the *President's Student Aid Fund*, the *Austin S. Bratcher Loan Fund*, the *Eleanore Gilbert Hall Loan Fund*, and the *Associated Students' Loan Fund*. No interest, but a small service fee, is charged for loans from these funds. The John W. Allen Loan Fund is restricted to worthy athletes and the Rosenzweig Student Loan Fund to worthy prospective teachers.

Some long-term loan funds, carrying interest charges, are administered by the University and are available to students who meet certain qualifications. The *Alumni Loan Fund* is available to juniors and seniors for necessary college expenses. Loans from this fund are repayable after graduation with interest at 4%. The *Dixon Fagerberg Revolving Fund* provides loans to junior and senior women to be repaid with 4% interest within two years after graduation. The *W. K. Kellogg Foundation Loan Fund* and the *Marshall Foundation Revolving Fund* are available for loans to medical technology students in the clinical or pre-clinical years of their course. The interest rate will not exceed 2½%. The *Marshall Foundation Revolving Fund* provides loans to Arizona residents who have attended Arizona State and wish to obtain a medical education but are unable to finance such an education through any other source. These loans are to be repaid by the student within a period of ten years, with no interest charged during the period of study and internship.

National Defense Education Act of 1958. To be eligible for a loan under the *National Defense Education Act of 1958*, a student must (a) be in need of the amount of the loan to pursue a course of study at Arizona State; (b) be capable of maintaining good standing in such course; and (c) have been accepted for enrollment as a full-time student, or, if already attending be in good standing and in full-time attendance as an undergraduate or graduate student.

No student may be loaned over \$1,000 in any year or over \$5,000 in the aggregate.

Repayment begins one year after a borrower ceases to pursue a full-time course of study in an institution of higher education, and ends eleven years thereafter. The interest rate is three per cent (3%) on the unpaid balance beginning with the date on which repayment of the loan is to begin.

Up to one-half of any loan (plus interest) is canceled for service as a full-time teacher in a public elementary or secondary school in a state, at the rate of ten per cent (10%) of the amount of the loan (which is unpaid at the time the teaching service begins) plus interest for each complete academic year of such service.

Many organizations outside the University maintain and administer loan funds for which Arizona State students may qualify. Included among these organizations are the *Arizona Federation of Women's Clubs*, the *Charles Trumbull Hayden Chapter of the Daughters of the American Revolution*, the *Independent Order of Odd Fellows*, the *Freeda Marks Loan Fund Committee*, the *Methodist Church*, the *Phoenix Panhellenic Association*, the *P. E. O. Sisterhood*, the *Phoenix Rotary Club* and the *Phoenix Optimist Club*.

Applications. Applications and other information about loan funds may be obtained from the Division of Student Affairs. Students are urged not to drop out of school for financial reasons without first consulting with this office.

Honors and Awards

Academic Vice President's Award. A decoration is presented to the Army Company Commander and the Air Force ROTC Squadron Commander winning the Company and Squadron drill competition.

Air National Guard Award. A trophy is presented by the Arizona Assistant Adjutant General for Air National Guard to the outstanding Air Force ROTC Cadet who has been accepted for Flight Training, has excelled in the Civil Aeronautics examination, has received a private flying license, has been recommended by his flight training instructor, has displayed the highest academic proficiency in his AFROTC courses, and who is a resident of Arizona.

Air Force Association Medal. A decoration is awarded by the Air Force Association to the outstanding junior cadet of the advanced Air Force ROTC.

Alpha Beta Alpha Award. A book is given to the outstanding senior student of the year in Library Science.

Alpha Pi Epsilon Secretarial Award. An award given in the Business Administration Department to the outstanding student of the year in secretarial courses.

American Association of University Women Awards, Arizona State Division. A national and a state membership in A.A.U.W. is awarded to two outstanding graduating senior women.

American Association of University Women Awards, Tempe Branch. The Tempe Branch of the American Association of University Women usually grants a tuitional award to an ASU freshman woman who has a record of high scholastic achievement.

American Institute of Architects Awards. Two awards totaling \$25.00 are made annually by the Central Arizona Chapter, American Institute of Architects, to the students achieving the highest standard in third and fourth year architectural design.

American Institute of Electrical Engineers Prize Paper Awards. Cash prizes are awarded by the Arizona Section of the American Institute of Electrical Engineers for the best papers on subjects in electrical engineering and related fields.

American Legion Medal. A medal is awarded by William A. Bloys Post Number 2, American Legion, to the two cadets of the second year Basic Course, Army and Air Force ROTC, displaying the highest academic proficiency and capacity for military leadership in their respective departments.

Arizona National Guard Award. A trophy is awarded to the outstanding ROTC cadet who is a member of the Arizona National Guard.

Arizona Society of Certified Public Accountants' Award. Made to a senior graduating with the B.S. degree with a field of specialization in accounting. Based on scholarship and contributions to business.

Arizona State University Streamer. A decoration is presented by the Military Science and Air Science Departments to the guidon of the best drilled Company, Army ROTC, and guidon of the best drilled Squadron, Air Force ROTC.

Armed Forces Communication and Electronic Association Award. A medal awarded to the outstanding senior AFROTC cadet majoring in electrical or electronic engineering.

Art Purchase Prizes and Awards. Cash purchase prizes totaling \$400 are awarded at the annual Art Exhibition for students and alumni of the Arizona State University Art Department in connection with the campus Art Festival. Prizes are offered in four classifications: oil painting, watercolor, ceramics and sculpture, and graphic and commercial arts. Both regular session and summer session students and alumni are eligible to exhibit. Fifteen faculty citations are awarded to worthy art works in addition to those winning cash prizes. Citation winners receive autographed copies of the illustrated catalog of the Arizona State University Collection of American Art. All awards and citations are officially listed on the records of individuals registered with the Arizona State University Placement Center.

Associated Men Students' Academic Achievement Award. This award is presented each year to the male student graduating with the highest cumulative index.

Associated Men Students' Award. An award presented by the A.M.S. Council to a senior member of the Associated Men Students in recognition of outstanding service to the University.

Associated Women Students' Recognition Award. The A.W.S. Recognition Award is presented each year to a graduating senior woman who is considered the outstanding woman in her class. She is judged on the basis of leadership, personality, scholarship, and service to the University. Recommendations are received from administrators, faculty, and student organizations.

Association for Childhood Education Award. A silver trophy to a kindergarten-primary junior or senior girl outstanding in scholarship and service.

Association of the United States Army Medal. A medal is presented to the member of the second year advanced course, Army ROTC exhibiting the greatest technical proficiency and highest capacity for leadership.

Bandsman's Award. A decoration is presented by the Division of Special Services, Arizona State University, to the outstanding member of the combined Army-Air Force ROTC Band.

M. O. Best B Hall Award. M. O. Best B Hall bestows the Antypas Award upon its outstanding resident each semester. The award is named in honor of John Antypas, first president of the hall, who did much to organize the hall council and establish the traditions of the dormitory. In making the award, service to the hall,

scholarship, and citizenship are taken into consideration. The name of each recipient is engraved on a plaque which is displayed in the M. O. Best B lobby.

Beta Chi Award. An award is given to the graduating senior chosen for her good scholarship, her contribution to the Home Economics Club, to the Home Economics Department, and to the University, and her promise of future development.

Burke Award. An award of \$25.00 is given by Attorney and Mrs. William Burke to a graduating senior in the Home Economics Department who is outstanding in the field of Nursery School education.

Chemical Rubber Publishing Company Award in Chemistry and Physics. The Chemical Rubber Publishing Company annually awards a copy of their Handbook of Chemistry and Physics to the freshman student in general chemistry and to the beginning physics major with the most outstanding performance during the first semester.

Chicago Tribune ROTC Awards. A gold and silver medal is awarded by the Chicago Tribune Publishing Company to two Air Force ROTC Cadets of the Advanced Course who have demonstrated military achievement, scholastic attainment and character during the Fall and Spring semesters.

Chi Omega Social Science Award. The Chi Omega Social Science Award of twenty-five dollars is given to the outstanding woman student in the field of Social Sciences. It is judged on scholarship and general ability in that field. The recipient is chosen by the Head, Division of Behavioral and Social Sciences and a committee of professors of Social Sciences.

Charles Christopher Memorial Award. This award, a replica of the trophy given posthumously to Charles Christopher, is given annually by the William H. Patterson BPOE of W Lodge No. 477, Phoenix to the freshman judged most outstanding in athletic ability, scholarship, and general desirable personal qualities.

Commandants' Award. A decoration is presented by the Departments of Military Science and Air Science to the members of the Army or Air Force Rifle Team compiling the highest average score during competitive firing.

Consolidated Vultee Aircraft Corporation Award. A model aircraft is awarded by the Consolidated Vultee Aircraft Corporation to the outstanding junior advanced Air Force ROTC cadet electing to pursue flight training upon graduation.

Thomas J. Croaff Award. An award of \$50.00 is given annually by Mrs. Carolyn B. Croaff in memory of her husband, Judge Thomas J. Croaff, to an undergraduate student for a research paper on juvenile delinquency or community problems.

Dean of the College of Liberal Arts Award. A decoration is presented by the Dean of the College of Liberal Arts to the two cadet commanders, Army and Air Force, winning the annual platoon-flight drill competition within their respective departments.

Delta Sigma Pi Scholarship Key. To encourage high scholarship, Delta Sigma Pi presents annually the Delta Sigma Pi Scholarship Key to the graduating senior who ranks highest in scholarship for the entire course in Business Administration.

Freshman Art Award. An award given to a freshman majoring in art. Selection determined on basis of scholarship, as well as art accomplishments and promise as an artist.

Bob Gehres Award. An award given each year by Blue Key to the most valuable baseball player in honor of Bob Gehres, an outstanding ASU pitcher, who died in 1950.

Governor's Medal. A decoration is presented by the Governor of the State of Arizona to the respective cadet commanders of the Army and Air Force Corps of Cadets.

Graduating Honors. The honor, "With Distinction," is given to those whose index of scholarship, for all work taken at the University, is from 3.00 to 3.49 points. "With High Distinction" is given those whose index is from 3.50 to 4.00.

Hayden Hall Award. An award to a resident of Hayden Hall for outstanding achievement in service to the hall, scholarship, and service to the University.

Hillel Honor Awards. The Hillel Honor Awards are given to students of the Jewish faith, who by their devotion to service, and consecration to duty have made Hillel a worthwhile student organization.

Home Economics Senior Award. An award is given to the senior home economics major selected by the staff because of outstanding accomplishments and promise of future contribution to the field.

Home Economics Sophomore Award. An award is given to the sophomore home economics major having the highest cumulative scholastic record during her first three semesters of college.

Illuminating Engineering Society Prizes. Awards totaling \$50.00 are made each year by the Illuminating Engineering Society, Arizona Section, to students submitting winning designs in an architectural design competition emphasizing lighting.

Interfraternity Council Scholarship Award. Each semester the Interfraternity Council awards scholarship trophies to: (a) the fraternity with the highest scholarship for its total membership, (b) the fraternity with the highest scholarship for its brothers, (c) the fraternity with the highest scholarship for its pledges, and (d) the fraternity showing the most improvement over the previous semester's performance (combined actives and pledges).

Interhall Council Awards. The Interhall Council awards the scholarship trophy to the men's residence hall for the highest grade index for the first semester of each year. The Interhall Council also awards an intramural trophy to the outstanding hall in intramural activities.

Jahn-Tyler Award. An award presented annually to a student doing outstanding work in journalism.

Kappa Delta Pi Award. An award of fifty dollars is made to the student in the College of Education having the highest cumulative index for all courses taken in the freshman and sophomore years at Arizona State University. The minimum number of hours is sixty.

Kappa Delta Pi Scholarship Key. This award is given to the graduating senior who has registered four years in the College of Education at Arizona State University, and has the highest cumulative scholarship index.

Kappa Kappa Psi Award. Beta Omicron Chapter of Kappa Kappa Psi presents an award to the most outstanding senior of the University Band.

La Liga Panamericana Award. An award given to a graduating senior for all around service to the club, and for high proficiency in oral Spanish.

Letter "A" Awards. A "Letter A" is awarded by the Athletic Department, Arizona State University, to the lettermen of the Army ROTC and Air Force ROTC Rifle Team.

McGrew Printing Journalism Award. An award to an outstanding journalism student.

Moeur Award. This award of \$50.00 is given by Sidney B. and Annie Laurie Lassator Moeur, both graduates of the class of 1914, to the graduate of any four-year curriculum who attains the highest standing in academic work during the four years immediately preceding graduation.

Ralph H. Morris Instrumental Music Award. An award of \$100.00 is given by Mary Scott Morris, in memory of her father Ralph H. Morris, to a junior student of exceptional talent in instrumental music.

Music Department Award. An award is presented by the Music Department, Arizona State University, to the outstanding second-year basic member of the combined Army-Air Force ROTC Band.

John Henry Newman Award. Membership in National Honor Society for Newman Club members who give outstanding leadership in local club, province, and national organization; and so honor club patron, Cardinal Newman.

Newman Club Service Award. An award to a graduating senior woman who by religious good example and four years of faithful service has enhanced the spiritual goals of the Newman Club.

Panhellenic Scholarship Cup. A Panhellenic Scholarship Cup is awarded each year by the Phoenix Panhellenic Association to that sorority which has the highest scholastic average. Any sorority receiving the award for three consecutive years retains the cup permanently.

Panhellenic Scholarship Plaque. A Panhellenic Scholarship Plaque is awarded each year by the Panhellenic Council to the sorority having the highest scholastic average.

P.E.O. Award. Chapter X, Tempe, of P.E.O. awards \$25.00 to a woman student of high ideals and outstanding service. Selection is based on integrity, intelligence, and aptitude.

Pershing Rifle Meritorious Award. An award presented by the Cadet Honorary Colonel to the Pershing Rifleman who has consistently contributed most to the furtherance of Pershing Rifle Co. D, 10th Reg. during the academic year.

Phi Eta Sigma Award. This award is given to the male student who attains the highest cumulative index for all courses taken in the freshman and sophomore years at Tempe.

Pi Kappa Delta Awards. Awards are made annually by this national honorary forensic fraternity to students who achieve forensic proficiency.

Pi Omega Pi Award. Alpha Iota Chapter of Pi Omega Pi presents an award to the graduating senior selected as the most outstanding prospective commercial teacher.

Pleiades Freshman Award. This award is presented at the close of each year to the most outstanding woman in the freshman class.

The Pleiades Plaque. Awarded by Pleiades to the women's hall having the highest collective undergraduate scholarship index. The group winning it three times in succession retains the plaque.

President's Award. A decoration is presented by the President of the University to the two outstanding cadets of the second year advanced course of their respective Cadet Corps.

Psi Chi Award. An award is annually presented to a member of Psi Chi with outstanding scholastic achievement and service.

Charles William Rawlins Memorial Award. Tau Kappa Epsilon Fraternity presents a trophy to the outstanding intramural man within fraternities. This is in tribute to the late Bill Rawlins, a fine fraternity man and a fine athlete.

Religious Activities Awards. Two awards of \$5.00 each are presented each year by the Student Religious Council to the man student and the woman student giving outstanding service in religious activities for the year. These awards are determined on the basis of (1) service to local university group and general church program, (2) service to total campus religious program, (3) personal religious living, and (4) other evidences of leadership.

Republic Aviation Award. A model F-84 Thunderjet is awarded by the Republic Aviation Corporation to the First Year Advanced Air Force ROTC Cadet who makes the most effective public presentation on an Air Power theme.

Will H. Robinson Award. An award of \$25.00, in honor of Will H. Robinson, is given annually to a freshman. The award is based on high scholarship for the first semester considering the number of hours the student gives to self-support.

Rosenzweig Trophy. This trophy is given annually by I. Rosenzweig & Sons to an outstanding letterman having the highest total point rating on athletic ability, general aptitude index, and scholarship index.

ROTC Award. An award presented by the Departments of Military Science and Air Science to the Army and Air Force ROTC Cadet making the greatest personal contribution to the Army and Air Force ROTC program at Arizona State University.

H. Clay Skinner Memorial Award. A \$50 award is presented annually by Mrs. H. Clay Skinner and Psi Chi to a senior psychology major who has attained the highest academic average among graduating psychology majors. The selection will be made by the officers and advisor of Psi Chi.

Sons of American Revolution Award. An award to the two cadets of the second year basic course, Army and Air Force ROTC, having the highest academic and military class standing and having rendered outstanding service to their respective departments and the University. Recommended by the PMS and PAS, chosen by the Arizona Society.

Student National Education Association Award. An award given by the Arizona State University Chapter of the Student National Education Association to the student or students who have rendered outstanding service to the SNEA and the University.

Superior Cadet Ribbon Award. A Department of the Army award to one Army ROTC student in each academic class, chosen by a board of officers from the students in the upper fourth of his class in ROTC and academic standing. The award consists of a ribbon, certificate and lapel device.

Glendon and Kathryn Swarthout Prizes in Creative Writing. Two first prizes of \$50 each and two second prizes of \$25 each awarded annually for the best undergraduate and graduate poetry and prose fiction.

Tau Beta Sigma Award. Sigma Chapter of Tau Beta Sigma presents an award to the most outstanding freshman of the University Band.

Tempe Daily News Journalism Award. An award is presented to a student doing outstanding journalism work.

Theta Chi Epsilon Award. This award is given annually to a senior student for excellence in scholarship and art achievement.

Veterans of Foreign Wars Medal. A medal is presented by Bob Finch Post Number 3632, Veterans of Foreign Wars, to the two

cadets of the first year basic course, Army and Air Force ROTC, exhibiting the highest academic proficiency and potentiality for military leadership in their respective departments.

Wall Street Journal Award. Dow Jones and Company presents a trophy and subscription to the Wall Street Journal to an outstanding senior in the College of Business Administration.

Weaver and Drover Prize for Architectural Design. An annual prize of \$500 is awarded to the student or students submitting winning designs in the prize competition.

West Hall Award. An award to a resident of West Hall for outstanding achievement in scholarship, and service to the hall and to the University.

Women's Physical Education Award. An award given by the women's division of the Physical Education Department to a senior major for achievement in physical education.

Student Affairs

Student Government

Associated Students. Every student carrying more than 6 hours is automatically a member of the Associated Students. The Board of Regents, the President and the faculty challenge every student to accept his individual responsibility by exerting intelligent effort for self-government and for promoting the intellectual, moral, and social welfare of all students in a truly democratic manner.

In terms of organization and procedure, these objectives may best be accomplished by patterning student government after the state and national government. This form, we believe, allows for protection, flexibility, and dynamic growth of student responsibility in higher education.

The Student Senate or Legislative Branch passes the laws governing ASASU, its boards and agencies. The Executive Council or Executive Branch carries out these laws, and the Student Court or Judicial Branch passes on the constitutionality of laws and interprets the Constitution.

Under authority delegated them by the President of the University, AWS sets and enforces social standards and regulations regarding campus dress, coordinates women's student government through residence hall councils and the off-campus women's organization, establishes hours for women students, and formulates and administers policies deemed essential to promote a desirable group living experience.

The Memorial Union. The headquarters for all Associated Student Activities are in the Union Building. Here many student activities take place. This is indeed the instructional building for the out-of-class educational program.

The Student Activities Program. The university calendar includes many and varied programs and functions held on the campus and elsewhere. These include athletic events; social events including dances, dinners, banquets, teas; entertainment and lecture series; music and other cultural gatherings. Both men's and women's residence halls play an important part in carrying out the activity program with the advice of carefully selected personnel officers and faculty members.

Student Organizations

Program. A wholesome, integrated program for the university student is provided through student organizations. According to the individual interest and available time, any student may choose those activities which meet his desire for congenial companion-

ship, his need for group security, his need for recognition, his need for creative effort, his need for growth—physically and socially—or supplement his classroom work in the many activities which are an extension of classroom programs.

Official Approval. Information regarding approval of organizations may be obtained in the Division of Student Affairs, Room 213, Memorial Union. Official approval of organizations may be withdrawn at any time the organization fails to comply with rules and regulations of Associated Students. At least once each year organizations are requested to submit the names of officers and other basic information. All approved organizations must have a copy of their constitution on file in the Office of Student Affairs. Organizations which do not meet these minimum requirements are removed from the official list which appears in the University catalog. Mail boxes are provided for all officially approved organizations in the Memorial Union Building.

Scholastic Requirements. In order to be eligible for admission to membership in any student organization, a student must have a scholarship index of 2.00 or better in all courses carried for the semester immediately preceding. Any member of such an organization whose semester report shows a scholarship index of less than 2.00 may be suspended from active work in the organization for one semester.

Councils

For Men

Engineering Coordinating Council

Interfraternity Council (See Sororities and Fraternities)

Men's Interhall Council (See Hall Councils)

For Women

Junior Panhellenic Council (See Sororities and Fraternities)

Panhellenic Council (See Sororities and Fraternities)

For Both Men and Women

Business Administration Student Council

College of Education Academic Council

Foreign Language Council

Student Religious Council (See Religious Groups)

Honorary Groups

For Men

Alpha Delta Sigma (National advertising honorary fraternity)

Alpha Mu Sigma (Men's sophomore honorary fraternity)

Arnold Air Society (National honorary Air Force fraternity for advanced cadets.)

Blue Key (National honorary service)

Delta Phi Honorary Fraternity (Returned missionaries)

Kappa Kappa Psi (National band fraternity)

National Society of Pershing Rifles (National professional honorary for ROTC cadets)

Phi Eta Sigma (National scholastic honorary for freshman men)
Sigma Delta Chi (American Society of Journalists)
Sigma Gamma Epsilon (Earth science)

For Women

Alpha Lambda Delta (National scholastic honorary for freshman women)
Alpha Pi Epsilon (National secretarial honor organization)
Angel Flight (Honorary AFROTC Cadet officers for women)
Gamma Alpha Chi (National professional advertising fraternity for women)
Kaydettes (Sponsors for the Army Reserve Officers Training Corps)
Natani (Junior women's honorary)
Pleiades (Honorary service organization)
Sigma Alpha Iota
Spurs (Honorary service organization)
Tau Beta Sigma (National band sorority)
Women's "A" Club (Honorary association in sports)

For Both Men and Women

Alpha Epsilon Delta (National pre-medical honorary)
Alpha Mu Gamma (Foreign language)
Beta Beta Beta (Biology)
Gamma Theta Upsilon (National honorary professional geographic fraternity)
Kappa Delta Pi (National honor society in education)
Orchesis (Dance honorary)
Phi Kappa Phi (National honorary scholastic society)
Pi Delta Epsilon (National journalism honorary)
Pi Kappa Delta—Arizona Beta (forensic fraternity)
Pi Omega Pi (National business education honorary)
Psi Chi (Psychology honor club)

Professional Groups

For Men

Delta Sigma Pi - Gamma Omega Chapter (Business professional fraternity)
Phi Delta Kappa (Professional education fraternity)
Phi Epsilon Kappa (Men's physical education fraternity)
Pi Sigma Epsilon - Iota Chapter (National professional fraternity in marketing, sales management, and selling)

For Women

Phi Upsilon Omicron (Home Economics)

Special Interest Groups

For Men

American Institute of Electrical Engineers
Arizona State University DeMolay Club
ASU Finance Club
ASU Judo Club
Chemical Engineers Society

Circle K Club (Service club)
Industrial Arts Club of Arizona State University
Industrial Engineers Club
Institute of Radio Engineers
Off-Campus Men
Phi Epsilon Kappa (Men's Physical Education Fraternity)
Student Society of Civil Engineers
Student Society of Mechanical Engineers

For Women

Arizona State University Student Nurse's Association
ASU Racquet Club
Beta Chi Epsilon (Home economics)
Naiads (Swim Club)
Par Busters (Women's golf)
Phrateres International (National Off-Campus Women's Group)
Physical Education Majors and Minors—P.E.M.M.
Pom Pon Girls
Women's Athletic Association—W.A.A.

For Both Men and Women

Accounting Club
American Chemical Society, Student Affiliate
American Institute of Architects, Student Chapter
Arizona State University History Club
Association for Childhood Education, International
ASU Fencing Team
ASU Young Republicans
Dawa-Chindi (American Indian Club)
Der Deutsche Verein (German Club)
Devils n' Dames (Square dance)
Featherdusters (Badminton)
Foreign Student Club
Gymnastic Club
La Liga Panamericana (Promotes friendly relations among those interested in things Spanish)
Le Cercle Francais (French Club)
Los Conquistadores (Promotes the welfare of the Spanish-speaking students)
Philosophy Club
Russian Circle
Sigma Eta Kappa (Speech and hearing)
Society for the Advancement of Management
Sociology Club
Student Marketing Club
Student National Education Association of Arizona State University
Sun Devil Band
Sun Devil Rodeo Association
University Chorus
Young Democratic Club of Arizona State University

Religious Groups

Student Religious Council. Composed of representative students from all denominations. Promotes religious programs, and fosters religious living.

For Men

Lambda Delta Sigma - Phi Omega Chapter (L.D.S.)

For Women

Lambda Delta Sigma - Phi Alpha Chapter (L.D.S.)

For Both Men and Women

American Baptist Student Movement

Baha'i World Faith Club

Baptist Student Union

Baptist Young People Union

Campus Crusade for Christ (non-denominational)

Canterbury (Episcopalian)

Christian Science College Organization

Congregational Fellowship

Disciples Student Fellowship

Hillel (Jewish)

Liberal Religious Students (Unitarian)

Lutheran Student Association

Martin Luther Society

Newman Club (Roman Catholic)

Wesley Foundation (Methodist)

Westminster Fellowship (Presbyterian)

Sororities and Fraternities

Panhellenic Council. The Panhellenic Council is composed of representatives of each sorority with the Associate Dean of Students and/or a representative from her office as sponsors. Sponsors are members ex officio.

Junior Panhellenic Council. The Junior Panhellenic is composed of representatives from the pledge class of each sorority.

Sororities. The following Greek letter societies carry on the traditional objectives of each group:

Alpha Delta Pi (national)

Alpha Epsilon Phi (national)

Alpha Phi (national)

Alpha Sigma Alpha (national)

Chi Omega (national)

Delta Gamma (national)

Gamma Phi Beta (national)

Kappa Alpha Theta (national)

Kappa Delta (national)

Kappa Kappa Gamma (national)

Sigma Sigma Sigma (national)

Interfraternity Council. Composed of two elected representatives from each member fraternity and the faculty adviser. The Interfraternity Council is the liaison between individual fraternities and the Associated Students and University administration.

Fraternities. The following Greek letter societies carry on the traditional objectives of each group:

Alpha Epsilon Pi (national)
Alpha Gamma Rho (national)
Alpha Tau Omega (national)
Delta Chi (national)
Delta Sigma Phi (national)
Kappa Alpha Psi (national)
Lambda Chi Alpha (national)
Phi Delta Theta (national)
Phi Kappa Tau (colony)
Phi Sigma Kappa (national)
Pi Kappa Alpha (national)
Sigma Alpha Epsilon (colony)
Sigma Chi (national)
Sigma Nu (national)
Sigma Phi Epsilon (national)
Sigma Pi (national)
Tau Kappa Epsilon (national)
Theta Chi (national)
Theta Delta Chi (colony)

Hall Councils

For Men

East
Haigler
Hayden
Irish
M. O. Best A
M. O. Best B
Sahuaro

For Women

Gammage
McClintock A
McClintock B
North
Palo Verde
South
West
Wilson

Men's Interhall Council. Composed of representatives from all men's dormitories. The purpose of the Council is to coordinate the social and educational programs of dormitories, as well as serve as a general means of communications between dormitories.

Special Group Activities

Musical Activities

Opportunities are offered to all university students to become members of the performing organizations maintained by the Music Department. College credit is given for regular work in the Symphony Orchestra, Bands, University Chorus, Concert Choir, Opera Workshop, Men's Glee Club, and in special instrumental and vocal ensembles. Participation in any of the above groups without credit is also permissible. Students in these organizations give local concerts, radio and TV performances, and state-wide tours.

Intercollegiate Athletics—Men

The University is a member of the Border Conference, and is represented in such sports as football, basketball, track and field, baseball, tennis, golf, wrestling, swimming, and rodeo. The purpose of the program of intercollegiate athletics at Arizona State University is to provide the following important educational experiences all of which the faculty and the institution believe are fundamental to the American way of life: (a) To train students in legitimate methods of good sportsmanship, in competition, and in the will to win. (b) To aid in character development which includes cooperation and teamwork, leadership qualities, group loyalty, clean living and right thinking. (c) To contribute to the development of institutional morale, loyalty, and school spirit. (d) To supply wholesome recreation for the participants and other students. (e) To serve as a laboratory for the professional courses of those interested in physical education and coaching as a career.

Intercollegiate Athletics—Women

All intercollegiate athletics for women are sponsored by the Women's Athletic Association with membership on teams open to all college women. This type of competition includes sports-days with other colleges in the State. Telegraphic, sectional, national meets, and tournaments in tennis, golf, badminton, and archery are conducted. Competition is in only those sports activities offered in regular instructional class periods.

Intramurals—Men

The University has a well-rounded intramural sports program. The program is designed to serve the needs of all the men students at Arizona State University. The sports are geared to individual and team competition.

Intramural sports have met a necessary challenge in the area of school life since their inauguration in the school program. The yearly program includes many diversified activities with both individual and team sports covering a wide range of needs.

Included in the seventeen sports are: tennis, volleyball, horseshoes, basketball, track and field, cross-country, tag football, golf and bowling.

Intramurals—Women

The program of intramurals for women is sponsored by the Women's Athletic Association, a member of the National ARFCW, and includes both the restricted student and the physically normal student. The program for both groups include only those sport and dance activities offered in instructional class periods. The activities are open to all women in the University and are broad enough in scope to meet the interest of all women students.

Recreational Facilities

In addition to the recreational facilities provided in the dormitories and the Memorial Union Building, there are two modern heated swimming pools, a large modern gymnasium which has an annex, ten tennis courts, a number of playing fields, and limited athletic and recreational equipment for student use.

Speech and Dramatics

Forensics. The University offers an extensive program of intramural and intercollegiate forensics, including debate, extemporaneous speaking, oratory, impromptu speaking, discussion and radio speaking. This activity provides one of the few ways in which the students and the school can establish prestige in academic competition. Each year rival speakers from many of the nation's major colleges and universities are met. The school is affiliated with three forensic leagues—The Arizona Speech League, which sponsors an annual tournament among six colleges in the State; the Western Association of Teachers of Speech, which sponsors a fall tournament for all western states; and the Pi Kappa Delta League, which holds a biannual national tournament, as well as tournaments in the western region. Students become eligible for membership in Pi Kappa Delta, national honorary speech fraternity, by a stipulated degree of proficiency in forensics.

Dramatics. The work in dramatics is designed to accomplish the following objectives: (1) To develop talent through participation in plays, recitals, and production. (2) To fulfill the social and therapeutic functions of dramatics in cases of defective personality. (3) To improve audience standards of entertainment. Active participation in dramatics may lead to an invitation to membership in Mask and Sandal, the local dramatics club, or Alpha Psi Omega, national dramatic fraternity.

Radio and Television

Station KASN. The Bureau of Broadcasting maintains a carrier current station for the training of students in radio station operation. Students may work on such jobs as writing, programming, continuity, and traffic. KASN provides students enrolled in Mass Communication classes with a working laboratory completely equipped with the finest professional radio facilities.

Station KAET. In extending the resources of the University to the entire State of Arizona, Arizona State operates KAET, a non-commercial, educational television station on Channel 8. Operation of KAET is carried on by the Bureau's staff of professional educational broadcasters. The station broadcasts over 25 hours per week of local and NET programs to help meet the educational needs of the community.

Students majoring in Radio-Television, and others interested in participating on an extra-curricular basis, assist in the operation of KAET. Courses in radio and television are closely related to the operation of KAET and KASN. Student participation includes art work, properties, dramatic performances, writing, directing, and experience in other phases of radio and television broadcasting.

Student Publications

The State Press. Under the combined auspices of the Administration, the Department of Mass Communications, and the Associated Students, there is published twice weekly throughout the year a university-owned, student-operated newspaper, the *State Press*. It is distributed to students on campus, student subscriptions being included in the activity fee. Staff work on the *State Press* serves as professional training for students enrolled in journalism courses, and lends weight to student applications for jobs on metropolitan daily newspapers, commercial weekly newspapers, and various other work in the mass media industry. In general charge of this and other student publications is the Board of Student Publications, equally representing the faculty, the administration, and the Associated Students, with a journalism faculty member as chairman. The Board selects student editors, who in turn select their own staffs and exercise the editorial responsibility within broad standards established by the Board. Financial and budgetary matters are under the control of the Associated Students.

Sahuaro. The University yearbook, *Sahuaro*, is student-edited and published under the auspices of a faculty appointed supervisor. The supervisor and the outgoing staff select incoming editors. Art and photography students, future teachers planning to supervise high school publications, and others interested in a major student activity find *Sahuaro* work especially rewarding.

College of Liberal Arts

Purpose

The College of Liberal Arts aims to give the student an opportunity to secure a well-rounded liberal education. Life in a changing world calls for a broad training and an appreciative understanding of the varied elements in our own and other cultures. Today the peoples of various nationalities, languages, religions, and vocational interests intermingle in a human society increasingly interdependent and bound together by improved means of communication, transportation, trade, and governmental cooperation. Peaceful and effective living in such a world requires flexibility in personal equipment and ability to make quick and intelligent adjustments in the social as well as the physical environment.

The liberally educated person will have facility with his own, and preferably one or more other languages; he will possess an understanding of himself and a broad knowledge of his physical, social, moral, and spiritual environment; he will be able to deal effectively with the problems of his day in the light of the most reliable and tested knowledge of his time; he will have an appreciative understanding of the fine arts and find enjoyment in them; he will be able to live and act in the home, the local community, the nation, and the international community as an informed, responsible, and understanding human being.

The degree requirements are so arranged as to acquaint the student with the main fields of human knowledge and, at the same time, to bring to light his special aptitudes and interests. Although emphasizing breadth of training, the curriculums permit such a degree of specialization as to prepare the student for work in a professional school, for graduate study, or for the duties of a vocation. Within the limits of the curriculum chosen, the student may elect to take a part of his work among the course offerings of the Colleges of Education, Business Administration, and Applied Arts and Sciences.

Organization

The College of Liberal Arts is divided as follows:

DIVISION OF BEHAVIORAL AND SOCIAL SCIENCES

Department of History

Department of Political Science

Department of Psychology and Philosophy

Department of Sociology and Anthropology

DIVISION OF FINE ARTS

Department of Art
Department of Music

DIVISION OF HEALTH, PHYSICAL EDUCATION, AND RECREATION

Department of Air Science
Department of Health, Physical Education, and Recreation
Department of Intercollegiate Athletics
Department of Military Science

DIVISION OF HOME ECONOMICS

Department of Home Economics

DIVISION OF LANGUAGE AND LITERATURE

Department of English
Department of Foreign Languages
Department of Humanities
Department of Mass Communications
Department of Speech and Drama

DIVISION OF LIFE SCIENCES

Department of Botany
Department of Zoology
Poisonous Animals Research Laboratory

DIVISION OF PHYSICAL SCIENCES

Department of Chemistry
Department of General Physical Sciences
Department of Geography
Department of Geology
Department of Mathematics
Department of Physics

SCHOOL OF NURSING

In addition to the instructional organization indicated above, the College includes a Bureau of Government Research within the Division of Behavioral and Social Sciences which publishes studies on state and local government in Arizona, cooperates with public officials and interested community organizations on the study of Arizona governmental problems, and assists in public service training.

Bachelor's Degrees

The College of Liberal Arts offers four bachelor's degrees: the Bachelor of Arts, the Bachelor of Science, the Bachelor of Music, and the Bachelor of Science in Nursing. The first two are similar in that both require 126 semester hours of credit for graduation and call for a considerable distribution of studies; yet they also permit of specialization. Indeed, they require sufficient stress in major fields to insure some degree of mastery in particular fields.

In general, the distinction between the curriculums offered for these two degrees lies in the fact that for the Bachelor of Arts degree, emphasis is placed on a broader, humanistic program, whereas for the Bachelor of Science, greater emphasis is placed on a special scientific field.

The Bachelor of Music degree proposes to give to the student a broad general background in the principal fields of human knowledge and to give training of professional calibre in musical performance and music theory. One hundred thirty-two semester hours of credit are required for graduation with at least eighty-four of these in Music. Two majors are offered, the first in Applied Music and Theory and the second in Sacred Music.

The School of Nursing offers the degree of Bachelor of Science in Nursing. This is a four-year program requiring 128 semester hours of credit for graduation. It is the intent of this program not only to permit the student to receive her bachelor's degree in a collegiate program of nursing which includes a broad background in general education, but also to provide the learning experiences which will help the student develop the professional nursing skills necessary to function in any branch of nursing.

Master's Degrees

A graduate program consisting of a minimum of 30 semester hours of approved work in a special field of study leads to master's degrees in the following fields:

Degree	Fields of Specialization
Master of Arts	Art
	English
	French
	German
	History
	Humanities
	Mathematics
	Music
	Political Science
	Psychology
	Sociology
	Spanish
	Master of Fine Arts
Master of Music	
Master of Natural Sciences	
Master of Public Administration	
Master of Science	Biological Science
	Chemistry
	Home Economics
	Physical Education
	Physics

For specific reference to these programs, see page 207 of this catalog.

Doctor's Degrees

A graduate program consisting of three academic years of work beyond the bachelor's degree as prescribed by the Graduate Council leads to the Doctor of Philosophy degree in the following fields:

Doctor of Philosophy	Chemistry
	English
	Physics
	Psychology

For specific reference to the programs in these fields, see page 212 of this catalog.

Honors Program

Purpose of the Program

The Honors Program is designed for students of exceptional ability who are interested in scholarly attainment. Through this program, it is hoped to encourage the student to develop an awareness of the inter-relatedness of all knowledge and experience, and to make him more concerned with basic values—intellectual, aesthetic, social, and ethical. Wide reading, thorough scholarship, and independent creative work are emphasized throughout the program.

Admission to the Program

Students may be admitted to the Honors Program on the basis of their previous academic record, specialized tests, and a conference with an examining committee of the Honors Council.

Description of the Program

Students admitted to the Honors Program will spend a considerable portion of their time in the serious study of the general field of their major and will also do some work in related fields and in General Education. The work includes: (1) general reading and discussion covering the entire major field, with emphasis on those areas not covered by formal courses, plus such work in related fields as may seem desirable; (2) specialized and intensive work in some phase of the major field selected by the student in consultation with his Honors adviser and approved by the department of his major. The student's thesis, or creative project, will be within this field of specialized work.

The program has the same general requirements for graduation as exist within the regular degree programs in the College of Liberal Arts. In order to stimulate the student to do outstanding work, the adviser, operating under the rules established by the Honors Council, may substitute work on a higher level than that stipulated in the General Education or major requirements

but always within the same field. A student in the Honors Program may, with permission of his adviser and the Chairman of the Honors Council, enroll in any undergraduate course in the College. Seniors may enroll in graduate courses with the consent of the Dean of the Graduate College.

When enrolled in the Liberal Arts Honors Program, the full-time student, with the consent of his adviser and the instructor involved, may attend without credit, any class in the College of Liberal Arts.

Graduation Requirements

For graduation With Honors, the student must pass a comprehensive examination in his major area. In addition, he must present to the Honors Council an acceptable honors project consisting of a thesis, or an equivalent creative project. This thesis, or creative project, must be defended in an oral examination before an examining committee of the Honors Council. A cumulative grade index of 3.20 is required for graduation With Honors.

Students successfully completing the program will be graduated *magna cum laude* or *summa cum laude* in recognition of their scholarly achievements. (See page 83).

Bachelor of Arts Degree Curriculum

The curriculum for the degree of Bachelor of Arts is designed to give the student a broad, general background in the principal fields of human knowledge and a reasonable amount of specialized training in a selected area. It is divided into three parts:

General Education Requirements

The general education program consists of 40 semester hours of approved courses, of which 12 semester hours must be in upper division work (courses numbered 300 and above).

Communications	6 sem. hrs.
Humanities	8 sem. hrs.
Behavioral and Social Sciences.....	8 sem. hrs.
Sciences and Mathematics	8 sem. hrs.
Physical Education and Health.....	1 sem. hr.
General Education Electives.....	9 sem. hrs.

All courses in general education will be selected by the adviser in consultation with the student from among those approved courses listed on page 78 of the catalog.

Major Requirements

A major shall consist of 45 semester hours of credit. Not more than 30 semester hours may be in a single subject field and at least 15 must be in one or more different but related subject fields. The content of the major is determined by the adviser in consultation with the student under the rules and regulations of the department concerned. At least 18 semester hours must be in upper division courses.

The majors in the following list which are marked with an asterisk (*) require a four-year sequence of courses. A student who elects them after the first semester of his college career must therefore expect to spend more than four years in attaining the bachelor's degree. Majors not marked with an asterisk can be completed in three years or less, and may therefore be elected at the beginning of the sophomore year with no loss of time.

Division	Major
Behavioral and Social Sciences	Anthropology
	Economics
	History
	Philosophy
	Political Science
	Psychology
	Sociology
	Social Welfare
Fine Arts	Fine Arts
	Music
Health, Physical Education, and Recreation	Health Education
	Physical Education
	Recreation
Home Economics	Clothing, Textiles, and Related Arts
	Family Life and Child Development
	*Foods and Nutrition
	General Home Economics
Language and Literature	Dramatics
	English
	*French
	*German
	Humanities
	Journalism
	Radio-Television
	*Spanish
Speech	
Life Sciences	Biology
Physical Sciences	Chemistry
	Geography
	Geology
	Mathematics
	Physics

Additional Degree Requirements

1. Knowledge in one foreign language equivalent to the level obtained through 16 hours of instruction on the college level. This requirement may be fulfilled in whole or in part through language instruction in secondary schools or by other means. If acquired in secondary school, two

years of instruction in foreign language will be considered the equivalent of one year of instruction on the college level. A student who desires to fulfill the entire requirement through language study in secondary schools or in other non-collegiate institutions must pass a proficiency examination given by Arizona State University in satisfaction of the total requirement.

2. All candidates for graduation in the Bachelor of Arts degree curriculum are required to present at least 50 hours of upper division courses.
3. A cumulative scholarship index of 2.00 is required for graduation and no credit will be granted toward fulfilling major requirements in any upper division course in the student's major unless the grade in that course is at least a C.
4. All students, except those who receive a grade of B or better in EN 102, or who were exempt from that course, shall, before the end of their sophomore year, take and pass a Written English Proficiency Examination. Failure to take this examination at the proper time or failure to pass it will make them ineligible to take upper division courses. This ineligibility will continue until such time as they pass a subsequent examination.
5. At least 60 hours, *not including the major*, must be taken in the following areas:

All courses in Anthropology, Art History, Biology, Botany, Drama, Economics, Educational Psychology, English, Entomology, Foreign Languages, History, Humanities, Mathematics, Microbiology, Philosophy, Physics, Political Science, Psychology, Social Foundations (Education), Sociology, and Zoology.

In the following areas, all courses *except* those specifically listed may be counted toward the fulfillment of this requirement: Chemistry, all courses except CH 300; Geography, all courses except GE 211 and 341; Geology, all courses except GL 215, 319, and 360; Health Education, all courses except HE 371, 461, and 470; Home Economics, all courses except HO 123, 131, 142, 321, 341, 343, 422, 423, 424, 431, 437, 452, 454, and 480; Journalism, all courses except JO 211, 212, 311, 313, 315, 320, and 413; Music, all courses except those in Music Performance and MU 211, 311, 312, 461, 465, and 480; Speech, all courses except SE 315 and 316.

In the following departments, only those courses listed may be taken for credit for the fulfillment of this requirement: Architecture 100, 311, 312, 413, and 414; General Physical Sciences, PL 110, 360, and 410g; Physical Education, PE 280, 285, and 286.

Curriculum Outline

The following is a suggested outline to indicate to the adviser and student one way in which the general education, major, and elective requirements may be worked into the first year of study.

FIRST YEAR			
First Semester	Hours	Second Semester	Hours
EN 101 First Year English.....	3	EN 102 First Year English.....	3
AS 101 Basic Air Science or MS 101 Basic Military Science.....	0.5	AS 102 Basic Air Science or MS 102 Basic Military Science.....	1.5
PE 101 Freshman Physical Educ.....	0.5	PE 102 Freshman Physical Educ.....	0.5
Foreign Language.....	4	Foreign Language.....	4
Electives to fulfill major and general education requirements 6 to 8		Electives to fulfill major and general education requirements 6 to 8	

Bachelor of Science Degree Curriculum

The curriculum for the degree of Bachelor of Science is designed to give the student a broad general background in the principal fields of human knowledge and an opportunity to specialize in one specific selected area of scientific endeavor. It is divided into three parts:

General Education Requirements

The general education program consists of 40 semester hours of approved courses, of which 12 semester hours must be in upper division work (courses numbered 300 and above).

Communications	6 sem. hrs.
Humanities	8 sem. hrs.
Behavioral and Social Sciences	8 sem. hrs.
Sciences and Mathematics	8 sem. hrs.
Physical Education and Health	1 sem. hr.
General Education Electives	9 sem. hrs.

All courses in general education will be selected by the adviser in consultation with the student from among those approved courses listed on page 78 of the catalog. In category IV, *Sciences and Mathematics*, the student must take at least one course in the Physical Sciences, one course in the Life Sciences, and one course in Mathematics. One of these courses must be a laboratory science. The additional work in this category is a required part of the general education electives.

Major Requirements

A major shall consist of from 45 to 55 semester hours of credit. The content of the major is determined by the adviser in consultation with the student under the rules and regulations of the department concerned. At least 40 per cent of the major must be in upper division courses.

The majors in the following list marked with an asterisk (*) require a four-year sequence of courses. A student who elects them after the first semester of his college career must therefore

expect to spend more than four years in attaining the bachelor's degree. Majors not marked with an asterisk can be completed in three years or less, and may therefore be elected at the beginning of the sophomore year with no loss of time.

Division	Major
Behavioral and Social Sciences	Anthropology
	Economics
	Political Science
	Psychology
	Sociology
Fine Arts	Social Welfare
	Applied Arts
Health, Physical Education, and Recreation	Boys' Club Administration
	Health Education
	Physical Education
	Recreation
Home Economics	Clothing, Textiles, and Related Arts
	Family Life and Child Development
	*Foods and Nutrition
	General Home Economics
Life Sciences	Botany
	Entomology
	Biology
	Microbiology
	*Physiological Zoology
	Wildlife Biology
Physical Sciences	Zoology
	*Chemistry
	Geography
	Geology
	Mathematics
	Physical Sciences
	Physics

Additional Degree Requirements

1. All candidates for graduation in the Bachelor of Science degree curriculum are required to present at least 50 hours of upper division courses.
2. A cumulative scholarship index of 2.00 is required for graduation and no credit will be granted toward fulfilling major requirements in any upper division course in the student's major unless the grade in that course is at least a C.
3. All students, except those who receive a grade of B or better in EN 102, or who were exempt from that course, shall, before the end of their sophomore year, take and

pass a Written English Proficiency Examination. Failure to take this examination at the proper time or failure to pass it will make them ineligible to take upper division courses. This ineligibility will continue until such time as they pass a subsequent examination.

- At least 60 hours, *not including the major*, must be taken in the following areas:

All courses in Anthropology, Art History, Biology, Botany, Drama, Economics, Educational Psychology, English, Entomology, Foreign Languages, History, Humanities, Mathematics, Microbiology, Philosophy, Physics, Political Science, Psychology, Social Foundations (Education), Sociology, and Zoology.

In the following areas, all courses *except* those specifically listed may be counted toward the fulfillment of this requirement: Chemistry, all courses except CH 300; Geography, all courses except GE 211 and 341; Geology, all courses except GL 215, 319, and 360; Health Education, all courses except HE 371, 461, and 470; Home Economics, all courses except HO 123, 131, 142, 321, 341, 343, 422, 423, 424, 431, 437, 452, 454, and 480; Journalism, all courses except JO 211, 212, 311, 313, 315, 320, and 413; Music, all courses except those in Music Performance and MU 211, 311, 312, 461, 465, and 480; Speech, all courses except SE 315 and 316. In the following departments, only those courses listed may be taken for credit for the fulfillment of this requirement: Architecture 100, 311, 312, 413, and 414; General Physical Sciences, PL 110, 360, and 410g; Physical Education, PE 280, 285, and 286.

Curriculum Outline

The following is a suggested outline to indicate to the adviser and student one way in which the general education, major, and elective requirements may be worked into the first year of study.

FIRST YEAR

First Semester	Hours	Second Semester	Hours
EN 101 First Year English.....	3	EN 102 First Year English.....	3
AS 101 Basic Air Science or MS 101 Basic Military Science.....	0.5	AS 102 Basic Air Science or MS 102 Basic Military Science.....	1.5
PE 101 Freshman Physical Educ.....	0.5	PE 102 Freshman Physical Educ.....	0.5
Electives to fulfill major and general education requirements 6 to 8		Electives to fulfill major and general education requirements 6 to 8	
Other electives to complete 15 to 17 hours.		Other electives to complete 15 to 17 hours.	

Bachelor of Music Degree Curriculum

The curriculum for the degree of Bachelor of Music is designed to give the student a broad general background in the principal fields of human knowledge, and training of a professional calibre in musical performance, music theory, composition, and sacred music.

Placement tests in theory, piano, and a major performing medium are required of all freshman and transfer students.

The curriculum is divided into three parts:

General Education Requirements

The general education program consists of 40 semester hours of approved courses, of which 12 semester hours must be in upper division work (courses numbered 300 and above).

Communications	6 sem. hrs.
Humanities	8 sem. hrs.
Behavioral and Social Sciences	8 sem. hrs.
Sciences and Mathematics	8 sem. hrs.
Physical Education and Health	1 sem. hr.
General Education Electives	9 sem. hrs.

All courses in general education will be selected by the adviser in consultation with the student from among those approved courses listed on page 78 of the catalog.

Major Requirements

A major shall consist of 84 semester hours of credit in music. The content of the major is determined by the adviser in consultation with the student under the rules and regulations of the Music Department.

Additional Degree Requirements

1. Knowledge in one foreign language equivalent to the level obtained through 16 hours of instruction on the college level. This requirement may be fulfilled in whole or in part through language instruction in secondary schools or by other means. If acquired in secondary school, two years of instruction in foreign language will be considered the equivalent of one year of instruction on the college level. A student who desires to fulfill the entire requirement through language study in secondary schools or in other non-collegiate institutions must pass a proficiency examination given by Arizona State University in satisfaction of the total requirement.
2. All candidates for graduation in the Bachelor of Music degree curriculum are required to present at least 50 hours of upper division courses.
3. A cumulative scholarship index of 2.00 is required for graduation and no credit will be granted toward fulfilling major requirements in any upper division course in the student's major unless the grade in that course is at least a C.
4. All students, except those who receive a grade of B or better in EN 102, or who were exempt from that course, shall, before the end of their sophomore year, take and pass a written English Proficiency Examination. Failure to take

this examination at the proper time or failure to pass it will make them ineligible to take upper division courses. This ineligibility will continue until such time as they pass a subsequent examination.

5. All students majoring in music are required to attend 25 approved recitals as set up by the faculty during the school year as partial fulfillment of the course requirements in their major performing field.

The Department of Music is a member of the National Association of Schools of Music, and the requirements for entrance and graduation set forth in this catalog are in accordance with the published regulations of that association.

Special Programs

Foreign Service Training Program

Training for the Foreign Service is designed to prepare the student for Department of State examinations for the position of Foreign Service Officer or Information Officer. Requirements for this examination include no specific courses, although an effective reading and speaking knowledge of at least one foreign language is mandatory. A sequence of recommended courses has been prepared based upon a careful study of prior examinations, and a copy of these recommendations may be obtained from the Foreign Service Training Program adviser.

General knowledge and good oral and written expression are essential in this examination. Although competition is keen, the State Department reports that the number of students who pass is high, especially among graduate students.

For specific requirements for the Foreign Service Examinations, the interested student should consult with the Foreign Service Training Program adviser. Copies of recent examinations may be had by writing to the Department of State, Washington, D.C.; or from the Placement Office on campus.

In selecting a major, the student interested in the Foreign Service would do well to major in political science, history, or economics. However, a major in Spanish, French, or German, supplemented by minors in both political science and history, would be acceptable.

Latin-American Area Studies

Arizona State University, in the hope of strengthening the State's position in Hispanic-American affairs, offers a program of studies designed to be of cultural and vocational value. Governmental departments and agencies, as well as innumerable private organizations, are constantly in need of persons trained in Latin-American affairs.

The program is intended primarily to acquaint American students with the culture and development of Latin America. The course of studies stresses a broad knowledge of Spanish, Latin-American literature, history, economics, geography, government, architecture, music, and art.

It is recommended that the student select a major in one of the social sciences, with minor areas in Spanish and geography, selected from within the curriculum leading to the degree of Bachelor of Arts.

Medical Technology

This curriculum is designed to prepare students for a career in medical technology. The program consists of a three-year period of resident study at the University and one year of practical hospital internship. Students who have completed 94 semester hours at Arizona State University with a scholarship index of 2.00 or above, and have satisfied the general education requirements of the College of Liberal Arts for the degree of Bachelor of Science, may obtain the degree after completing a full year's work (not less than 32 semester hours) with an average grade of C or above in an approved hospital offering an accredited program in medical technology, providing, before entering the hospital, the student secures a statement in writing from the Dean of the College of Liberal Arts, giving senior-in-absentia privileges. The student, at the end of his year in the hospital medical technology program, must have completed a total of 126 semester hours of college credit.

Students who begin their internship in June or July will not find it possible to complete the 12 month's program in time to graduate the following May. Students may not participate in the commencement exercises until all requirements for the degree have been completed. Students should consult the medical technology curriculum adviser and the Dean of the College of Liberal Arts to be certain that all arrangements, including those for graduation, are clearly understood. Following completion of the hospital program, the student shall request that a transcript of credits and a statement recommending that the degree be granted be forwarded from the hospital school to the Registrar, Arizona State University.

Pre-Dental, Pre-Medical, and Pre-Osteopathy

While schools of medicine, osteopathy, and dentistry indicate in their catalog that students may occasionally be admitted with only two or three years of pre-medical training, the competition for admittance is so great that few students can hope for admission unless they have completed the work for their bachelor's degree with a scholarship index of at least 3.00.

The requirements for entrance into schools of medicine, dentistry, and osteopathy are very similar. The following analysis of admission requirements to medical schools, prepared by the Asso-

ciation of American Medical Colleges, is *apropos*. "Medical schools differ in the specific subjects they require of their applicants. All medical schools require some college work in chemistry, biology, and with one exception, physics. More work is specified in chemistry than any other single subject. Courses in both general and, with one exception, organic chemistry are required by all of the medical schools; quantitative analysis is specified by roughly half, and qualitative analysis and physical chemistry are specified by less than a quarter of the schools. Half of the medical schools require that the total number of semester hours spent in these chemistry courses be 16 or more, while the comparable figure for both biology and physics is 8 semester hours. Required courses in biology, other than general biology and zoology, include comparative anatomy and embryology, specified by approximately a quarter of the schools; and anatomy, genetics, micro-technique, etc., listed by only one or two schools. Nineteen of the medical schools require one or more courses in mathematics. English is a general requirement of almost all of the schools, and about half of them specify some knowledge of a foreign language. Only 18 of the medical schools require any work in the social sciences, although most of the medical schools believe such work helps to round out the liberal arts background of applicants. The total semester hours of required courses in all fields varies from 27 specified by Cornell to 84 hours for Alabama."

Approximately seventy-five per cent of the professional schools of the United States require less than forty semester hours in science and mathematics. While additional work in these fields may be taken, the professional schools generally suggest that the prospective student secure a broad, general education, postponing his professional training until he enrolls in a professional school. They generally recommend study in English, the social sciences, psychology, and other subjects of interest to the student.

At the present time, many more students qualify for entrance into the professional schools than can be admitted. It is advised that those who plan medical careers select their major and electives in such a way as to prepare for a possible alternate career in the event that they are not able to secure immediate admission to the school of their choice. Students may major in almost any field in the Arts and Sciences curriculums, but majors in chemistry, biology, psychology, medical technology, and physiological zoology are most common.

The student should consult the pre-medical adviser and discuss with him the program of studies necessary to qualify for admission to the professional schools in which the student may desire to register. The student will major in a specific field and the pre-medical adviser will refer him to the adviser in his field. It is wise, however, for the student to keep in touch with the pre-medical adviser, regardless of his major field of study, in order to keep abreast of any changes in admission requirements in the professional schools in which he is interested.

A few medical schools admit students upon completion of three years of college work. Under the guidance of the pre-medical adviser, work may be taken without reference to the requirements of a degree, and the only degree obtained will be that in medicine at the end of three additional years at medical school.

Students who have completed 94 semester hours at Arizona State University with a scholarship index of 2.00 or above in all hours attempted, and have satisfied the general education and major requirements of the College of Liberal Arts for the degree of Bachelor of Arts or Bachelor of Science, may obtain the degree after completing a full year's work in an accredited school of medicine with an average grade of "C" or above, providing, before entering the school of medicine, the student secures a statement in writing from the Dean of the College of Liberal Arts giving senior-in-absentia privileges. In order to receive the degree in this manner, the student must, at the end of his first year in medical school, have completed a total of 126 semester hours of college credit and present a signed testimonial from the Dean of the Medical School to the Registrar at Arizona State University, which shall include a statement of courses taken, grades achieved, and a recommendation that the degree be granted.

Pre-Law

The requirements for admission to law schools vary from a minimum of three years of pre-legal college work to a four-year program leading to a bachelor's degree. The pre-law student should obtain a copy of the catalog of the law school that he plans to attend and plan his course of study under the guidance of his adviser.

The Association of American Law Schools has indicated that pre-law education should provide the student with: (a) ability in the comprehension and expression of words; (b) the critical understanding of human institutions and values with which the law deals; (c) creative power in thinking. The Association does not recommend any particular courses or sequence of courses for pre-legal training.

The leading law schools prefer that their students shall have completed four years of college work before entrance. Students planning to enter a law school requiring a bachelor's degree for entrance may register within any of the major fields in the Arts and Sciences curriculums, or in the Business Administration curriculum, paying due regard to the recommendations in the preceding paragraph. The student should check carefully in the catalog of the law school which he hopes to attend in order to determine the entrance requirements of that school.

A few law schools admit students upon completion of three years of college work. Under the guidance of the pre-law adviser, work may be taken without reference to the requirements of a degree, and the only degree obtained will be that in law at the end of three additional years at law school.

Students who have completed 94 semester hours at Arizona State University with a scholarship index of 2.00 or above in all hours attempted, and have satisfied the general education and major requirements of the College of Liberal Arts for the degree of Bachelor of Arts or Bachelor of Science, may obtain the degree after completing a full year's work in an accredited school of law with an average grade of "C" or above, providing, before entering the school of law, the student secures a statement in writing from the Dean of the College of Liberal Arts giving senior-in-absentia privileges. In order to receive the degree in this manner, the student must, at the end of his first year in law school, have completed a total of 126 semester hours of college credit and present a signed testimonial from the Dean of the Law School to the Registrar at Arizona State University, which shall include a statement of courses taken, grades achieved, and a recommendation that the degree be granted.

Students planning a pre-law program which provides for a bachelor's degree should select a major field of specialization not later than the beginning of his sophomore year. The pre-law adviser will refer him to the adviser in the specific field chosen to see that he meets the requirements for the bachelor's degree at Arizona State University.

Pre-Ministerial

Students preparing to enter a Theological Seminary for advanced training leading to a degree in theology, should secure the catalog of the institution which they hope to enter and be guided by its recommendations during their preliminary training. Although no required course of preliminary training is offered at Arizona State University, it is suggested that the student follow the curriculum leading to the degree of Bachelor of Arts with a major in one of the social sciences (including history, sociology, and economics) and minors in English literature and psychology.

Pre-Occupational, Pre-Physical Therapy

Upon completion of the bachelor's degree within either of these programs, a student is qualified to enroll in the one year certificate program offered in approved schools of occupational or physical therapy. Customarily, an internship of from nine to eighteen months is required beyond the certificate year to complete the student's training.

Students desiring to specialize in one of these fields should major in physical education with a pre-occupational or pre-physical therapy emphasis. The student's adviser in the Department of Health, Physical Education, and Recreation will indicate the courses essential in the student's preparation to qualify for admission to the professional school.

Pre-Optometry

The general requirements for entrance to most schools of optometry include a total of sixty (60) hours, grouped as follows:

English Composition, 6 hours; Chemistry, 8-9 hours; Biological Sciences, 8 hours; Psychology, 3-6 hours; the remaining hours being chosen from the social sciences and humanities. It is strongly urged that a prospective optometry student obtain a catalog from the school he plans to enter, and that he follow their specific courses. The following courses taught at Arizona State University will meet the entrance requirements of most schools of optometry: EN 101, 102; MA 117, 118, 120; CH 113, 115; PY 100, 180; PE 101, 102; PH 111, 112; ZO 100; SE 100; 12 hours of social sciences and humanities electives.

Pre-Pharmacy

The requirements for admission to a college of pharmacy are limited to one year of pre-pharmacy training. The pre-pharmacy student should obtain a copy of the catalog of the college of pharmacy that he plans to attend and work out his course of study under the guidance of his adviser. The following program will meet the entrance requirements of most schools of pharmacy. The student should have an average of 2.50 or better in this work.

FIRST YEAR			
First Semester	Hours	Second Semester	Hours
EN 101 First Year English.....	3	EN 102 First Year English.....	3
CH 113 General Chemistry.....	4	CH 115 General Chemistry and Qualitative Analysis.....	5
ZO 100 General Zoology.....	4	BO 100 General Botany.....	4
MA 117 College Algebra.....	3	MA 118 Trigonometry.....	3
MS 101 Basic Military Science or AS 101 Basic Air Science.....	0.5	MS 102 Basic Military Science or AS 102 Basic Air Science.....	1.5
PE 101 Freshman Physical Education.....	0.5	PE 102 Freshman Physical Education.....	0.5
	15		17

Public Service Training Program

It is anticipated that persons applying for positions in the public service in non-technical fields will have a broad cultural education with an adequate knowledge of political science, psychology, history, English, sociology, and economics. Non-technical Civil Service examinations stress the breadth of knowledge of a liberally educated person, his ability to reason clearly, his ability to quickly and accurately grasp and understand detail, and his rapidity and accuracy of judgment. While no program of courses is endorsed by the Federal Civil Service Commission, a study of the examinations given indicate that course work in the fields listed above could be profitably taken as preparation for a career in the public service. The student should remember that high grades and outstanding accomplishments during his educational preparation are highly desirable indications of probable ability and are important factors in a Civil Service examination.

Students on the undergraduate level preparing for public service should enroll in the curriculum leading to the Bachelor of Arts or to the Bachelor of Science degree, and major in political science with emphasis in public administration. Graduate stu-

dents enrolling in the public administration program should apply under the curriculum leading to a Master of Public Administration degree.

A listing of recommended courses for the program may be obtained from the Public Service Training Program adviser.

In cooperation with state and local governmental units, a Bureau of Government Research in this and related programs is maintained in the Department of Political Science.

School of Nursing

History and Purpose

The School of Nursing, approved on February 24, 1957, as an integral part of the College of Liberal Arts, is a professional school which functions within the general framework and philosophy of Arizona State University. In September, 1957, Arizona State University first offered to qualified high school graduates a basic four-year collegiate program leading to the degree of Bachelor of Science in Nursing. *Registered Nurses are admitted to this program with advanced standing.*

The program of the School of Nursing has been approved by the Arizona State Board of Nurse Registration and Nursing Education since 1957, and in 1958 the School became a member of the Council of Member Agencies for the Baccalaureate and Higher Degree Programs of the National League for Nursing and the Western Council on Higher Education for Nursing. In November, 1959, the School was approved by the Army Nurse Corps, so that qualified students may apply for the Army Student Nurse Program. Graduates of the School of Nursing are eligible to take the State Board Examination for licensure as registered nurses.

The purpose of this program, which leads to a Bachelor of Science in Nursing degree, is to prepare students for beginning professional nursing positions under supervision in Psychiatric, Maternal and Child Health, Medical and Surgical, and Public Health Nursing; and to provide a foundation for further specialization in clinical nursing, supervision, administration and teaching.

Philosophy

The School of Nursing contributes to the improvement of society through the preparation of competent professional nurses.

The School of Nursing believes that the professional nurse is one who is able not only to give comprehensive nursing care in the hospital, home or community agency, but is also able to function as a participating member of professional and citizen's groups.

engaged in the promotion of health, prevention of disease and care of the sick. The professional nurse also contributes to nursing research, upholds the ideals of the nursing profession, works toward its continued improvement and growth, and interprets her profession to society.

The School of Nursing believes that courses in the humanities and the social, behavioral, physical and biological sciences are an integral part of the curriculum, contributing to the student's depth and breadth of understanding.

The School of Nursing believes that there must be recognition of the individual student's level of development and needs in order that there may be the selection of learning experiences necessary for optimum personal and professional growth.

Objectives

The objectives of the School of Nursing are to assist the student to:

1. Develop the knowledge, appreciations, attitudes, and skills which enable a nurse to function effectively as a member of the health team in meeting the physical, social, psychological, spiritual, and health educational needs of the patient, family, and community.
2. Understand the common phenomena of one's physical environment, to apply habits of scientific thought to personal, professional, and civic problems, to appreciate the implications of scientific discoveries for human welfare, and to apply scientific principles in the promotion of health.
3. Acquire and use the skills and habits involved in critical and constructive thinking.
4. Understand the ideas of others and to express one's own effectively.
5. Participate actively as an informed and responsible member of the nursing profession in solving professional problems.
6. Develop as a responsible and creative citizen of the local, state and international community.

General Information

Scholarships

For information regarding scholarships and loans, see "Financial Assistance and Awards," page 93. Information about other loan funds for student nurses may be obtained from the Director of the School of Nursing.

Fees

The fees for attendance at Arizona State for nursing students are the same as for other students, listed in the current general catalog, with the addition of fees for clinical nursing courses, and special tests. Uniforms, uniform shoes, a watch with a second hand, and bandage scissors must be provided by the student. Bandage scissors may be purchased at the University Bookstore.

Student Health

In addition to the health policies required by the University, the nursing student is responsible for having an annual physical examination. Each spring students will be supplied with physical examination forms. The physical examination may be completed during the summer and the reports returned to the health service before fall semester begins. The nursing student will also have an annual chest X-ray at Student Health Service. Those students whose diphtheria, tetanus, polio and smallpox immunizations are not current will be required to start these series during spring semester of the freshman year.

Student Activities

The nursing student is a member of the general student body of the University and selects and participates in those campus activities which are of interest to her.

Student nurses, selected by the student body of the School of Nursing, serve on various committees of the School of Nursing.

Students of the School of Nursing are eligible for membership in the Arizona Association of Student Nurses and the National Student Nurse Association.

Academic Standing

A student must maintain a cumulative index of 2.00 and achieve a minimum grade of "C" in all nursing courses in order to remain in the nursing major. Students who may have deficiencies in subject matter preparation may be required to complete additional university credit course-work which may not be applied toward a nursing degree. This requirement applies both to deficiencies in secondary preparation and, in the case of registered nurses, to clinical nursing deficiencies.

Well-prepared beginning students can usually complete the plan of study leading to the degree of Bachelor of Science in Nursing in four years. In general, the curriculum for registered nurses will require three academic years of full-time study for completion of the program. Many students, however, may find it advantageous or necessary to devote more than these minimum times to the undergraduate nursing program of study by pursuing at one time, in any semester, fewer studies than are regularly prescribed. In cases of inadequate secondary preparation, or financial necessity

requiring much time for outside work, the time for the undergraduate course should be extended. A student who so desires may devote an increased length of time to his undergraduate work and include additional instruction in the humanities, the social sciences, the physical sciences or mathematics.

Nursing Program

The Bachelor of Science in Nursing degree is granted upon completion of 128 credit hours. The nursing program consists of the completion of the program of general education of Arizona State University, and the major in nursing. Requirements include selected courses from the physical, biological, social and behavioral sciences; and maternal and child health, medical and surgical, psychiatric and public health nursing. The nursing major begins in the sophomore year following the completion of the Introductory Nursing course in the second semester of the first year.

Prior to enrolling in the clinical nursing specialty areas in the sophomore year, each nursing student must (a) receive approval from the office of the Director of the School of Nursing and (b) secure from his or her adviser an approved course of study for the remaining work. Generally, students with an aptitude for nursing, desirable personal qualifications, sound physical and mental health, and students with a 2.00 scholarship index (C average) or higher will receive approval.

The School of Nursing is fortunate in being located in close proximity to those hospitals and health agencies used for student clinical experience throughout the program. Community agencies cooperating with the School of Nursing include: Good Samaritan Hospital, Arizona State Hospital, Crippled Children's Hospital, Maricopa County Hospital, Maricopa County Health Department, Visiting Nurse Service, Inc., Samuel Gompers Rehabilitation Center and other hospitals and health centers in the Phoenix area.

Requirements for Admission

The program is designed to meet the needs of: (1) freshman students with no prior nursing education (2) transfer students from other programs within the University or from other educational institutions, (3) students with advanced standing.

- I. Freshman students must meet general requirements for admission to the University. It is recommended that the high school program of the students wishing to register in nursing should include at least four units of English, two units of history and government, one unit of algebra, two units of science (chemistry, physics, biology) and two units of Latin and/or foreign language.

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- II. Transfer students must have a cumulative 2.00 index (C average) and follow procedure for admission to the University.
 - III. Advanced standing students (includes registered nurses) must follow the procedure for admission to the University and complete the following requirements:
 - A. Request your School of Nursing to send two transcripts of your hospital school of nursing work directly to the Registrar and Director of Admissions. These must be in the hands of the Registrar and Director of Admissions at least thirty days in advance of the registration date. These are required in addition to transcripts of high school and previous college work, as stated in the catalog.
 - B. Request that a letter confirming the applicant's active registered nurse status be sent to the Registrar and Director of Admissions by any State Nurse Licensure Board where the applicant is currently registered and in active standing.
 - C. Have received a notification from the Admissions Office of the number of tentative advanced standing credit hours granted. After the completion of application to the University, a maximum of 36 credit hours advanced standing for completed clinical nursing courses will be granted to a graduate of a currently approved hospital school of nursing subject to the following procedure:
 1. Make an appointment for an interview by calling the School of Nursing. At this time the applicant must present the evaluation of her advanced credit sent to her by the Director of Admissions.
 2. Plan a program to satisfactorily complete 30 credit hours, 15 of which must be in residence at Arizona State University.
 3. Take and pay a fee, if necessary, for any clinical nursing qualifying tests designated by the School of Nursing.
 4. Have the approval of the Director, School of Nursing. This approval will be granted upon the recommendation of the Standards Committee after an interview with the applicant and an individual evaluation of his or her credentials, abilities, and personal qualifications.

College of Education

Purpose

The purpose of the College of Education is to promote interest in the teaching profession and to prepare students to carry on effective work as teachers, administrators, or special personnel in the public schools and in institutions of higher education. To accomplish this end, the aim is to acquaint the student with human nature, educational subject matter, methods of teaching and administration, and methods of social reconstruction commensurate with democratic social theory.

It is the belief of those concerned with teacher education that those who work with the children in our schools should be educated as well as trained. To this end a wide array of cultural and general educational background is provided. There is no conflict in the approach to develop a person who lives wholesomely and happily as well as one who realizes his greatest potentialities, both professionally and in other phases of living. The College is dedicated to these purposes as well as to a program of training leading to the degrees and certificates listed below.

Organization

The courses of instruction offered by the College of Education are organized into departments so that a well-related sequence is established for important subject fields. These subject fields make for better organization in selecting courses to meet requirements for the various teacher education curriculums. This also provides a balanced program with virtually complete coverage in the field of education and with a wide array of specialization possibilities.

For administrative purposes, these subject fields are organized into the following departments: Elementary Education; Secondary Education; Educational Administration and Supervision; Educational Psychology and Guidance; Educational Foundations; Educational Services; and Library Science.

Degrees

Bachelor of Arts in Education Degree

The Bachelor of Arts in Education Degree is awarded after successful completion of a four year curriculum in teacher education. A minimum of 126 semester hours of work is required for each of the curriculums. A balanced program of activities for this degree provides work in well recognized basic areas.

Master of Arts in Education Degree

A graduate program consisting of a minimum of 30 semester hours of properly arranged work leads to the degree of Master of Arts in Education. Students who complete any of the teacher education curriculums at Arizona State University, may arrange for a program of studies leading to the degree of Master of Arts in Education. This degree is also available to graduates of other recognized institutions of higher learning by meeting the prescribed requirements. For specific reference to this program, see page 207 of this catalog.

Education Specialist Degree

The degree, Education Specialist, is awarded for satisfactory completion of the Specialist Program of graduate studies. For specific reference to this degree, see page 211 of this catalog.

Doctor of Education Degree

The degree, Doctor of Education, is awarded for satisfactory completion of the Doctoral Program of graduate studies. For specific reference to this degree, see page 215 of this catalog.

Certification

Arizona Certification

The State Board of Education issues the following types of certificates, preparation for which may be obtained at the Arizona State University: (1) Kindergarten-Primary; (2) Elementary; (3) Pre-Secondary; (4) Secondary; (5) Administrative; (6) Administrative Supervisory; (7) Special in Home Economics; (8) Vocational in Home Economics; (9) School Librarian; (10) School Counselor and Guidance Worker. For complete details concerning certification, students should refer to the Rules and Regulations published by the State Board of Education, or consult with the Director of Teacher Education. As new certificates are approved by the State Board of Education, the College will attempt to offer preparation to meet fully their requirements.

The four-year Elementary Teacher Education Curriculum provides opportunity to prepare for all certificates issued for kindergarten through grade nine. Special courses are selected in this curriculum on the basis of appropriateness for the age level pupil with whom the teacher plans to work. The Pre-Secondary certificate (good for four years) may be obtained by completing the four-year Secondary Teacher Education Curriculum, and an additional six semester hours of graduate credit. The five-year Secondary Teacher Education Curriculum leading to the Master of Arts in Education degree encompasses all of the requirements for the full secondary certificate.

For conditions or requirements of other certificates, consult the Rules and Regulations published by the State Board of Education.

In some instances, transfer students or others not enrolled in a teacher education curriculum may meet certification requirements through education courses not listed in teacher education curriculums. In each case, a teacher education adviser should be consulted before the course is selected. Information regarding certification requirements may be obtained from the State Superintendent of Public Instruction, or the office of the Dean of the College of Education.

Directed Teaching

Admission

Before admission, all candidates for directed teaching must meet the following requirements: (1) Junior or senior standing; (2) A cumulative scholarship index of 2.00 or better; (3) Credit in all the required courses of the first two years of a teacher-education curriculum being followed. Credit in Fundamentals of Teaching, Language Arts, and Elementary Curriculum for those in Elementary Curriculum. (Curriculum may be taken concurrently with directed teaching.) Credit in Principles and Curricula of the Secondary Schools, and Methods of Teaching and Evaluating in Secondary Schools for those in Secondary Curriculum. (Methods of Teaching and Evaluating may be taken concurrently with directed teaching.)

Modification of course sequences may be made for irregular and transfer students by the Director of Teacher Education. Evidence of freedom from tuberculosis validated within 60 days prior to assignment is also required. In all cases, the student must have demonstrated competence in the course work in his field of specialization.

Requirements

Ordinarily, students who are candidates for the bachelor's degree and elementary certification teach in the cooperating schools for one-half day for one semester either for the first or second half of the third or fourth year. Students who are preparing for secondary certification teach for one-quarter day for one full semester in either the first or second half of the fourth year. Students whose programs permit them to devote their full time to directed teaching spend all day in the cooperating schools and receive one semester hour of credit per week of successful directed teaching. Required conferences are held during the directed teaching period. The student's load is limited to sixteen semester hours during the semester in which he is teaching. Student teachers are not permitted to take part in activities that interfere with their directed teaching, conferences, or other activities related to teaching in the cooperating school.

Students must count full time or part time employment as part of their load while they are doing directed teaching. Each

five hours of employment per week will be considered equivalent to a load of one semester hour in calculating the total 16 semester hour load permitted during the semester in which the student is teaching. It is recommended that students plan not to be employed during the directed teaching period.

Professional Semester

Directed teaching may be scheduled with specific courses to comprise a professional semester as prescribed by a department fielding a teacher education program. The courses comprising (with directed teaching) the professional semester are identified in the schedule of classes published prior to each registration period. Students interested in doing directed teaching as a part of a professional semester should discuss this matter with their advisers as early as possible after admission to the College of Education.

Training Schools Available

The University has available many fine schools or school systems for the training of student teachers. Others will be added as the program expands. Among those utilized at present are the following: The Campus Laboratory School, Alhambra Elementary Schools, Balsz Elementary Schools, Chandler Schools, Creighton Elementary Schools, Gilbert Elementary Schools, Glendale Elementary Schools and High Schools, Kyrene Elementary School, Madison Elementary Schools, Mesa Schools, Osborn Elementary Schools, Phoenix Elementary Schools, Phoenix High Schools, Roosevelt Elementary Schools, Scottsdale Schools, Tempe Elementary Schools and High School, Wilson Elementary Schools, Maricopa County Accommodation Schools, Phoenix Indian Schools, and others. Students are assigned to schools other than those listed above only on approval of special requests.

Each of these schools presents its own particular type of organization and problems so that the student may receive training in any type of work desired from the kindergarten through the high school. All of these are regular public schools; therefore, students obtain their training under actual classroom conditions of the public school. Each student teacher is under direct guidance of a cooperating teacher, a college supervisor, and the Director of Teacher Education.

Waiver

Students who have been employed as regular teachers in public, parochial, or Indian schools, may apply to the Director of Teacher Education, College of Education, for waiver of the directed teaching requirement. Waiver of directed teaching in the required grade level is granted by the Director of Teacher Education. Waiver of this requirement in no way changes the total number of semester hours required for graduation or for establishing residence.

Regular teaching experience in the required grade level of two years' duration within the past five years will be considered sufficient to waive the total directed teaching requirement.

Regular teaching experience in the required grade level of one year's duration within the past five years will be considered sufficient to waive one-half the directed teaching requirement.

Regular teaching experience of two or more years' duration prior to the past five years will be considered sufficient to waive one-half the directed teaching requirement.

Students who have met the full directed teaching requirement of another American Association of Colleges for Teacher Education member institution, which is also accredited by the National Council for Accreditation of Teacher Education, may petition through the College Admissions and Standards Committee to have their directed teaching experience requirement interpreted as fully met.

Additional Directed Teaching as Elective

Qualified undergraduate students whose programs will permit and who are enrolled in a teacher education curriculum may, with the approval of their adviser, the Director of Teacher Education and the Standards Committee of the College of Education, register in directed teaching for additional elective semester hours of credit above the number of semester hours required by their teacher education curriculum. Advisers and the Standards Committee will approve application for this privilege only when it is apparent that additional experience in directed teaching would be more beneficial to the student than the equivalent number of semester hours of other elective course work.

Additional Degree Requirements

Students in teacher education curriculums are required to complete the following requirements in addition to those specified for graduation from the Arizona State University before being awarded the Bachelor of Arts in Education Degree.

1. Complete an Application for Admission to the College of Education at the time of enrollment.
2. Show satisfactory performance on the College Qualification Test.
3. Demonstrate satisfactory achievement on standardized examinations in reading, computation, and study skills.
4. File four letters of recommendation.
5. Demonstrate adequate proficiency in speech.
6. Pass a mental and physical screening examination.
7. Be approved for student teaching by the Undergraduate Standards Committee of the College of Education.
8. Make written application for graduation.

Bachelor of Arts in Education Degree Curriculums

Elementary Curriculum

The Elementary Curriculum offers specialized training for students who wish to teach in nursery school, kindergarten, or in elementary school grades. The specializations for which special programs are available include early childhood education, lower elementary grades, intermediate grades, and upper elementary grades. The courses are designed to give the student a better understanding of young children, and of their total personality development during the early years of their school adjustment. Special emphasis is given to the growth and development of the child, and how he learns as he progresses through the grades in the elementary school.

This curriculum leads to the degree of Bachelor of Arts in Education and to certification for teaching in the kindergarten and grades one through nine.

Major and Minor Teaching Fields. The major in this program is in elementary education. A major or minor teaching field is not required. However, students who wish to do so may elect to pursue a minor of 18 or more semester hours by utilizing elective hours available.

Suggested Pattern. A program of 126 approved semester hours is required. This is divided as follows:

General Education	40 semester hours
Includes state certification requirements for School-Community Health and United States and Arizona Constitutions.	
Communications	6 sem. hrs.
Humanities	8 sem. hrs.
Behavioral and Social Sciences	8 sem. hrs.
Sciences and Mathematics	8 sem. hrs.
Physical Education and Health	1 sem. hr.
General Education Electives	9 sem. hrs.

For specific courses for each of the above groups, consult topic on General Education for all curriculums, on page 78 of the catalog.

Basic Education Core.....	9 sem. hrs.
BE 111 Exploration of Education	
BE 222 Psychological Foundations of Education	
BE 333 Issues in Teaching: An Interdisciplinary Approach	
Professional Training.....	45 sem. hrs.
Military or Air Science (for men).....	6 sem. hrs.
Electives	26 or 32 sem. hrs.

Advisers in this curriculum have check sheets with recommended and required courses for each year of work. These check sheets contain appropriate patterns of course work for the age level of pupils with whom the students as teachers will want to work. The check sheets also contain recommendations for electives. It is necessary for students to consult advisers in this curriculum in order to insure the best possible program of training. This is particularly important inasmuch as the adviser must sign the checkout sheet for graduation which indicates that an approved program of course work has been developed.

Students interested in learning to work with children and youth, but not in certification, may elect elementary education courses.

Secondary Curriculum

This curriculum prepares students for service in the secondary school. Majors and minors are completed in the teaching fields desired. The curriculum has considerable flexibility for those who wish to pursue specialized work in addition to the regular expectations for teaching. This curriculum leads to the degree of Bachelor of Arts in Education and to the certification for teaching in the secondary school.

Suggested Pattern. A program of 126 approved semester hours is required. This is divided as follows:

General Education10 semester hours

Includes state certification requirements for School-Community Health and United States and Arizona Constitutions.

Communications6 sem. hrs.
 Humanities8 sem. hrs.
 Behavioral and Social Sciences8 sem. hrs.
 Sciences and Mathematics8 sem. hrs.
 Physical Education and Health1 sem. hr.
 General Education Electives9 sem. hrs.

For specific courses for each of the above groups, consult topic on General Education for all curriculums on page 78 of the catalog.

Major Teaching Field.....45 semester hours

Minor Teaching Field18 semester hours

Professional Training22 semester hours

The following are required:

BE 111 Exploration of Education
 BE 222 Psychological Foundations of Education
 BE 333 Issues in Teaching: An Interdisciplinary Approach
 SE 311 Principles and Curricula of Secondary Schools

SE 411 Methods of Teaching and Evaluating in the Secondary Schools

SE 433 Directed Teaching in the Secondary School
 Military or Air Science (for men).....6 semester hours
 Electives (as needed to fill out 126 semester hours).

Advisers in this curriculum have check sheets with recommended courses for each year of work. The check sheets include recommendations for electives. Students should consult advisers in this curriculum in order to insure the best possible program of training. This is very necessary for the following reasons: (1) An adviser approves a program of studies prior to registration each semester. (2) An adviser signs the graduation checkout sheet for the student. (3) Check sheets are revised each year on the basis of refinements which are incorporated into the program. (4) Check sheets offer excellent opportunity for the student to keep a record of his progress throughout the curriculum.

It is necessary to utilize general education hours to build a minor and to some extent a major. This is explained in the paragraph under *Major and Minor Teaching Fields*. However, the student should not use hours credited to the development of a major to apply on hours needed to develop a minor.

Major and Minor Teaching Fields. Students under the secondary curriculum are required to complete a major and a minor teaching field.

A major teaching field shall consist of 45 semester hours of work, 24 semester hours of which shall be in courses in a subject field from one department, and the remainder of which shall consist of courses from the same or related fields. A minimum of 18 semester hours in the major teaching field should be upper division courses. Wherever practicable, general education courses which are appropriate should be used to meet the requirements of a major teaching field. Courses included in the general education requirements or options, if taken, may be applied toward meeting the semester hour requirements of a major teaching field if such courses are specified as required courses for the major teaching field, or if approved by the adviser as satisfying major teaching field requirements.

A minor teaching field shall consist of 18 semester hours in a subject field from one department or division. In order to meet the various graduation requirements under the secondary curriculum, it is usually necessary to use general education courses to build the minor teaching field to the extent of 8 semester hours.

In selecting major and minor teaching fields, students should keep in mind the requirements of the North Central Association, the Arizona State Board of Education, and the combinations usually assigned beginning teachers in Arizona high schools. Information concerning these matters can be obtained at the office of the Director of Teacher Education.

Major Teaching Fields Available

Art	Health Education
Biological Sciences	History
Business	Home Economics
Chemistry	Industrial Arts
Choral Music	Instrumental Music
Distributive Education	Mathematics
Double Music Major	Physical Education
English	Physics
French	Political Science
Geography	Spanish
Geology	Speech and Dramatics
German	

Minor Teaching Fields Available

In addition to minors in the above fields, the following minors are available:

Dramatics	Music
Driver Training and Safety Education	Physical Sciences
Economics	Psychology
General Business	Russian
Journalism	Secretarial
Library Science	Sociology
	Speech

Other minors can be developed with the approval of the Division Head under which the minor is developed or the Dean of the College of Education.

Considerable attention should be given to the selection of teaching combinations. In many instances, teachers must assume positions which call for a major and one or two minors. Although there is no definite pattern concerning teaching combinations, it should be profitable to consider the more prevalent ones. Information regarding these may be obtained from the student's adviser or the Director of Placement.

Professional Education. In addition to the courses listed under other requirements, all students registered under the secondary curriculum are required to take 22 semester hours of work in Education. The following must be included: BE 111, 222, 333; SE 311, 411, and 433.

Recommended Electives and Specialization. Students are urged to plan electives in conjunction with suggestions from their advisers.

Certification for Teaching in Arizona. Completing the requirements for the degree of Bachelor of Arts in Education under the Secondary Curriculum does not meet the requirements for a certificate to teach in Arizona high schools. Students who graduate under this curriculum must have in addition to the degree of Bachelor of Arts in Education, *at least six semester hours of grad-*

uate work to qualify for a Pre-Secondary Teaching Certificate. An exception to this exists for those who complete the Vocational in Home Economics.

Major and Minor Teaching Fields

Following are suggestions for preparing to teach in each of the respective major and minor fields. In each case it is advisable to complete a major teaching field of 45 semester hours in the first four years. Candidates for the master's degree planning to teach in the secondary schools may complete an additional 15 semester hours of graduate credit in the fifth year. In each case, the student should consult his adviser in the planning of his course program.

The Teaching of Art

The student of Art Education will develop the necessary skill in art teaching and at least one field of specialization. He will acquire a broad understanding of the whole field in relationship to contemporary society and its education. He will understand the purposes, theories, philosophy, and methods necessary to implement this knowledge. The understanding of art as basic to the development of the human being in all fields of human endeavor is emphasized.

Major Teaching Field in Art. A major teaching field in Art shall consist of 45 semester hours of which 18 shall be in upper division courses. The student will be advised as to the appropriate courses.

Minor Teaching Field in Art. Eighteen semester hours, planned in consultation with the adviser.

The Teaching of Biology

Major Teaching Field in the Biological Sciences. Entering freshmen who show an inadequate high school background in general biology must take BI 100. Majors must take 45 hours in the Division of Life Sciences plus supporting courses in physics, chemistry, and mathematics as indicated on the curriculum check sheet for biology. Those electing the physical sciences as a minor may use the supporting courses as part of the 18 semester hours minimum. Check sheets may be obtained through the adviser or the Divisional Office.

Minor Teaching Field in the Biological Sciences. Eighteen semester hours. BI 100 and ZO 102 may not be used. The entire program must be selected with the approval of the minor adviser.

The Teaching of Business

Major Teaching Field in Business. Students interested in the teaching of business must have a balanced program carefully selected from subject fields in business. The entire program must be approved by the adviser to majors in this field.

Major Teaching Field in Distributive Education. Students interested in teaching Distributive Education must have a carefully planned program especially designed for the field of Distributive Education. The entire pattern must be approved by the adviser to majors in this field.

Minor Teaching Field, Secretarial. Eighteen semester hours, as approved by the adviser, are required.

Minor Teaching Field in General Business. Eighteen semester hours, as approved by the adviser, are required.

Minor Teaching Field in Economics. Eighteen semester hours, as approved by the adviser, are required.

The Teaching of English, Speech, Dramatics and Journalism

This department offers major teaching fields in English, and in speech and dramatics as outlined below. To complete either of these, 45 semester hours in the field must be completed.

Major Teaching Field in English. Forty-five semester hours of approved course work are required. Check sheets indicate a sequence of required courses for each year of work.

Major Teaching Field in Speech and Dramatics. Forty-five semester hours of approved course work are required. Check sheets indicate a sequence of required courses for each year of work.

Minor Teaching Field in English. Eighteen semester hours, including a minimum of six hours of upper division English, as approved by the adviser, are required.

Minor Teaching Field in Journalism. Eighteen semester hours, as approved by the adviser, are required.

Minor Teaching Field in Speech. Eighteen semester hours, including a minimum of six hours of upper division speech, as approved by the adviser, are required.

Minor Teaching Field in Dramatics. Eighteen semester hours, as approved by the adviser, are required.

The Teaching of Foreign Languages

Major Teaching Field in French. A major teaching field in French consists of 45 semester hours, of which 18 shall be in upper division courses in French. The entire program must be approved by the student's adviser. Considerable flexibility is provided to select work in German, Latin, Russian, and Spanish.

Major Teaching Field in German. A major teaching field in German consists of 45 semester hours, of which 18 shall be in upper division courses in German. The entire program must be approved by the student's adviser. Considerable flexibility is provided to select work in Spanish, French, Latin, and Russian.

Major Teaching Field in Spanish. A major teaching field in Spanish consists of 45 semester hours, of which 18 shall be in upper division courses in Spanish. The entire program must be approved by the student's adviser. Considerable flexibility is provided to select work in French, German, Latin, and Russian.

Minor Teaching Field in Spanish. Eighteen semester hours, including six hours of upper division Spanish, as approved by the adviser, are required.

Minor Teaching Field in French. Eighteen semester hours, including six hours of upper division French, as approved by the adviser, are required.

Minor Teaching Field in German. Eighteen semester hours, including six hours of upper division German, as approved by the adviser, are required.

Minor Teaching Field in Russian. Eighteen semester hours, including six hours of upper division Russian, as approved by the adviser, are required.

The Teaching of Home Economics

Major Teaching Field in Home Economics. A major in Home Economics shall consist of 45 semester hours. At least 40 of these must be in the Home Economics field, and must include the courses approved by the adviser. At least 18 semester hours must be in the upper division Home Economics. The above requirements for graduation and vocational certification may be met in four years by careful selection of electives.

Minor Teaching Field in Home Economics. Eighteen semester hours, as approved by the adviser, are required.

The Teaching of Industrial Arts

Major Teaching Field in Industrial Arts. For students planning to teach in the secondary schools, 45 semester hours of industrial arts courses are required. In order to insure a balanced program, all courses are to be planned with the approval of an adviser.

Minor Teaching Field in Industrial Arts. Eighteen hours, as approved by the adviser, are required.

Library Science

Students who desire to prepare for librarianship may choose a minor field in library science. The undergraduate program of professional education for librarians should also include a systematic survey of the various fields of knowledge, concentration in one or more subject fields taught in Arizona schools, background courses of special value in library science, study of professional principles and methods common to all libraries.

Students who have completed a minor field in library science at the undergraduate level may select library science as a field of specialization at the graduate level.

Minor Teaching Field in Library Science. Eighteen semester hours, as approved by the adviser, are required.

Minor Field in Library Science. The minor in library science consists of 18 semester hours as prescribed by the department.

The Teaching of Music

Under the secondary curriculum, students may choose a major teaching field in choral music, instrumental music, or choral and instrumental music.

A minimum level of musical literacy is presumed for all students wishing to major in music. Placement tests in theory, piano and a major performing medium are required of all freshmen and transfer students planning to major in music. Advanced standing may be secured through these tests. If minimum requirements cannot be met, the student may meet these requirements by assignment to classes below the music major college credit level.

All students majoring in music are required to attend 25 approved recitals as set up by the faculty during the school year as partial fulfillment of the course requirements in their major performing field.

Major Teaching Field in Choral Music. Forty-five semester hours of approved course work are required.

Major Teaching Field in Instrumental Music. Forty-five semester hours of approved course work are required.

Double Music Majors. Only students with a good background in both instrumental and vocal will be accepted as candidates for the double major. The required courses include all those listed as required for both choral and instrumental majors, and, therefore, cannot be completed in eight regular semesters.

Minor Teaching Field in Music. For a minor in music, the student should consult the music department adviser for courses best designed to develop competence.

The Teaching of Health and Physical Education

Major Teaching Field in Health Education. This teaching field consists of 45 semester hours. At least 18 of the 45 hours must be in upper division courses. The entire program must be planned in consultation with the student's adviser.

Minor Teaching Field in Health Education. Eighteen semester hours, as approved by the adviser, are required.

Major Teaching Field in Physical Education. This teaching field requires 45 semester hours. At least 18 of the 45 hours must be in the upper division courses. The entire program must be planned in consultation with the student's adviser.

Minor Teaching Field in Physical Education. Eighteen semester hours, as approved by the adviser, are required.

The Teaching of Physical Sciences and Mathematics

Students planning to teach chemistry, earth science, mathematics, or physics should take basic courses in biology, chemistry, geology, mathematics, and physics. Over-specialization at the undergraduate level is to be avoided. The student should carefully select his electives so that he may complete the undergraduate requirements needed for a master's degree in the subject that he plans to teach. The master's degree is required by an increasing number of secondary schools, and by all Junior Colleges. The Division of Physical Sciences offers teaching majors in chemistry, geography, geology, earth science, mathematics, and physics. At least one upper division course in the major teaching field must be taken by the student during each semester of the senior year.

Major Teaching Field in Chemistry. Forty-five semester hours of approved course work are required. Students interested in teaching chemistry should complete a minor in mathematics, physics, or biology.

Major Teaching Field in Geography. Students planning to teach geography, conservation, social sciences, and related subjects should select this field. Forty-five semester hours, as approved by the adviser, are required.

Major Teaching Field in Geology (Earth Science). Forty-five semester hours of approved course work are required.

Major Teaching Field in Mathematics. Forty-five semester hours of approved course work are required.

Major Teaching Field in Physics. Forty-five semester hours of approved course work are required.

Minor teaching fields are offered in geography, geology, (earth science), chemistry, physics, and physical sciences. Each student desiring a science teaching minor shall begin planning with his science adviser not later than the beginning of his third year. Any courses required for the major will not be accepted as meeting the requirements for the minor teaching field. Transfer students must complete at least one course in their minor teaching field at this University.

Minor Teaching Field in Chemistry. Eighteen semester hours, as approved by the adviser, are required.

Minor Teaching Field in Geography. Eighteen semester hours, as approved by the adviser, are required.

Minor Teaching Field in Geology (Earth Science). Eighteen semester hours, as approved by the adviser, are required.

Minor Teaching Field in Mathematics. Eighteen semester hours, as approved by the adviser, are required.

Minor Teaching Field in Physical Sciences. Eighteen semester hours, approved by the Department of Physical Sciences, are required.

Minor Teaching Field in Physics. Eighteen semester hours, as approved by the adviser, are required.

The Teaching of Social Sciences

Students planning to teach social sciences should complete basic courses in history, economics, sociology, and political science. Major and minor teaching fields are offered in history and political science.

Major Teaching Field in History. Forty-five semester hours of approved course work are required.

Major Teaching Field in Political Science. This field is for those who plan to teach courses in government, civics, or social problems. Thirty semester hours in political science are required. In addition, 15 semester hours must be taken in courses related to political science. All courses must be selected in consultation with the political science adviser, including required courses as determined by the Department of Political Science.

Minor Teaching Field in History. Eighteen semester hours, as approved by the adviser, are required.

Minor Teaching Field in Political Science. Eighteen semester hours, as approved by the adviser, are required.

Other Minors Available

Minor Teaching Field in Psychology. Eighteen semester hours, as approved by the adviser, are required.

Minor Teaching Field in Sociology. Eighteen semester hours, as approved by the adviser, are required.

Minor Teaching Field in Driver Training and Safety Education. Eighteen semester hours, as approved by the adviser, are required.

Special Programs

Special Programs of Teacher Preparation

Several fields of specialization are available on the undergraduate level in connection with any of the undergraduate curriculums. These are available as a sequence of courses to be taken in addition to the regular requirements of the undergraduate curriculum.

Teaching the Hearing-Handicapped Child

Students pursuing the elementary program may, in the junior year, with the approval of the adviser, elect to take a special sequence preparatory to the teaching of hearing-handicapped children in regular or special classroom situations. These students shall be required to complete satisfactorily the basic four-year elementary program. Specific requirements for this minor may be obtained from the regular adviser, or from the adviser in Special Education.

Students pursuing a major teaching field in secondary education may also include this field of Special Education. Such students shall be required to complete satisfactorily the basic four-year secondary major. The special courses follow:

SP 311 Orientation to Education of Exceptional Children	3 sem. hrs.
1-SE 421 Speech Correction	3 sem. hrs.
1-SE 424 Phonetics	2 sem. hrs.
1-SE 425 Audiology	3 sem. hrs.
1-SE 426 Audiometry	3 sem. hrs.
1-SE 427 Clinical Practice in Audiology and Audiometry	3 sem. hrs.
*EE 478 Directed Teaching in the Elementary School	5 sem. hrs.
or	
SE 433 Directed Teaching in the Secondary School (3)	
SP 455 Education of the Hearing- Handicapped	3 sem. hrs.
SP 456 Education of the Hearing- Handicapped	3 sem. hrs.

26 or 28

*Half in a program with hard-of-hearing children; half in a "regular" school situation.

Teaching Indian Children

Students pursuing the elementary program may, in the junior year, with the approval of the adviser, elect to take a special sequence preparatory to the teaching of Indian children. This is appropriate for those who will have only a few Indian children in a classroom, or for those who will have a classroom composed only of Indian children. These students shall be required to complete satisfactorily the basic four-year elementary program.

Students pursuing a major teaching field in secondary education may also take this special training for teaching Indian children. Such students shall be required to complete satisfactorily the basic four-year secondary major.

IE 322 Methods and Materials for Teaching Indian Children	3 sem. hrs.
IE 333 Curriculum and Practices for Indian Education	3 sem. hrs.
IE 490 Problems of Teachers of Indian Children	3 sem. hrs.
*EE 478 Directed Teaching in the Elementary School	5 sem. hrs.
or	
SE 433 Directed Teaching in the Secondary School (3)	

1-AN 221 Indians of the Southwest	3 sem. hrs.
1-AN 421 The American Indian	3 sem. hrs.

18 or 20

*Half in a program with Indian children; half in a "regular" school situation.

Teaching Spanish in the Elementary School

Students pursuing the elementary program may, with the approval of the adviser, elect to take a special sequence preparatory to the teaching of Spanish in the elementary school. These students shall be required to complete satisfactorily the basic four-year elementary program.

SP 101, 102 Elementary Spanish (or two years of Spanish in high school)....	8 sem. hrs.
SP 201, 202 Intermediate Spanish	8 sem. hrs.
SP 311, 312 Spanish Conversation	6 sem. hrs.
SP 417g Spanish Phonetics	2 sem. hrs.
FL 421g Directed Reading for Foreign Language Majors	2 sem. hrs.
SP 472g Spanish-American Civilization	3 sem. hrs.
FL 480g Methods of Teaching Foreign Languages	3 sem. hrs.

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SP 321, 322 Survey of Spanish Literature, may be substituted for FL 421g Directed Reading.

HI 441g Study Tour to Mexico or SP 401g Spanish Language Study Abroad, may be substituted for SP 472g Spanish American Civilization.

Elementary teachers in the field desiring a program to prepare for teaching Spanish in the elementary schools may take the following sequence of courses: SP 491g, SP 492g, SP 493g, and SP 494g.

Other Special Programs

Students pursuing the elementary program may, with the approval of the adviser, elect to take a special sequence preparatory to specialization in a subject field in the elementary school. Examples of this are in the field of Art, Physical Education, Home Economics, Music, Industrial Arts, and others. These students shall be required to complete satisfactorily the basic four-year elementary program.

College of Business Administration

Purpose

The primary purpose of the College of Business Administration is to prepare students for positions of responsibility in the business community. The undergraduate and graduate degree curricula are designed to provide (1) a basic background of general education helpful to informed, thinking citizens in a democracy, (2) a mastery of basic business tools and skills and an understanding of business procedures, and (3) a specialized and professional knowledge of a selected field of business. In order to attain these objectives in the undergraduate program the curriculum has been devised so that the student completes 45% of his work in general education and other non-business courses and 45% in courses offered by the College of Business Administration, with the remaining 10% selected from either area by the student in consultation with his adviser.

In addition to the regular degree curricula, other programs of study in the College of Business Administration are designed to meet special needs. Preparation for the teaching of business subjects in the secondary schools is offered in cooperation with the College of Education. A special secretarial program is offered for students who wish to prepare for office positions but who do not plan to spend four years in college. Evening and extension courses are conducted for qualified persons who are regularly employed and who would otherwise be unable to enroll in college courses. Short courses and institutes on a non-credit basis are organized in cooperation with various business groups for the furtherance of in-service training of employed personnel.

Organization

The courses of instruction offered by the College of Business Administration are organized into groups in order that a related sequence may be established for the various subject fields. These subject fields include Accounting, Advertising, Economics, Finance, General Business Administration, Insurance, Management, Marketing, Office Administration, Real Estate, and Business Education.

For administrative purposes these fields are organized into the following departments:

Accounting
 Economics
 General Business Administration
 Management
 Marketing
 Office Administration and Business Education

In addition to the regular instructional program, the College of Business Administration operates a Bureau of Business Services which gathers and publishes business and economic data pertaining to the surrounding community. The Bureau serves as a laboratory for students in the College of Business Administration who wish to secure practical experience in business research and analysis.

Degrees

Bachelor of Science Degree

The College of Business Administration awards the Bachelor of Science Degree upon successful completion of a four-year curriculum of 126 semester hours as prescribed on the following pages. Students may select one of the following ten fields of specialization:

- | | |
|------------------------------------|--------------------------|
| 1. Accounting | 6. Insurance |
| 2. Advertising | 7. Management |
| 3. Economics | 8. Marketing and Selling |
| 4. Finance | 9. Office Administration |
| 5. General Business Administration | 10. Real Estate |

Students who wish to qualify to teach business subjects in high school should major in business education. Under this program, the student enrolls in the College of Education but specializes in business courses for his major teaching field. This curriculum leads to the Bachelor of Arts in Education Degree and certification for teaching business subjects in the Arizona secondary schools. The courses required in business for this curriculum are listed under the secondary curriculum section of the College of Education (Page 154).

Masters Degrees

The Master of Business Administration Degree and Master of Science Degree in the fields of Accounting, Economics, and Business Administration are awarded upon successful completion of programs detailed in the Graduate Catalog.

Master of Business Administration. The Master of Business Administration Degree is designed to meet the needs of students who seek a broad, integrated program and who wish only a minimum amount of specialization.

Master of Science. The Master of Science Degree provides preparation for those who desire to acquire both a broad background in the business field and concentrated training in a field of specialization. Students may elect to specialize in accounting, economics, management, advertising, marketing and selling, finance, insurance, real estate, general business, business education, and office administration.

Bachelor of Science Degree Curriculum in Business Administration

Students seeking a Bachelor of Science Degree in the College of Business Administration must satisfactorily complete a curriculum of 126 semester hours as indicated below.

I. General Education Courses and Non-Business	
Electives	57 sem. hrs.
II. Business Administration Core Curriculum.....	33 sem. hrs.
III. Field of Specialization.....	24 sem. hrs.
IV. Electives	12 sem. hrs.
	Total 126 sem. hrs.

General Education

For courses permitted under categories 1 to 6, see General Education requirements (Page 78).

Communications8 sem. hrs.

All students in the College of Business Administration must complete either SE 200 Elements of Speech or SE 300 Principles and Methods of Discussion.

Humanities8 sem. hrs.

Behavioral and Social Sciences.....8 sem. hrs.

All students in the College of Business must complete both EC 201 and 202, Principles of Economics.

Sciences and Mathematics.....8 sem. hrs.

All students in the College of Business Administration must complete MA 116 Intermediate Algebra or a higher level approved course in mathematics.

Physical Education and Health.....1 sem. hr.

General Education Electives.....7 sem. hrs.

The student shall select 7 hours from any of the General Education courses listed on page 78 which are outside his major field or field of specialization.

Non-business Electives.....17 sem. hrs.

Non-business courses which provide breadth and cultural background must be selected in consultation with the student's adviser. Additional general education courses or similar courses are recommended. Military or Air Science, required of all freshmen and sophomore men, may be included in this group.

Total General Education and Non-business Electives....57 sem. hrs.

Business Administration Core Curriculum

In order to obtain an understanding of fundamentals of business operation, and to develop a broad business background, every student seeking a Bachelor of Science degree in the College of Business Administration must complete the following courses:

GB 101 Introduction to Business.....	3
AC 101 Elementary Accounting.....	3
AC 102 Elementary Accounting.....	3
GB 161 Business Mathematics.....	3
GB 221 Business Statistics.....	3
GB 233 Business Communication.....	3
MK 300 Principles of Marketing.....	3
MG 301 Principles of Management.....	3
GB 305 Business Law.....	3
FI 325 Business Finance.....	3
MG 463 Business Policies.....	3

Total33 sem. hrs.

Field of Specialization Requirements

A field of specialization consists of a pattern of 24 semester hours in related courses falling primarily within a given subject field. Fields of specialization are available in Accounting, Advertising, Economics, Finance, General Business Administration, Insurance, Management, Marketing and Selling, Office Administration and Real Estate.

Accounting. Accounting is a fast-growing professional field. This field of specialization includes the essential academic training for: (1) those wishing to prepare themselves for professional careers in public accounting; (2) those seeking positions as controllers, heads of accounting divisions, cost accountants, or internal auditors; (3) those wishing to serve in any of the numerous accounting positions offered in federal, state, and local governments; (4) those planning to operate their own businesses.

A field of specialization in accounting shall consist of a minimum of 24 semester hours. The following 18 hours must be included:

AC 201 Intermediate Accounting.....	3
AC 202 Intermediate Accounting.....	3
AC 331 Cost Accounting.....	3
AC 383 Advanced Accounting.....	3
AC 451 Federal and State Income Tax.....	3
AC 481 Auditing Theory and Practice.....	3

To complete the field of specialization the student, with the approval of his adviser, shall select 6 hours or more from the group below:

AC 322 Mathematics of Finance.....	2
AC 409 Governmental and Institutional Accounting..	3
AC 415 Financial Statement Analysis.....	3
AC 441 Budgetary Control.....	2
AC 442 Controllership	2
AC 452 Federal and State Income Tax.....	3
GB 301 Mechanized Data Processing.....	3
GB 302 Electronic Data Processing.....	3
GB 306 Business Law.....	3
GB 402 Data Processor Programming.....	3
GB 407 Data Processing Systems.....	3
GB 431 Business Report Writing.....	2

Note: All accounting students must complete 1-MA 117, College Algebra, as a part of the General Education requirements in Sciences and Mathematics.

Advertising. Use of the mass communications media for conveying ideas and information to customers, employees, stockholders, and the general public is an essential part of modern business operation. This field of specialization offers students an opportunity to prepare for careers in advertising, public relations, and related activities dealing with mass communications. Employment opportunities include positions with advertising agencies, retail stores, manufacturing firms, newspapers, and broadcasting stations.

A field of specialization in advertising shall consist of a minimum of 24 semester hours. The following 19 hours must be included:

AD 301 Advertising Principles.....	3
AD 311 Advertising Campaigns	2
AD 312 Advertising Campaigns	2
AD 371 Radio and Television Advertising.....	3
AD 461 Advertising Management.....	3
MK 310 Principles of Selling.....	3
MK 483 Marketing Research.....	3

To complete the field of specialization the student, in consultation with his adviser, shall select 5 hours or more from the following group:

AD 322 Retail Promotion and Display.....	2
AD 453 Advertising Campaign Problems.....	2
1-JO 110 Mass Communications	3
MK 321 Principles of Retailing.....	3
MK 401 Public Relations.....	3
MK 412 Sales Promotion Policies.....	2
MK 460 Marketing Policies.....	3

Economics. The study of economics affords an opportunity for the student to acquire a general knowledge of the operation of business and economic systems. This knowledge provides a sound basis for successful business ownership and control. Specialized courses are included to develop ability in the use of the tools of economic theory and analysis. Such tools are essential for graduates who wish to qualify for government or business positions requiring formal training in economics.

The field of specialization in economics shall consist of a minimum of 24 semester hours. The following 12 hours must be included:

FI 301 Money and Banking.....	3
EC 401 Intermediate Price Analysis.....	3
EC 402 Economics of Income and Employment.....	3
EC 441 History of Economic Thought.....	3

In addition the student shall select a minimum of 12 semester hours from the group below to complete the field of specialization:

EC 321 Labor Economics.....	3
EC 331 Comparative Economic Systems.....	3
EC 336 International Economics.....	2
EC 341 Public Finance.....	3
EC 412 Business Cycles.....	2
EC 451 Economics of Public Utilities.....	3
EC 453 Government and Business.....	3
EC 461 Current Economic Problems.....	3
FI 441 Investments	3
GB 341 Transportation	3
GB 422 Adv. Bus. and Econ. Stat.....	3
MK 471 Price Policies.....	2

Finance. Courses in finance are designed to provide students with an understanding of the financial operations of business enterprises, as well as knowledge of the fields of commercial banking, investments, and mercantile and retail credits. This field of specialization prepares students for careers in (1) commercial banks and related financial institutions, (2) investment banking and investment management, and (3) financial management, including careers as treasurers, controllers, credit managers, and financial administrators in business enterprises.

A field of specialization in finance shall consist of a minimum of 24 semester hours. The following 15 hours must be included:

FI 301 Money and Banking.....	3
FI 305 Credits and Collections.....	3
FI 441 Investments	3
FI 451 Bank Organization and Management.....	3
FI 461 Cases in Business Finance.....	3

To complete the field of specialization the student, in consultation with his adviser, shall select 9 hours or more from the group below:

AC 201 Intermediate Accounting.....	3
AC 202 Intermediate Accounting.....	3
AC 415 Financial Statement Analysis.....	3
AC 451 Federal and State Income Tax.....	3
EC 336 International Economics.....	2
EC 341 Public Finance.....	3
EC 402 Economics of Income and Employment.....	3
EC 412 Business Cycles.....	2
GB 306 Business Law.....	3
IN 251 Principles of Insurance.....	3
RE 251 Real Estate Principles.....	3
RE 331 Real Estate Finance.....	2

General Business Administration. This field offers the opportunity for a broad survey of all phases of business operation. It is particularly suitable for (1) those students who are planning to operate their own businesses and seek a broad business background, (2) those who are preparing for jobs in large organizations with training programs in which specialization is taught after employment, (3) those who desire a general business background at the undergraduate level prior to taking more specialized graduate work.

The objective of the curriculum in General Business Administration is to provide breadth of preparation rather than specialization. Sufficient flexibility is provided, however, to permit students to emphasize such professional fields as transportation, hotel administration, statistics, or electronic data processing.

A minimum of 24 semester hours in economics and business administration is required with a maximum of 9 hours in one subject field. Four senior courses (numbered 400 or above) must be included. Twelve of the 24 hours must be selected from the following list of courses:

AC 415 Financial Statement Analysis.....	3
AD 301 Advertising Principles.....	3
EC 321 Labor Economics.....	3
EC 453 Government and Business.....	3
FI 305 Credits and Collections.....	3
GB 306 Business Law.....	3
GB 341 Transportation	3
GB 431 Business Report Writing.....	2
GB 451 Business Research Methods.....	3
IN 251 Principles of Insurance.....	3
MG 311 Personnel Administration.....	3
MG 451 Human Relations in Business.....	3
MK 310 Principles of Selling.....	3
MK 401 Public Relations.....	2
MK 460 Marketing Policies.....	3
OA 351 Principles of Office Management.....	3
RE 251 Real Estate Principles.....	3

Insurance. Academic preparation for professional work in insurance sales, insurance adjustment, and insurance management is offered through this program. A field of specialization in insurance shall consist of a minimum of 24 semester hours. The following 11 hours must be included:

IN 251 Principles of Insurance.....	3
IN 321 Life Insurance.....	3
IN 331 Property Insurance Principles and Coverages.....	3
IN 451 Social Insurance.....	2

To complete the field of specialization, 13 or more hours from the following:

IN 425 Current Problems in Insurance.....	2
IN 432 Property Insurance.....	3
FI 301 Money and Banking.....	3
FI 441 Investments	3
GB 306 Business Law	3
MK 310 Principles of Selling.....	3
MK 411 Sales Management.....	3
RE 251 Real Estate Principles.....	3

Management. The management function includes the planning, organizing, motivating, and controlling of business operations. It deals with both human elements and material or physical factors. Through selection of courses, as outlined below, the student may place his major emphasis upon personnel management, production management, or the broad aspects of management philosophy and practice. A field of specialization in management shall consist of a minimum of 24 semester hours. The following 18 hours must be included:

MG 311 Personnel Administration.....	3
MG 331 Industrial Management.....	3
MG 335 Methods Management.....	3
MG 433 Managerial Decision Making.....	3
MG 434 Management Responsibility in Society.....	3
MG 451 Human Relations in Business.....	3

The remainder of the required courses shall be selected by the student in consultation with his adviser as follows:

Those students planning careers in industrial relations or personnel management shall select at least 6 semester hours from:

MG 413 Wage and Salary Management.....	3
MG 423 Industrial Relations and Collective Bargaining.....	3
EC 321 Labor Economics.....	3
IN 451 Social Insurance.....	2

Those students planning careers in industrial and production management shall select at least 6 semester hours from:

MG 338 Industrial Safety.....	3
MG 432 Production Control.....	2
MG 491 Operations Research.....	3
AC 331 Cost Accounting.....	3
MK 355 Purchasing	3

Those students seeking preparation in the broad aspects of management philosophy and practice shall select at least 6 semester hours from:

MG 422 Employee Training and Supervision.....	2
MG 423 Industrial Relations and Collective Bargaining.....	3
MG 491 Operations Research.....	3
EC 453 Government and Business.....	3
MK 401 Public Relations.....	2

Marketing and Selling. The continuing expansion of production and the increase in the variety of goods and services available will require additional personnel in all phases of marketing activity. Opportunities for careers in a number of related areas are open to students who specialize in some phase of distribution. Through proper selection of courses, a student may place emphasis upon preparation for a career in (1) selling and sales management, (2) retail merchandising and management, (3) purchasing and industrial procurement, or (4) foreign trade, or he may choose to obtain a broad background in the field of preparation for a career with a large marketing organization which provides its own specialized training program.

A field of specialization in marketing and selling shall consist of a minimum of 24 semester hours. The following 17 hours must be included:

MK 310 Principles of Selling.....	3
MK 321 Principles of Retailing.....	3
MK 460 Marketing Policies.....	3
MK 471 Price Policies.....	2
MK 483 Marketing Research.....	3
AD 301 Advertising Principles.....	3

To complete the field of specialization the student in consultation with his adviser, shall select 7 hours or more from courses listed below. The various groupings are merely suggestive and do not preclude the student's choosing courses from more than one group or working out with his adviser the most satisfactory combination of courses for his particular career goal.

Recommended for students planning careers in selling and sales management:

MK 332 Wholesaling	2
MK 411 Sales Management.....	3
MK 412 Sales Promotion Policies.....	2
GB 341 Transportation	3

Recommended for students planning careers in retail buying, merchandising, and store management:

MK 323 Retail Buying and Merchandising.....	2
MK 423 Retail Store Control.....	3
MK 424 Retail Store Management.....	3
AD 322 Retail Promotion and Display.....	2
GB 341 Transportation	3

Recommended for students planning careers in purchasing and industrial procurement:

MK 355 Purchasing	3
MK 334 Industrial Marketing.....	2
MG 331 Industrial Management.....	3
GB 341 Transportation	3

Office Administration. The course work in this field is designed to prepare students for either secretarial or office management positions. Through the selection of courses, as outlined below, the student may place his major emphasis upon either of these fields.

A field of specialization in office administration shall consist of a minimum of 24 semester hours. The following 15 hours must be included:

OA 143 Business Machines.....	2
OA 201 Advanced Typewriting.....	3
OA 344 Office Appliances.....	2
OA 351 Principles of Office Management.....	3
GB 301 Mechanized Data Processing.....	3
GB 431 Business Report Writing.....	2

To complete the field of specialization the student, in consultation with his adviser, shall select the remainder of the 24 hour major requirement from the following courses:

For those planning careers in secretarial administration:

OA 214 Shorthand	3
OA 232 Records Systems and Filing.....	2
OA 312 Transcription	4
OA 331 Secretarial Procedures.....	3
AC 102 Elementary Accounting.....	3
MG 311 Personnel Administration.....	3
MK 401 Public Relations.....	2
1-SE 411 Business and Professional Speech.....	3

For those planning careers in office management:

OA 452 Office Systems and Procedures.....	3
AC 201 Intermediate Accounting.....	3
AC 202 Intermediate Accounting.....	3
GB 302 Electronic Data Processing.....	3
MG 311 Personnel Administration.....	3
MG 422 Employee Training and Supervision.....	2
MG 451 Human Relations in Business.....	3

Real Estate. Courses in real estate are designed to acquaint students with the basic information, knowledge, and practices pertaining to real property and the real estate business. This field of specialization is the academic foundation for careers in various aspects of real estate work: sales, acquisition and development, taxation, management of property, title searching and legal work, appraisal, and finance.

A field of specialization in real estate shall consist of a minimum of 24 semester hours. The following 11 hours must be included:

RE 251 Real Estate Principles.....	3
RE 302 Real Estate Management.....	3
RE 331 Real Estate Finance.....	2
RE 411 Real Estate Law.....	3

To complete the field of specialization the student, in consultation with his adviser, shall select 13 hours or more from the following:

RE 401 Real Estate Appraisal.....	2
RE 441 Real Estate Land Development.....	3
RE 461 Real Estate Problems.....	3
AC 451 Federal and State Income Tax.....	3
AD 301 Advertising Principles.....	3
FI 441 Investments	3
GB 306 Business Law.....	3
IN 251 Principles of Insurance.....	3
MK 310 Principles of Selling.....	3

Elective Courses

Sufficient elective courses are to be selected by the student to complete the total of 126 semester hours required for graduation.

SUGGESTED FOUR-YEAR CURRICULUM OUTLINE

FIRST YEAR

	Sem. Hrs.
GB 101	3
GB 161	3
1-EN 101, 102	6
1-MA 116 or other approved mathematics course.....	3
1-PE 101, 102	1
1-AS 101,102 or 1-MS 101, 102	2
Behavioral and Social Sciences.....	2
Science or Mathematics.....	5
Electives	6

SECOND YEAR

	Sem. Hrs.
AC 101, 102	6
EC 201, 202	6
GB 221	3
GB 233	3
1-SE 200 or 300	2
1-AS 201, 202 or 1-MS 201, 202	2 or 3
Humanities	8
	—
	31 or 32

THIRD YEAR

	Sem. Hrs.
MK 300	3
MG 301	3
GB 305	3
FI 325	3
Field of Specialization and Electives.....	20
	—
	32

FOURTH YEAR

	Sem. Hrs.
MG 463.....	3
Field of Specialization and Electives.....	28
	—
	31

Note: Students registering in the accounting field of specialization should enroll in AC 101 and AC 102 the first year, postponing science, mathematics or electives until later in the program. In some other fields of specialization, students should schedule beginning courses in their field during the sophomore year, postponing one of the general education courses until later. The students should consult his adviser for details of the course sequence in the field of specialization.

GENERAL REGULATIONS

Each student enrolling in the College of Business Administration will be assigned an adviser upon the basis of the subject-matter field in which he is primarily interested. The student should follow the sequence of courses suggested in the four-year curriculum outline and the recommendations of his adviser in completing the prescribed background and tool courses in preparation for the subsequent professional program.

The third and fourth years constitute the professional program of the undergraduate curriculum. For admission to the professional program the student must (1) have attained junior standing, (2) have completed all Business Administration core-

curriculum courses numbered below 300, (3) have completed at least 32 semester hours in general education and related background courses, including Principles of Economics (EC 201, 202).

A student must earn a minimum of 30 semester hours of credit, including 24 in professional business courses (numbered 300 or above), after admission to the professional program in order to be eligible for the Bachelor of Science Degree in the College of Business Administration. Only those regular undergraduate students who have been admitted to the professional program will be permitted to enroll in 400 level courses (other than the courses in economics).

In order that a student may be eligible for graduation, his cumulative scholarship index must be 2.00 or better for all work taken while a student at this University. A minimum of 40 per cent of the semester hours required for graduation must be represented by courses numbered 300 and 400.

To be accepted for credit as part of the professional program in Business Administration, all courses transferred from other institutions must carry prerequisites similar to those of the courses which they are replacing at Arizona State University.

Any exceptions to the core curriculum and field of specialization requirements of the College of Business Administration must be approved by the Standards Committee.

PRE-LAW CURRICULUM

Pre-law students may pursue a program of study in the College of Business Administration as well as in the College of Liberal Arts. A thorough understanding of the principles and practices of business will prove valuable in the practice of law. Accounting is especially valuable since it provides an understanding of the meaning and interpretation of balance sheets and income statements. It is a part of the "language of the lawyer." Courses in economics, insurance, statistics, taxation, business and public finance, and labor relations are also recommended for any student planning to enter the legal profession.

The admission requirements of colleges of law differ considerably. The student should communicate with the dean of the law school he hopes to attend and plan his program to meet the requirements of that school. Many law schools require a baccalaureate degree for admission whereas others permit admission upon completion of three years of college work. Arizona State University cannot accept responsibility for the admission to law school of students following any pre-law program. A four-year and a three-year curriculum are offered for students wishing to complete their pre-law in one of the various fields of business. The four-year program affords a better business preparation for a career in law.

Four-Year Curriculum

Students who plan to take a bachelor's degree prior to entering law school may follow any of the standard curricula in the College of Business Administration. Regular advisers in each field will assist the student in selecting both required and elective courses which will be of particular value in the study of law.

Three-Year Curriculum

A student may select a three-year program in the College of Business Administration, and if after completing 98 semester hours, he is admitted to an accredited law school, 28 semester hours completed in law school may be counted toward meeting the requirements for a Bachelor of Science Degree at Arizona State University. Since the 28 semester hours of the first year of law school are accepted as electives for the Bachelor of Science Degree in business administration, this program permits few electives during the first three years.

The student who wishes to enter law school upon the completion of 98 hours and to use credits earned in law school to qualify for the Bachelor of Science Degree must complete all general education requirements, all core requirements of the College of Business Administration, and a field of specialization as indicated below:

General Education (See page 78).....	40 hours
College of Business Administration	
Core Curriculum (See page 168).....	33 hours
Field of specialization in accounting, economics, or	
finance (See below).....	18 hours
Electives	7 hours

Field of Specialization Requirements:

Accounting	Economics
AC 201 Inter. Accounting.....3	EC 321 Labor Econ.....3
AC 202 Inter. Accounting.....3	EC 401 Inter. Price
AC 383 Adv. Accounting.....3	Analysis
AC 415 Fin. St. Analysis.....3	EC 402 Econ. of I. and E.....3
AC 451 Fed. & St. Inc. Tax.....3	EC 441 Hist. of Econ. Tht.....3
AC 452 Fed. & St. Inc. Tax.....3	EC 453 Gov't. and Business...3
AC 481 Auditing	FI 301 Money and Banking...3
Theory and Practice	FI 441 Investments
	Finance
	FI 301 Money and Banking..3
	FI 441 Investments
	FI 461 Cases in
	Business Finance
	AC 201 Inter. Accounting.....3
	AC 415 Financial Statement
	Analysis
	EC 341 Public Finance

A grade point ratio of 2.00 or above is required in both the course work taken at Arizona State University and in the school of law.

Students who pursue this program must obtain a statement in writing from the Dean of the College of Business Administration giving senior-in-absentia privileges before entering the law school. At the end of his first year in law school, the student must have completed a total of 126 hours of college credit in pre-law and law combined. He must then present a signed testimonial from the dean of the law school to the Registrar at Arizona State University, which shall include a statement of courses taken, grades achieved, and a recommendation that the degree of Bachelor of Science be granted by this University.

A student following the three-year pre-law curriculum should consult the pre-law adviser in the College of Business Administration upon his first enrollment at Arizona State University.

SPECIAL SECRETARIAL PROGRAM

A special program is offered for those who do not plan to complete a four-year degree program but who wish to qualify for office positions in one or two years of study. Students who complete the curriculum outlined below and meet departmental standards will receive a certificate of proficiency. The 64-hour program may be completed in less than two years by enrollment in summer sessions.

A student who has had previous instruction in typewriting and shorthand may be required to enter advanced courses. Additional business subjects may be included to meet the student's needs.

A student who decides later to complete a degree program may count the courses earned in the special secretarial program as regular credit toward the degree, but must complete all requirements as outlined in a degree curriculum.

FIRST YEAR

	Sem. Hrs.
1-EN 101, 102 First Year English	6
1-PE 101, 102 Freshman Physical Education	1
1-PY 100 Elementary Psychology	3
GB 101 Introduction to Business	3
OA 101 Basic Typewriting	2
OA 113 Shorthand	3
OA 143 Business Machines	2
OA 201 Advanced Typewriting	3
OA 214 Shorthand	3
OA 232 Records Systems and Filing	2
1-Humanities	4-6

SECOND YEAR

	Sem. Hrs.
1-SE 200 Elements of Speech	2
AC 101, 102 Elementary Accounting	6
GB 233 Business Communication	3
GB 301 Mechanized Data Processing	3
OA 312 Transcription	4
OA 331 Secretarial Procedures	3
OA 344 Office Appliances	2
OA 351 Principles of Office Management	3
Electives	6-8
	<hr/>
	32-34

College of Applied Arts and Sciences

Purpose

The purpose of the College of Applied Arts and Sciences is to provide a university education of such fundamental background and scope that a student may achieve competency in one of the fields offered by the Schools of Architecture and Engineering, and the Divisions of Agriculture and Industrial Education. The Research Center provides an opportunity for the students to augment their theoretical knowledge with research experience. Every effort is made to carry on a well rounded, well integrated program which will not only give the student proficiency in his professional field but also will develop character, judgment, ideals, breadth of view, general culture, and physical well-being.

Organization

The College of Applied Arts and Sciences is divided into the following:

- Division of Agriculture
- School of Architecture
- School of Engineering
- Division of Industrial Education
- Research Center

Degrees

Bachelor's Degrees

The completion of a four-year curriculum in agriculture, construction, and industrial education leads to the degree of Bachelor of Science. The completion of a four-year curriculum in engineering leads to the degree of Bachelor of Science in Engineering. The completion of a five-year curriculum in architecture leads to the degree of Bachelor of Architecture. In agriculture, a minimum of 126 semester hours of credit is required for graduation; in construction, 130 semester hours; in engineering, 134 semester hours; in industrial education, a minimum of 126 semester hours; and in architecture, a minimum of 170 semester hours.

Master of Science in Engineering Degree

The Master of Science in Engineering degree is awarded upon successful completion of prescribed graduate level course work and research endeavor. The student's program of study is administered under an adviser with the approval of the Dean.

Doctor of Philosophy Degree

The degree Doctor of Philosophy is awarded in engineering upon the satisfactory completion of an approved program of graduate study and research. For specific reference to this degree, see page 212 of this catalog.

General Education

Higher education should provide the student not only with competency in his chosen subject field, but also with experiences which facilitate the student's growth in ability to perceive significant relationships, to make intelligent value judgments, to express himself with ease, clarity, and good taste, and to develop the qualities of character and personality requisite for a successful career. For these reasons the student's curriculum will include study in communications, the humanities, the social sciences, the sciences, and physical education. The order in which the selected courses of study are taken is not prescribed, although in certain degree programs specific courses may be recommended. In all cases, prerequisites must be followed.

The General Education requirements under each of the curriculums offered in the College of Applied Arts and Sciences include the following:

Communications	6 sem. hrs.
Behavioral and Social Sciences.....	8 sem. hrs.
Humanities	8 sem. hrs.
Sciences and Mathematics	8 sem. hrs.
Physical Education and Health.....	1 sem. hr.
General Education Electives.....	9 sem. hrs.

Note: All courses should be chosen with the approval of the student's adviser. See page 78 for a listing of the general education courses.

Division of Agriculture

Purpose

The purpose of the Division of Agriculture is to prepare students for the production and management phases of agriculture at home and abroad. Fields of specialization are offered in Agricultural Science, Agricultural Production and Management, and Agricultural Business. The curriculum and courses offered are planned to meet the particular needs of the following students: (1) Those who are interested in preparing for careers in Farm and Ranch Management; Animal Husbandry; Crop Production or Horticulture; (2) Those desiring to prepare for a career in Agricultural Business; (3) Those desiring to prepare for a career in Agri-

cultural Science; (4) Those desiring to prepare for foreign agricultural service; (5) Those who wish to take certain electives in agriculture while pursuing another curriculum; (6) Those who desire pre-forestry or pre-veterinary training, or preparatory courses for agricultural education.

Organization

The Division of Agriculture is divided into three areas as follows:

1. Agricultural Economics and Management
2. Plant Science
 - Agronomy
 - Horticulture
 - Agricultural Mechanics
3. Animal Science
 - Animal Husbandry
 - Dairy Husbandry
 - Poultry Husbandry

Advisers in the three areas and special interest fields are available to assist students in program planning.

Bachelor of Science Degree Curriculum in Agriculture

The completion of the four-year agriculture curriculum leads to the Bachelor of Science degree. A total of 126 semester hours of credit is required for graduation including general education and field of specialization requirements.

Students may choose a field of specialization in Agricultural Science, Agricultural Production and Management, or Agricultural Business with areas of emphasis shown below. Special programs of studies are available for students who wish to prepare for foreign agricultural service, agricultural education, pre-veterinary, or pre-forestry.

Fields of Specialization

Agricultural Science

Fields of specialization in Agricultural Science place emphasis on physical sciences, biological sciences, economics, and mathematics to prepare students for skilled professional work in research and service industries, and to prepare them for advanced studies in their field of interest. Areas of emphasis include Agricultural Economics, Animal Science, and Plant Science. Specialization requirements in addition to General Education requirements are listed below. Specific courses will be selected by the student under the direction of his adviser.

Agricultural Economics

	Semester Hours
Courses in Agriculture	30
Courses in Economics and Business	27
Courses in Physical Sciences, Biological Sciences, and Mathematics	25
Elective and General Education Courses	44
	126

Animal Science

	Semester Hours
Courses in Agriculture	30
Courses in Physical Sciences, Biological Sciences, and Mathematics	49
Elective and General Education Courses	47
	126

Plant Science

	Semester Hours
Courses in Agriculture	30
Courses in Physical Sciences, Biological Sciences, and Mathematics	58
Elective and General Education Courses	38
	126

Agricultural Production and Management

Fields of Specialization in Agricultural Production and Management place emphasis on the technology of production and management to prepare students to become farmers, ranchers, farm managers, foremen, herdsman, and for jobs with Government agencies and the technical phases of industry. Areas of emphasis include Farm and Ranch Management, Animal Husbandry, Crop Production, and Horticulture. Specialization requirements in addition to General Education requirements are listed below. Specific courses will be selected by the student under the direction of his adviser.

In addition to the academic requirements outlined below, students are required to demonstrate ability in the practical phases of production and husbandry related to their areas of emphasis. Students without adequate farm background can gain experience in farm practices at the University Farm, or on any farm that meets the approval of the adviser.

Farm and Ranch Management

	Semester Hours
Courses in Agriculture	50
Courses in Physical Sciences, Biological Sciences, and Mathematics	15
Elective and General Education Courses	61
	126

Animal Husbandry

	Semester Hours
Courses in Agriculture	48
Courses in Physical Sciences, Biological Sciences, and Mathematics	23
Elective and General Education Courses	55
	126

Crop Production

	Semester Hours
Courses in Agriculture	48
Courses in Physical Sciences, Biological Sciences, and Mathematics	27
Elective and General Education Courses	51
	126

Horticulture

	Semester Hours
Courses in Agriculture	48
Courses in Physical Sciences, Biological Sciences, and Mathematics	33
Elective and General Education Courses	45
	126

Agricultural Business

This field of specialization provides the agricultural student with the opportunity to supplement his program in agriculture with additional business and management courses. It is designed to prepare students for work in the agricultural industries concerned with handling, processing, and marketing farm products, and financing of farm production. It also prepares students for jobs in service industries involved in supplying equipment and materials used in agriculture. An area of emphasis may be selected from plant industry, animal industry, or agricultural economics. Specialization requirements in addition to General Education requirements are listed below. Specific courses will be selected by the student under the direction of his adviser.

	Semester Hours
Courses in Agriculture	36
Courses in Economics and Business	30
Courses in Physical Sciences, Biological Sciences and Mathematics	12
Elective and General Education Courses	48
	126

Special Programs

Foreign Agricultural Service

This program of studies is available for students desiring preparation for agricultural work in foreign industries and underdeveloped countries of the world. The objective is to give the student an opportunity to become better acquainted with the physical and cultural environment in which he plans to work. Under the guidance of his adviser, the student may select elective and general education courses to give a unified area of study concerned with the physical and cultural geography of a region, as well as the government, history, language, religion, philosophy, and esthetic values of the people.

Whenever feasible, applied work in agriculture, business, and the social sciences will be conducted with American Indian people who have similar problems of underdeveloped resources and talents.

Area study courses should be selected from the following:

Subject Field	Semester Hours
Geography	6
History	6
Foreign Language	8
Sociology and Anthropology	9
Philosophy and Art	8
Political Science	3
Psychology	3
	43

Agriculture Education

The first two years of the curriculum preparing students to teach vocational agriculture in the high school is offered as a special program. Students should consult their adviser and select their courses to meet the requirements of the college from which they plan to obtain their agriculture education degree.

Pre-Veterinary and Pre-Forestry

The requirements for the first two years of courses in forestry and veterinary work vary considerably in the different colleges offering these programs. The student is advised to obtain a copy of the catalog from the school he plans to attend and select his program accordingly. The following course of study will meet most of the requirements if the student carefully selects electives to meet the requirements of the college that he plans to attend.

Pre-Veterinary**FIRST YEAR**

First Semester		Hours	Second Semester		Hours
1-EN	101 First Year English	3	1-EN	102 First Year English	3
1-ZO	100 General Zoology	4	1-BO	100 General Botany	4
1-CH	113 General Chemistry	4	1-CH	115 Gen. Chem. and Qual. Analysis	5
1-MA	117 College Algebra	3	1-MA	118 Trigonometry	3
1-PE	101 Freshman Phys. Ed.	0.5	1-PE	102 Freshman Phys. Ed.	0.5
1-MS	101 Basic Military Science or 1-AS 101 Basic Air Science	0.5	1-MS	102 Basic Military Science or 1-AS 102 Basic Air Science	1.5
		15			17

SECOND YEAR

First Semester		Hours	Second Semester		Hours
1-PH	111 General Physics	4	1-PH	112 General Physics	4
1-CH	331 General Organic Chemistry	4	1-CH	225 Quantitative Analysis	4
1-ZO	271 Chordate Anatomy	4	1-CH	332 General Organic Chemistry	4
1-MS	201 Basic Military Science or 1-AS 201 Basic Air Science	1.5	1-MS	202 Basic Military Science or 1-AS 202 Basic Air Science	1.5 or 0.5
	Electives	4		Electives	4
		17.5			17.5 or 16.5

Pre-Forestry**FIRST YEAR**

First Semester		Hours	Second Semester		Hours
1-EN	101 First Year English	3	1-EN	102 First Year English	3
1-BO	100 General Botany	4	1-CH	115 Gen. Chem. and Qualitative Analysis	5
1-MA	117 College Algebra	3	1-MA	118 Trigonometry	3
1-CH	113 General Chemistry	4	1-ZO	100 General Zoology	4
1-PE	101 Freshman Phys. Ed.	0.5	1-PE	102 Freshman Phys. Ed.	0.5
1-MS	101 Basic Military Science or 1-AS 101 Basic Air Science	0.5	1-MS	102 Basic Military Science or 1-AS 102 Basic Air Science	1.5
		15			17

SECOND YEAR

First Semester		Hours	Second Semester		Hours
1-PH	111 General Physics	4	1-PH	112 General Physics	4
1-GL	113 Physical Geology	4	CE	241 Surveying	3
AG	232 Soils	3	1-BO	280 Plant Pathology	4
1-BO	250 Plant Anatomy	4	AG	246 Conservation of Ag. Resources	3
1-MS	201 Basic Military Science or 1-AS 201 Basic Air Science	1.5	1-MS	202 Basic Military Science or 1-AS 202 Basic Air Science	1.5 or 0.5
				Electives	2
		16.5			17.5 or 16.5

School of Architecture

Purpose

The School of Architecture offers degree programs and special courses with the purpose of providing liberal, technical and professional preparation for careers concerned with creation of the buildings and related facilities of a functional and satisfying environment.

Organization

The courses of instruction are organized as follows:

Architecture—5-year curriculum leading to the degree of Bachelor of Architecture.

Construction—4-year curriculum leading to the degree of Bachelor of Science.

Admission

Students who wish to be admitted to full freshman standing in the School of Architecture should present certain secondary school units in addition to the minimum University requirements shown on page 56.

Mathematics must include algebra, advanced algebra and geometry for a total of 2½ units.

Laboratory sciences must include one unit of physics and one unit of chemistry.

Other units should include geometry, trigonometry, art and drawing.

Students presenting other or fewer credits may be required to take additional preparatory work without degree credit.

Bachelor of Architecture Degree Curriculum

Purpose

The profession of architecture has the obligation of providing comprehensive leadership in the shaping of man's physical environment.

The architect must have a working mastery of all aspects of our complex technology. He must have mature intuition and understanding of the character and significance of today's world. And he must have the talent, partly native and partly developed, to apply this working knowledge and understanding to the creation of architecture that will enrich men's lives.

It is the purpose of the program in architecture to provide graduates with:

- a thorough and intimate comprehension of the nature of architecture
- an awareness of the high purpose and responsibility of the architect
- the competence necessary to acquire professional registration
- the high ideals necessary for responsible functioning as an individual and as an architect in our society

History and Status

Since 1949, programs have permitted the student to major in architecture in meeting requirements for the four-year Bachelor of Science degree—the five-year degree program became operative

in 1957. It is designed to meet requirements for accrediting by the National Architectural Accrediting Board and to provide educational qualification for registration under Arizona law as administered by the State Board of Technical Registration in conformity with the recommendations of the National Council of Architectural Registration Boards. The School is an associate member of the Association of Collegiate Schools of Architecture. An advisory committee of six architects practicing locally and in neighboring states gives counsel in shaping policies of the School. The Central Arizona Chapter of the American Institute of Architects lends support in many ways including award of scholarships and sponsorship of the Student Chapter of the American Institute of Architects.

Curriculum

The curriculum provides for the student's development in each of three areas:

Courses in *Architectural Techniques* provide *knowledge* of the technical bases of architecture, including: environmental factors; materials and methods of construction, furnishing and landscaping; structural, mechanical, and electrical systems; planning techniques; drawing techniques; legal and professional procedures.

Courses in *Architectural Philosophies* provide *understanding* of architecture as both a consequence and a determinant of man's character—in the past (history) and at present (theory).

Courses in *Architectural Design* provide for *integration of knowledge and understanding* in the shaping of our physical environment.

The curriculum is arranged to accommodate students with varying backgrounds and interests through choice of electives. For example, before the beginning of his second year, the student may choose a sequence of courses in mathematics and structures totaling either 26 or 31 semester hours as indicated in the curriculum outline. Decisions regarding the individual student's program will be reached by the student and his faculty adviser.

CURRICULUM IN ARCHITECTURE

FIRST YEAR

First Semester	Hours	Second Semester	Hours
1-EN 101 First Year English_____	3	1-EN 102 First Year English_____	3
1-MA 119 Algebra & Trigonometry 4	4	1-MA 120 Analyt. Geom. and Cal.____	4
1-HI 101 Survey of Western Civil_ 3	3	1-HI 102 Survey of Western Civil_ 3	3
1-AS 101 Basic Air Science or 1-MS 101 Basic Military Science____	0.5	1-AS 102 Basic Air Science or 1-MS 102 Basic Military Science____	1.5
1-PE 101 Freshman Phys. Ed._____	0.5	1-PE 102 Freshman Physical Educ. 0.5	0.5
AC 100 Intro. to Arch._____	2	AC 101 Fundamentals of Arch.____	2
AC 121 Drawing & Design_____	3	AC 122 Drawing & Design_____	3
	16		17

SECOND YEAR					
First Semester		Hours	Second Semester		Hours
1-PH 111	General Physics.....	4	1-PH 112	General Physics.....	4
1-GE 411	Principles of Physical Geography.....	3	1-AN 111	Anthropology.....	3
	Elective (Humanities).....	3	1-AS 202	Basic Air Science or 1- MS 202 Basic Military Science.....	0.5 or 1.5
1-AS 201	Basic Air Science or 1- MS 201 Basic Military Science.....	1.5	AC 224	Architectural Design.....	4
AC 223	Architectural Design.....	4	AC 262	*Mechanics of Materials.....	3
AC 261	*Statics.....	3			
		18.5			17.5 or 18.5
THIRD YEAR					
First Semester		Hours	Second Semester		Hours
AC 311	Historical Architecture.....	3	AC 312	Historical Architecture.....	3
AC 325	Architectural Design.....	5	AC 326	Architectural Design.....	5
AC 351	Materials and Techniques.....	3	AC 352	Materials and Techniques.....	3
AC 363	*Structures.....	3	AC 364	*Structures.....	3
AC 371	Mechanical and Electrical Systems.....	3	AC 372	Mechanical and Electrical Systems.....	3
Elective (Humanities).....		2	Elective.....		2
		19			19
FOURTH YEAR					
First Semester		Hours	Second Semester		Hours
AC 413	Modern Architecture.....	3	AC 414	Modern Architecture.....	3
AC 427	Architectural Design.....	5	AC 428	Architectural Design.....	5
AC 431	Landscape Materials and Techniques.....	2	AC 432	Community Planning.....	3
AC 465	*Structures.....	3	AC 466	*Structures.....	3
Elective.....		4	Elective.....		4
		17			18
SUMMER FOLLOWING THIRD OR FOURTH YEAR					
First Summer Session			Second Summer Session		
AC 435	Architecture Workshop (Required).....	6	AC 436	Architecture Workshop (Optional as elective).....	(6)
FIFTH YEAR					
First Semester		Hours	Second Semester		Hours
AC 415	Architectural Philosophies Seminar.....	2	AC 493	Thesis.....	12
AC 429	Architectural Design.....	5			
AC 492	Thesis Research.....	2			
AC 456	Architectural Techniques Seminar.....	2			
AC 482	Professional Practice.....	3			
		14			12

Courses marked * may be omitted and the following sequence in Mathematics and Structures (in the School of Engineering) may be substituted:

1-MA 121	Analytic Geometry and Calculus.....	4
1-MA 212	Analytic Geometry and Calculus.....	4
ES 211	Engineering Mechanics.....	3
ES 321	Mechanics of Solids.....	3
CE 321	Design of Steel Structures.....	3
CE 322	Design of Concrete Structures.....	3
AC 467	Structural Systems.....	3

This choice will make use of five elective hours.

Bachelor of Science Degree Curriculum in Construction

Purpose

The construction industry is one of the largest in the country in terms of business activity, money expended, and total employment. Traditionally, it has provided creative and fascinating careers with opportunity for those individuals who develop the perceptive judgment and the wide range of technical and administrative abilities which this complex field requires.

Many trained construction men are engaged as owners, executives, or key employees of building and contracting companies. Others hold positions of responsibility in engineering firms, in government and administration, in labor relations, in the manufacture and distribution of building materials and machinery, and other such allied ventures and services.

It is the purpose of the curriculum in construction to prepare students for work in the varied field of construction through a program which provides essential educational, technical, and administrative training.

History and Status

For many years, programs have permitted the student to major in basic building construction in meeting requirements for the four-year Bachelor of Science Degree. The general four-year Bachelor of Science degree in construction as described herein became an operative program in 1957. An advisory committee of twelve representatives of various segments of the construction industry gives counsel in shaping curriculum and policies. Various associations and firms in the State support the program with funds, scholarships and awards as well as with both summer and permanent employment opportunities.

Curriculum

The curriculum provides for the student's progressive development in each of three primary areas:

General education courses furnish a broad base for developing understanding of the modern world and the relation of construction to it.

Technical courses, offered in the College of Applied Arts and Sciences, provide knowledge of buildings and structures, the materials of construction and the techniques, systems and procedures related to construction, architecture, engineering, and management.

Business courses, offered in the College of Business Administration, provide knowledge of general business principles and methods.

CURRICULUM IN CONSTRUCTION

FIRST YEAR

First Semester		Hours	Second Semester		Hours
1-EN	101 First Year English	3	1-EN	102 First Year English	3
1-MA	119 Algebra & Trigonometry	4	1-MA	120 Analytical Geometry and Calculus	4
	Elective (Behavioral and Social Sciences)	3		Elective (Behavioral and Social Sciences)	3
3-GB	101 Introduction to Business	3	4-CO	157 Construction Drawing	3
CO	101 Construction Principles	2	CO	191 Construction Materials	2
1-AS	101 Basic Air Science or		1-AS	102 Basic Air Science or	
1-MS	101 Basic Military Science	0.5	1-MS	102 Basic Military Science	1.5
1-PE	101 Freshman Phys. Ed.	0.5	1-PE	101 Freshman Phys. Ed.	0.5
		16			17

SECOND YEAR

First Semester		Hours	Second Semester		Hours
1-PH 111	General Physics.....	4	1-PH 112	General Physics.....	4
3-EC 201	Principles of Economics..	3	3-EC 202	Principles of Economics..	3
CO 221	Mechanics	4	CE 241	Surveying	3
CO 291	Construction Systems and Materials	2	CO 322	Structures	4
3-AC 101	Elementary Accounting..	3	CO 383	Construction Estimating	3
1-AS 201	Basic Air Science or		1-AS 202	Basic Air Science or	
1-MS 201	Basic Military Science..	1.5	1-MS 202	Basic Military Science....	0.5
					or 1.5
		17.5			17.5 or 18.5

THIRD YEAR

First Semester		Hours	Second Semester		Hours
3-GB 305	Business Law	3	3-GB 306	Business Law.....	3
3-MG 301	Principles of Manage- ment	3		Elective (Humanities) ..	3
	Elective (Humanities) ..	3	CO 301	Construction Accounting	3
CO 384	Construction Estimating	3	IE 311	Engineering Economy....	2
	Electives	5	CO 391	Construction Equipment..	3
		17		Elective	3
					17

FOURTH YEAR

First Semester		Hours	Second Semester		Hours
ES 400	Technical Communications	3	IE 481g	Supervision and Labor....	2
	Elective (Humanities) ..	2	CE 452g	Soil Mechanics.....	3
CO 490g	Pre-Plans and Methods..	3	CO 496g	Construction Operations..	3
CO 495g	Construction Operations..	3	CO 471g	Special Construction Problems	3
	Electives	5		Electives	5
		16			16

Eighteen hours of electives will be chosen by the student and his adviser from selected courses offered in the engineering, business administration or construction programs.

School of Engineering

Purpose

The Engineering Program seeks the attainment by each graduate of certain broad objectives, and it is designed to make effective a philosophy of education for careers in science, engineering, and industry for leadership in the second half of the twentieth century.

The curriculums and courses offered are designed to meet the needs of the following students: (1) Those who wish to obtain a Bachelor of Science in Engineering Degree and who plan careers in fields where science, mathematics, and analytical methods are of special value; (2) Those who wish to do graduate work in engineering; (3) Those who wish one or two years of training in mathematics, science, and engineering in preparation for a technical program; (4) Those who desire pre-engineering for the purpose of deciding which engineering field to undertake or those

who desire to transfer to another college or university; (5) Those who wish to take certain electives in these fields while pursuing another curriculum in the University.

Admission

Students who wish to be admitted to full freshmen standing in the School of Engineering should present certain secondary school units in addition to the minimum University requirements shown on page 56. A total of $3\frac{1}{2}$ units are required in mathematics. Included must be: advanced algebra, geometry, and trigonometry. Calculus is recommended. The laboratory sciences chosen must include at least one unit in physics and one unit in chemistry.

Students who may have deficiencies in subject matter preparation may be required to complete additional university credit course-work which may not be applied toward an engineering degree.

Well prepared students can usually complete the plan of study leading to the degree of Bachelor of Science in Engineering in any of the engineering curricula in four years. Many students, however, may find it advantageous or necessary to devote more than four years to the undergraduate engineering programs of study by pursuing at one time, in any semester, fewer studies than are regularly prescribed. In cases of inadequate secondary preparation, poor health, or financial necessity requiring much time for outside work, the undergraduate course should be extended to five years or longer. A student who so desires may devote five years to his undergraduate work and include additional instruction in the humanities, the social sciences, the physical sciences or mathematics.

Organization

Fields of specialization have been developed around an engineering core. The engineering core consists of a highly correlated group of courses of fundamental importance and basic concern to engineers. It constitutes a broad base of science, mathematics, and engineering upon which the various fields of specialization are founded. Instructional patterns are basically variations of a single curriculum, and the student is allowed considerable latitude in developing an instructional pattern to fit his particular interests. In each of the several fields of specialization, the scientific knowledge and techniques are applied and further developed through analysis, synthesis, and design in a definite engineering discipline. For convenience, all of the fields of specialization offered by the School of Engineering are shown in the following list:

Chemical Engineering
 Civil Engineering
 Electrical Engineering
 Computers
 Electronics
 Power
 Engineering Science
 Industrial Engineering
 Mechanical Engineering
 Nuclear
 Space

Bachelor of Science in Engineering Degree Curriculum

The satisfactory completion of a four-year curriculum of a minimum of 134 semester hours, including general education, an engineering core curriculum, and both required and elective courses of study in a field of specialization, leads to the degree of Bachelor of Science in Engineering.

The principle fields of specialization in the engineering curriculum are devoted to the basic sciences, mathematics, the fundamentals of engineering science, and their application to the solution of engineering problems. These courses are not training courses for any of the mechanical or manipulative skills, but rather, are planned to provide preparation for development, design, research, graduate work, and, with certain electives, for operation, production testing, maintenance and management.

In any field of specialization the degree requirements consist of the engineering core, the general education requirements, and the courses in a field of specialization. In addition to these 134 semester hours, 6 semester hours are required in AFROTC or ROTC for all male students, unless exempt.

For assistance and counsel in planning a program, each student will be assigned an adviser from the instructional staff in his special interest field.

ENGINEERING CORE COURSES

1-CH 113	General Chemistry	4
1-CH 114	General Chemistry	4
1-MA 120	Analytic Geometry and Calculus	4
1-MA 121	Analytic Geometry and Calculus	4
1-MA 212	Calculus	4
1-MA 220	Differential Equations	3
1-PH 251	Sound and Optics	3
1-PH 361	Modern Physics	3
EE 301	Electrical Networks	4

ES 211 Engineering Mechanics	3
ES 231 Electrical Science	4
ES 312 Engineering Mechanics	3
ES 321 Mechanics of Solids	3
ES 350 Theory of Material Properties	2
ES 371 Fluid Mechanics	3
ES 381 Thermodynamics	3
ES 400 Technical Communications	3
ME 102 Engineering Problem Analysis	2
ME 113 Engineering Graphics	3

The program of study in the first year precedes, and is common to, all fields of specialization. It gives the student time to become adjusted, and to choose the field of specialization for which he is best adapted. Counseling is provided in order that the student may be aided in making his choice. To a considerable extent, the course requirements of the second year are common to all fields of specialization.

As an aid to student program planning, a freshman program of study is shown below.

FIRST YEAR ENGINEERING

(Common to all engineering programs)

First Semester	Hours	Second Semester	Hours
1-CH 113 General Chemistry.....	4	1-CH 114 General Chemistry.....	4
1-EN 101 First Year English.....	3	1-EN 102 First Year English.....	3
1-MA 120 Analytic Geometry and Calculus	4	1-MA 121 Analytic Geometry and Calculus	4
ME 102 Engineering Problem Analysis	2	ME 113 Engineering Graphics.....	3
ME 102 Engineering Problem Humanities Elective.....	2	Social Science Elective	2
1-AS 101 Basic Air Science or 1- MS 101 Basic Military Science.....	0.5	1-AS 102 Basic Air Science or 1- MS 102 Basic Military Science.....	1.5
1-PE 101 Freshman Phys. Ed.....	0.5	1-PE 102 Freshman Physical Educ.	0.5
	16		18

All engineering students will complete the general education and engineering core courses. In addition to these subjects, there are approximately 49 hours of required and elective courses which are necessary to complete the degree requirements in each field of specialization. For convenience, these are listed below, and changes may be made only with the consent of the Dean.

Each program of study includes several hours of technical electives. With the consent of the student's faculty adviser, selection of elective courses may be made from 300 level courses or above in such fields as engineering, mathematics, business administration, the physical sciences, or foreign languages.

Prior to enrolling in courses at the 300 level, each engineering student must: (1) receive approval from the office of the Dean of Engineering to continue in engineering; (2) secure from his adviser an approved course of study for his remaining work. Generally, students with a 2.00 scholarship index (C average), or higher will receive approval.

CHEMICAL ENGINEERING

The work of the chemical engineer is concerned with the design, construction, and operation of equipment and plans, research, and processes whereby materials undergo a chemical and/or physical change. Chemistry, physics, and mathematics are the underlying sciences of chemical engineering, and economics is the guide in practice. Nucleonics, ultra-pure materials, plastics, drugs, and food processing are in the realm of chemical engineering activities.

KE 211, 212	Chemical Process Calculations	4
IE 311	Engineering Economy	2
CH 331, 332	General Organic Chemistry	8
KE 331	Transport Processes	4
KE 332	Chemical Engineering Operations	4
CH 441, 442	General Physical Chemistry	8
CH 421	Instrumental Analysis	3
or CH 225	Quantitative Analysis	4
KE 441, 442	Chemical Process Principles	6
KE 422	Metallurgy	3
KE 451, 452	Chemical Engineering Laboratory	4
KE 461	Process Control	3
KE 462	Process Design	3
KE 474	Chemical Technology	2
	Technical Elective	3

To satisfy the Engineering Core and to obtain the necessary chemical science background, chemical engineers may make the following substitutions in Engineering Core requirements:

- for ES 381 substitute CH 441
- ES 350 substitute CH 442
- ES 371 substitute KE 331

CIVIL ENGINEERING

Civil engineers are responsible for the research, development, design, and construction of the structures that form the basis of our modern civilization. These include buildings of all types, bridges, highways, dams, canals, irrigation, and multipurpose hydraulic systems. Civil engineering further encompasses portions of environmental engineering; including city planning, water resources development and supply, waste treatment, and engineering aspects of environmental health. Education in this field is founded on scientific fundamentals with extensive training and practice in one or more fields of professional specialization including structural, hydraulic, soil mechanics, transportation, and sanitary engineering.

CE 241	Surveying	3
CE 311	Materials of Engineering	2
CE 321	Structural Mechanics	4
CE 380	Hydraulic Engineering	4

CE 423 Structural Design	4
CE 424 Structural Design	4
CE 451 Soil Mechanics	3
CE 461 Sanitary Engineering	3
CE 462 Sanitary Engineering	3
CE 472 Highway Engineering	3
GL 311 Engineering Geology	3
Technical Electives	13

ELECTRICAL ENGINEERING

Many modern scientific developments are either essentially electrical in character or depend on electrical equipment and technique. The field is very broad since it enters into much of industry and service where power is utilized, intelligence is transmitted, and control is exercised over physical, chemical, or mechanical operations.

While all students in Electrical Engineering pursue a common program in fundamentals, specialization in various areas of Electrical Engineering is provided through a choice of technical electives. These technical electives are based on a common core of Electrical Engineering fundamentals. The Electrical Engineering Core is in addition to, and integrated with, the Engineering Core.

EE 302 Electrical Networks	3
EE 331 Electronic Engineering	4
EE 332 Electronic Engineering	4
EE 341 Electromagnetic Fields	3
EE 362 Energy Conversion	3
EE 401 Electrical Networks	4
EE 450 Electron Devices	3
EE 461 Electrical Machinery	4
EE 480 Feedback Control Systems	4
1-MA 362 Mathematical Methods for Engineering and Physics	3
Technical Electives	16

Electrical Engineering students may take EE 450 instead of ES 350.

Electrical Engineering technical electives available (to be chosen *only* with adviser's approval) are shown below. It is desirable that a student choose one or more electives from a field other than Electrical Engineering.

(Electronics)

EE 402 Electrical Networks	3
EE 410 Pulse Techniques	3
EE 435 Communication Theory	4
EE 445 Microwaves	4
EE 485 Industrial Electronics	3
EE 490 Electroacoustics	2
EE 495 Magnetics	3

(Computers)

EE 326 Numerical Methods	3
EE 420 Switching Networks	3
EE 421 Digital Computers	3
EE 422 Digital Computers	3
EE 425 Analog Computers	3
EE 426 Numerical Methods	3

(Power)

EE 462 Motor Applications and Control	3
EE 471 Electric Power Systems	3
EE 472 Electric Power Systems	3
EE 475 Economics of Public Utilities	3

(Applications of Computers)

A program is also offered in scientific application of computers. Students following this program take the Engineering Core courses followed by additional mathematics, engineering, and computer courses. The following are required courses in addition to the Engineering Core:

1-MA 362 Mathematical Methods for Engineering and Physics	3
1-MA 363 Mathematical Methods for Engineering and Physics	3
1-MA 437 Statistical Methods for Engineering and Physical Sciences.....	3
1-MA 458 Matrix Theory	3
ES 483 Heat Transfer	3
EE 302 Electrical Networks	3
EE 326 Numerical Methods	3
EE 331 Electronic Engineering	4
EE 420 Switching Networks	3
EE 421 Digital Computers	3
EE 425 Analog Computers	3
EE 426 Numerical Methods	3
EE 480 Feedback Control Systems	4
Technical Electives	8

ENGINEERING SCIENCE

Engineering science is designed to produce a graduate who knows the basic sciences, the important engineering sciences, and understands how to apply them to a broad and fundamental field of engineering activity. It leads to analytical engineering, to development, research, and to graduate work in many areas. The graduate of this curriculum will be able to avail himself of the facts of basic science and engineering science in the solution of engineering problems using mathematics and the research method as tools.

EE 331	Electronic Engineering	4
EE 332	Electronic Engineering	4
EE 341	Electromagnetic Fields	3
ES 421	Vibrations	3
ES 422	Mechanics of Materials	2
ES 473	Fluid Mechanics	3
ES 483	Heat Transfer	3
MA 460g	Foundations of Applied Mathematics: Real Analysis	3
MA 461g	Foundations of Applied Mathematics: Complex Analysis	3
MA 462g	Introduction to Partial Differential Equations	3
	Technical Electives	18

INDUSTRIAL ENGINEERING

Industrial Engineering is concerned with the design, improvement, and installation of integrated systems of men, materials, and equipment. It draws upon specialized knowledge and skill in the mathematical, physical, and social sciences together with the principles and methods of engineering analysis and design, to specify, predict, and evaluate the results to be obtained from such systems.

Typical job assignments for industrial engineers are in production control, work methods and measurements, quality control, operations research, factory planning, systems and procedures, product design and development, and sales engineering.

EE 326	Numerical Methods	3
IE 300	Industrial Engineering	2
IE 311	Engineering Economy	2
IE 312	Engineering Economy	2
IE 322	Work Analysis and Design	3
IE 431	Engineering Administration	3
IE 432	Engineering Administration	3
IE 461	Design of Industrial Operations	4
IE 462	Design of Industrial Operations	4
IE 471	Engineering Statistics	3
IE 472	Engineering Statistics	3
IE 475	Operations Research	2
	Technical Electives	15

MECHANICAL ENGINEERING

Mechanical engineers are used for such a variety of work that the curriculum is broad and fundamental. The work of mechanical engineers falls under design, construction, erection, operation, inspection, production, maintenance, research, sales, and administration.

Energy from the atomic nucleus will revolutionize man's concepts of power and energy utilization within the foreseeable future. Applications of nuclear reaction products will expand to all branches of engineering and technology. The need for engineers specifically trained to cope with the problems of nuclear engineering, nuclear processes and their applications to industry and living is now large and will increase. Well informed specialists in the field believe that the rate of advancement of nuclear applications is wholly dependent on the number of well qualified engineers available.

Missile and space technology have recently become an integral part of the industrial and technological scene, and the field of aeronautical engineering has had its boundaries expanded to unlimited space. Where earlier curriculums emphasized airframe and aircraft power plant design, today's engineers are, in addition, concerned with supersonic speeds, guidance systems, recent developments in propulsion, celestial navigation, manned and un-manned space flight.

Mechanical Engineering Core Courses

EE 331	Electrical Engineering	4
ES 422	Mechanics of Materials	2
ES 473	Fluid Mechanics	3
ES 483	Heat Transfer	3
KE 321	Metallurgy	3
MA 362	Mathematical Methods for Engineering and Physics	3
or		
MA 460	Foundations of Applied Mathematics	3
ME 441	Analysis and Design	3
or		
ME 443	Aero-Space Design	3
ME 382	Thermodynamics of Mechanical Systems...	3
ME 461	Engineering Measurements	3

In addition to the Mechanical Engineering Core, students should select one of the following:

(Mechanical)

ES 421	Vibrations	3
IE 311	Engineering Economy	2
ME 442	Analysis and Design	3
ME 462	Mechanical Engineering Laboratory	3
	Technical Electives	11

(Space)

ES 421	Vibrations	3
ME 405	Human Factors in Space Travel	2
ME 412	Mechanics of Orbits and Trajectories	3
ME 453	Rocket Propulsion and Rocketry	3
ME 463	Space Science Laboratory	3
	Technical Electives	8

(Nuclear)

NE 411 Nuclear Engineering	3
NE 421 Nucleonics Laboratory	2
NE 431 Nuclear Reactor Engineering	3
NE 451 Reactor Design	3
Technical Electives	11

Division of Industrial Education

Purpose

The Division of Industrial Education serves several major functions. Important among these functions is the offering of technical and professional courses for those planning to become teachers of industrial arts education in the elementary, and secondary schools.

For in-service teachers of Industrial Arts Education a comprehensive graduate course offering, leading to the Master of Arts degree, is available.

A parallel function of the division is the offering of four-year degree curriculums with opportunity for field specialization in one of the following: aeronautics, technical design, electronics, general industrial, and mechanics.

Students who do not wish to pursue a four-year degree program, but who desire to secure specialized preparation at the university level in industrial activities, may choose a two-year curriculum from one of the several field specializations noted above.

Organization

The courses of instruction offered by the Division are organized under the following subject fields: industrial arts education, aeronautics, construction, technical design, electronics, and mechanics.

While many division courses are designated as Industrial Arts courses, they are in certain instances also elective to students of the various field specializations of the four-year non-teaching curriculums. Conversely, the Industrial Arts students to some extent, build their concentrations of technical work in courses of the above listed fields of specialization.

Industrial Arts Education

The total pattern of course work required of the prospective secondary school industrial arts teacher is as follows:

General Education	40
Professional Education	22
Major teaching field	45
Minor teaching field	18
Air or Military Science	6

For the specific requirements of general and professional education, consult the catalog section of the College of Education.

Major Teaching Field

The major teaching field in industrial arts requires 45 hours of which 27 hours are required shop courses, 9 hours are elected in a field of specialization, and 9 hours are required in professional industrial arts courses.

The required shop core is as follows:

TD 111—Technical Drawing	2
IA 104—Drafting and Design	2
IA 220—Electricity	3
TM 274—Basic Automotives	3
IA 261—General Metals	4
IA 121—Woods	3
IA 322—Machine Woods	3
IA 135—Basic Graphic Arts	3
IA 161—General Shop	2
IA 323—Shop Maintenance	2
	27

The industrial arts professional course requirement of 9 hours is outlined below:

IA 342—Selection and Organization of Subject Matter	3
IA 480—Teaching Industrial Subjects	3
IA Elective	3
	9

Nine hours are to be elected, with approval of the adviser, from a field of specialization.

Minor Teaching Field

Eighteen semester hours of work are required including:

TD 111—Technical Drawing	2
IA 121—Woods	3
IA 261—General Metals	4
IA 322—Machine Woods	3
IA 342—Selection and Organization of Subject Matter	3
Approved Elective	3
	18

Bachelor of Science Degree Curriculum

Technical (non-teaching) curriculums are four-year degree programs with a significant portion of the college work being completed in an area of technical specialization. These areas include aeronautics, technical design, electronics, general industrial, and mechanics. Specialization in one of these areas is designed to afford the student an excellent preparation in the techniques, skills and processes essential to entering industrial, technical and commercial occupations.

All four-year technical curriculums of this Division require the satisfactory completion of a minimum of 126 hours, divided into five requirements as follows:

I General Education	40 hours
II Air or Military Science	6 hours
III Technical Core Courses	12 hours
IV Field of Specialization—(Courses required and elected)	50 to 56 hours
V Supporting Field	12 to 18 hours

A minimum of 20 semester hours taken in the major field of specialization must be in upper division courses.

All technical curriculums require the following courses:

*1-MA 117 College Algebra	3
*1-MA 118 Trigonometry	3
IA 109 Calculations	2
*1-PH 111 General Physics	4
*1-CH 111 or 113 Elementary Chemistry	4
1-CH 114 General Chemistry	4
*3-GB 101 Intro. to Business	3
ES 400 Technical Writing	3

—
26

Of these 26 hours the starred 17 hours are general education requirements; the remaining 9 hours complete the technical core courses (Item III above).

Beyond the above core, the specific requirements of each of the fields of specialization are set forth in the following section.

Field of Specialization Requirements

A field of specialization consists both of required and elective courses within the selected field of emphasis.

Aeronautics. Instruction combines thorough technical training with a general university education to prepare aeronautical technicians for employment in General or Commercial Aviation and manufacturing employment.

Required Courses: TA 180, 181, 182, 183, 287, 288, 289, 384, 388, 486, 487, 488; TD 111, 112; TM 161, 169; KE 320.

Electives: TA 185, 385; GB 301, 302, 305; MG 301, 338; IE 321, 439.

Supporting Field: TE 200, 210, 310, 318.

Electronics. This field of specialization provides theoretical, practical and technical knowledge of electronics and allied fields. It prepares for employment in commercial broadcasting and television station operation, maintenance, and repair; radar and other military applications of electronics; industrial applications of electronics as well as commercial activities associated with the field.

Required Courses: TE 200, 213, 310, 311, 315, 316, 317, 330, 412, 414, 417; 1-MA 120.

Technical Electives: Select 12 hours from the following: TE 210, 318, 319, 320, 410, 415, 418, 419, 420; TD 111, 112; 1-MA 121, 212. Note: A minimum of 8 hours of the 12 selected must be upper division courses.

Supporting Field: TM 161, 164; GB 301, 302, 305; KE 320; IE 439; MG 301, or suitable courses chosen with the approval of an adviser.

General Industrial. Curriculum provides experiences designed to permit a degree of specialization, but with emphasis upon broad preparation in industrial areas. Designed to meet the needs of those desiring to become inspectors, managers, salesmen, supervisors, shop owners or associated employment goals.

Required Courses: TD 111, 112; TM 161, 164, 169, 274; IA 121, 322, 327.

Elective Courses: Select a minimum of 15 semester hours from one of the five special emphases. A minimum of 20 additional hours must be selected from courses offered by the division with approval of adviser.

Emphasis on Aeronautics: TA 180, 181, 182, 183, 287, 288, 289, 384, 388, 486, 487, 488.

Emphasis on Technical Design: TD 121, 200, 302, 303, 305, 330, 340, 350, 402, 406, 408.

Emphasis on Electronics: TE 200, 213, 310, 311, 315, 316, 317, 330, 412, 414, 417.

Emphasis on Graphic Arts: IA 135, 235, 335, 435, 436.

Emphasis on Mechanics: TM 162, 164, 169, 173, 274, 364, 369, 371, 376, 377, 461, 462, 467, 469, 478.

Mechanics. Designed to meet the needs of students desiring to enter employment in technical and related positions in metals and allied industries including the several phases of automotives.

Required Courses: TM 161, 162, 164, 169, 173, 274, 364, 369, 371, 376, 377, 461, 462, 467, 469, 478.

Electives: GB 301, 302, 305; MG 301, 338; IE 321, 439g; TD 200.

Supporting Field: TD 111, 112, 121; KE 320; TE 200.

Technical Design. Program includes: drafting techniques, scientific and mathematical background for design; advanced work in mechanical design for production. A minor emphasis may be elected as a basis for employment in mining, oil production, highways, utilities, electro-mechanical, technical writing, or production.

Required Courses: TD 111, 112, 121, 200, 302, 303, 305, 330, 340, 350, 402, 406, 407, 408.

Electives: Chosen in one of five minor fields as approved by the adviser.

Supporting Field: ME 102; 1-MA 120, 121; TE 200, 213; ES 211, 320; KE 320.

Special Students and Two-Year Technical Curriculums

Students not desiring to pursue a four-year degree program, but who wish to secure specialized preparation at the college level in industrial activities, may do so. Special students are those who are not enrolled in any curriculum leading to a degree but who desire instruction in subjects of special interest to themselves. Moreover, a student may choose one of the two-year curriculums from a field of specialization. Specific courses included in the student program must have the approval of adviser.

SUGGESTED FIRST YEAR PROGRAM—AERONAUTICS

First Semester		Hours	Second Semester		Hours
1-EN	101 First Year English	3	1-EN	102 First Year English	3
1-MA	117 College Algebra	3	1-MA	118 Trigonometry	3
TM	169 Oxy-Acetylene Welding	3	TA	183 Aircraft Maintenance	3
TA	180 Aircraft Structures	3	TM	161 Machine Shop	3
TA	182 Metal Aircraft Structures	2	TA	181 Composite Aircraft Structures	2
1-PE	101 Freshman Physical Ed.	0.5	1-PE	102 Freshman Physical Ed.	0.5
1-AS	101 Basic Air Science or		1-AS	102 Basic Air Science or	
1-MS	101 Basic Military Science	0.5	1-MS	102 Basic Military Science	1.5
		15			16

SUGGESTED FIRST YEAR PROGRAM—ELECTRONICS

First Semester		Hours	Second Semester		Hours
1-EN	101 First Year English	3	1-EN	102 First Year English	3
1-MA	117 College Algebra	3	1-MA	118 Trigonometry	3
4-TD	111 Technical Drawing	2	4-IA	109 Calculations	2
3-GB	101 Intro. to Bus.	3	1-HI	102 Survey of Western Civil. or 1-HI 104 History of the U.S.	3
1-PE	101 Freshman Physical Ed.	0.5	TM	161 Machine Shop or TM 164 Sheet Metal	3
1-AS	101 Basic Air Science or		1-PE	102 Freshman Physical Ed.	0.5
1-MS	101 Basic Military Science	0.5	1-AS	102 Basic Air Science or	
		15	1-MS	102 Basic Military Science	1.5
					16

SUGGESTED FIRST YEAR PROGRAM—MECHANICS

First Semester		Hours	Second Semester		Hours
1-EN	101 First Year English	3	1-EN	102 First Year English	3
1-MA	117 College Algebra	3	1-MA	118 Trigonometry	3
1-HI	101 Survey of Western Civl.		1-HI	102 Survey of Western Civl.	
	or 1-HI 103 History of the U.S.	3		or 1-HI 104 History of the U.S.	3
TD	111 Technical Drawing	2	TM	162 Machine Shop	3
TM	161 Machine Shop	3	TD	112 Descriptive Geometry	2
1-PE	101 Freshman Phys. Ed.	0.5	1-PE	102 Freshman Physical Ed.	0.5
1-AS	101 Basic Air Science or		1-AS	102 Basic Air Science or	
1-MS	102 Basic Military Science	0.5	1-MS	102 Basic Military Science	1.5
		<u>15</u>			<u>16</u>

SUGGESTED FIRST YEAR PROGRAM—TECHNICAL DESIGN

First Semester		Hours	Second Semester		Hours
1-EN	101 First Year English	3	1-EN	102 First Year English	3
1-MA	117 College Algebra	3	1-MA	118 Trigonometry	3
1-CH	113 General Chemistry	4	1-CH	114 General Chemistry	4
TD	111 Technical Drawing	2	TD	112 Descriptive Geometry	2
GB	101 Intro. to Business	3	TD	121 Production Language	2
1-PE	101 Freshman Physical Ed.	0.5	1-PE	102 Freshman Physical Ed.	0.5
1-AS	101 Basic Air Science or		1-AS	102 Basic Air Science or	
1-MS	101 Basic Military Science	0.5	1-MS	102 Basic Military Science	1.5
		<u>16</u>			<u>16</u>

Graduate College

Programs for Graduate Study are offered at Arizona State University by the various colleges through the Graduate College under the direction of the Dean of the Graduate College and the Graduate Council. The Graduate Council is responsible for the development and formulation of general policies and for the approval of procedures essential to the organization and administration of the graduate programs. The Dean of the Graduate College is directly responsible for the administration of its policies and programs.

Purpose

The graduate program affords advanced training to meet the pressing demands of the state and nation, especially as currently reflected in the Phoenix metropolitan area.

Degree Programs Offered

At present the following degree programs are offered:

1. Master of Arts:
 - Art
 - English
 - French
 - German
 - History
 - Humanities
 - Mathematics
 - Music
 - Political Science
 - Psychology
 - Sociology
 - Spanish
2. Master of Science:
 - Accounting
 - Biological Science
 - Business Administration
 - Chemistry
 - Economics
 - Home Economics
 - Physical Education
 - Physics
3. Master of Arts in Education
4. Master of Business Administration
5. Master of Fine Arts
6. Master of Music
7. Master of Natural Sciences

8. Master of Public Administration
9. Master of Science in Engineering
10. Education Specialist
11. Doctor of Philosophy
 - Chemistry
 - Education
 - Engineering
 - English
 - Physics
 - Psychology
12. Doctor of Education

Admission to the Graduate College

Applicants for admission to the Graduate College should address inquiries or requests for application forms to the Dean of the Graduate College.

An applicant who holds a degree from an accredited institution is considered for admission on the basis of an undergraduate record of high quality and adequate undergraduate preparation in the field of study selected. Application for admission should be made to the Dean of the Graduate College at least three months in advance of the date on which admission is sought.

Official Transcripts

The applicant should request the registrar of each institution he has attended to send a transcript of his record directly to the Dean of the Graduate College. Transcripts sent by the applicant will not be accepted.

Transcripts should show the degree received, date of graduation, and the official seal of the institution. Transcripts submitted for admission become the property of the University.

Classification of Graduate Students

Students may be admitted to the Graduate College in one of two categories: (1) regular graduate students, (2) unclassified graduate students.

Regular Graduate Students. (Those qualifying as candidates for advanced degree). To be considered for admission as a regular graduate student the applicant must have received a bachelor's degree from a university or college of recognized standing, and in addition, must (1) show promise or ability to pursue advanced study and research as judged by his previous scholastic record, and (2) have adequate preparation in his chosen field of study to enter at once upon graduate study in that field. Deficiencies, if any, as determined by the Departmental Graduate Committee, may be made up concurrently with his graduate study only with the approval of the Graduate Council. Otherwise students may be admitted as unclassified graduate students.

Unclassified Graduate Students. To be admitted as an unclassified graduate student the applicant must have received a bachelor's degree from a university or college of recognized standing and show promise or ability to pursue graduate courses. Should an unclassified graduate student wish to change his status to a regular graduate degree student, he must meet all of the requirements for regular graduate degree status. There is no assurance that any of the credits earned as an unclassified graduate student can be used in his graduate degree program. Certain courses taken may be used only with the approval of his supervisory committee. Under no circumstances, however, are more than nine semester hours of graduate courses taken as an unclassified graduate student counted toward an advanced degree.

Graduate Record Examination. An applicant who falls into either of the following categories is required to take the Aptitude or other test section of the Graduate Record Examination:

1. Those who have been graduated from a non-accredited institution.
2. Those students denied admission on the basis of their previous academic record who request further consideration.

Master's Degree

Admission to the Master's Degree Program. Students who seek admission to the Master's Degree Program shall file with the Dean of the Graduate College an application for admission and transcripts of all college work completed. The field of specialization selected shall be designated on the application. Forms are available in the Graduate Office.

The applicant must have an acceptable undergraduate record. Those who do not have an acceptable record may be able to qualify by taking the Aptitude test of the Graduate Record Examination.

Since graduate work in a field presupposes adequate training in this field at the undergraduate level, applicants are required to meet departmental or college requirements in this respect. (See Graduate Bulletin for these requirements).

Credit Requirements. A minimum of thirty semester hours of course work is required. A minimum of twenty semester hours must be taken in the major field. Ten semester hours may complete the program in a supporting field. A minimum of 15 hours must be taken in 500 level courses. (In foreign languages the division may be eighteen hours in the major language and twelve hours in a second language.)

Supervisory Committee. A Supervisory Committee is appointed by the Dean of the Graduate College upon recommendation of the Department Head or Dean of the College in which the student

plans to study. The designated chairman shall direct the student's thesis study and the committee shall serve as a supervisory committee and as an examining committee.

Residence Requirements. Two semesters of residence involving completion of a minimum of twenty semester hours of graduate credit are required. One ten-week summer session is equivalent to a semester residence.

Language and Thesis Requirements. Language and thesis requirements are determined by the department or division concerned. (See Graduate Bulletin).

Final Examinations. A final examination, written, oral or both, is required.

Graduate Credit for Seniors. A senior student regularly enrolled in his last semester of work at Arizona State University, who is within 12 semester hours of completing the requirements for a bachelor's degree and has the approval of the Dean of the Graduate College, may register for a sufficient number of additional hours of approved courses carrying graduate credit to complete his semester or term program. Official graduate credit may be had for this work provided the student's record qualifies him to be considered as a graduate student. The necessary forms for this approval are available in the Graduate College Office. This approval must be secured before registration.

Transfer of Credits. Six semester hours of graduate credit taken in other institutions may be transferred for credit toward a master's degree. Such courses must have been taken in a fully accredited college or university which offers graduate study and must be acceptable toward graduate degrees in that institution. The courses to be acceptable must fit into the planned program of studies at Arizona State. Only courses with an A or B grade are acceptable by transfer.

Extension Courses. Up to ten semester hours of credit toward a master's degree may be earned in extension courses offered by Arizona State University. Students who take graduate extension courses with a view to meeting degree requirements should apply for admission to the Master's Degree Program. It should be remembered that not more than nine semester hours of graduate credit, completed before admission to the degree program, will be accepted toward a master's degree, and that a minimum of twenty semester hours must be completed on campus.

Maximum Time Limits. A program leading to a master's degree must be completed within a span of six years. Any exception to this rule must have the approval of the Graduate Council. A petition requesting an extension of time must explain the extenuating circumstances causing the delay. The Council is in no way obligated to extend the time but may do so if circumstances justify it.

Course Load. A graduate student studying full time is allowed to enroll for a maximum of sixteen semester hours a semester and six semester hours each summer term. Students working full time and full-time teachers are limited to six semester hours a semester.

Scholarship Requirements. Excellence in performance is expected of students doing graduate work. A student who does not appear to be doing satisfactory work may be required to withdraw from the degree program.

An overall average grade of B or better for all graduate work is required for graduation with a master's degree. Not more than six semester hours of C grade may be accepted toward degree requirements, provided these six hours are offset by six hours of A grade. The grade of D is not accepted in meeting master degree requirements.

Graduate course work other than thesis reported "incomplete" must be completed within one year of the official ending of the course. Thesis will be open for credit for a period of two years following the official ending of the semester in which the student registered for the course.

Graduate Credit Courses. Courses carrying graduate credit are numbered 400g, 500, 600, and 700. The 400g-level courses are open to seniors and graduates. The 500-level courses are open to graduate students and qualified seniors at Arizona State University. The 600-level courses generally are reserved for the Education Specialist Degree Program and other specialized professional programs. The 700-level courses are reserved primarily for especial needs of the Doctor's Degree Program.

Graduate Bulletin. Refer to the Graduate Bulletin for a listing and a detailed description of the Graduate Programs at Arizona State University. Copies of the Graduate Bulletin and forms may be obtained in the Office of the Dean of the Graduate College.

Education Specialist Degree

The Education Specialist Degree Program is designed to provide opportunity for professional persons in the field of education to develop the skills of competent practitioners in the various areas of education. The curricula of the Education Specialist Degree program include the following:

1. School Administration
2. Curriculum and Supervision
3. Guidance and Counseling
4. Teaching Specialist

Admission to the Degree Program. In order to be eligible to apply, the applicant must:

1. Hold an official Bachelor's degree. Normally a student has a Master's Degree when he enters the Education Specialist Degree Program.
2. Have an adequate background in the areas involved in his specialization plan.
3. Have an acceptable undergraduate and graduate scholastic average.
4. Have had one year of successful teaching experience.

An Admissions Committee will consider those applicants who have filed (1) An application for admission, (2) Letter of Intent, (3) Undergraduate and graduate transcripts, (4) Three letters of recommendation, and (5) A letter verifying at least one year of successful teaching experience.

Graduation Requirements

1. Complete within six years a sixty-semester hour approved program with no grade below "B" which may include the thirty semester hours Master's Degree Program. At least 48 of the 60 hour program must be earned in 500 or above level courses; 24 hours in Education and 30 hours (including project) must be earned in the area of specialization.
2. Pass the written Comprehensive Examination prior to Candidacy. Pass an Oral Examination.
3. Apply for Candidacy and secure this approval through the Graduate Council.
4. Complete a report of an applied project in education.
5. File a graduation form and pay fees.

Doctor of Philosophy Degree

The degree of Doctor of Philosophy is granted upon evidence of proficiency and of high attainment in a special field including recognized ability for independent investigation. Such attainment must be demonstrated in a dissertation based upon original and/or creative research presented with a high degree of literary skill. The degree is never conferred solely as a result of study extending over any prescribed period. It accordingly must represent more than merely the sum of semesters in residence and credits for courses taken. Ordinarily, a program of study is pursued, full time, over a two year period of residence, before admission to Candidacy. During this time the foreign language examinations may be taken and, upon successful completion of the program of study, the Comprehensive examinations may be taken. Following are the minimum general requirements which must be met. Additional divisional and departmental requirements may be added with the consent of the Graduate Council.

Admission to the Ph.D. Degree Program. A student admitted to the graduate college may request admission to a Ph.D. program by filing a written application with the Dean, Graduate College Office. The applicant's acceptability is judged by the Graduate Committee of the department or college and a recommendation is made to the Dean of the Graduate College. Judgments for admission are based upon:

1. Past records of scholastic ability and/or tests of scholastic aptitude.
2. Standing on examinations and/or interviews administered by the department.
3. Scholastic promise and letters of recommendation.

If the applicant holds a degree from Arizona State University and plans to continue work in the department where a Master's degree has been received within the past four years, the results of his Master's degree examination together with recommendations of his Master's degree Committee, may be used for recommending him for admission to the Dean of the Graduate College.

In all other cases the student may be required, at the discretion of the Departmental Graduate Committee, to take a special written and oral qualifying examination prepared and evaluated by the Departmental Graduate Committee. Their evaluation and recommendation shall be filed with the Graduate Dean within a month of the examination.

Supervisory Committee. After each student is formally admitted, the Graduate Dean, upon recommendation of the Departmental Committee, shall appoint a Supervisory Committee consisting of a chairman and four committee members. Each area of study included in the degree program shall be represented on this Committee. This Committee shall approve the student's program of study, guide the student through his entire period of study and serve on his final examining committee. Normally, the Chairman shall serve as the student's academic adviser.

Within six weeks after this committee is formed, it shall meet with the student and approve a tentative program of study. A copy of the approved program shall be filed in the Graduate Office. Any change must have the chairman's sanction and must be filed in the Graduate Office.

Program of Study. A program of study must embrace an area of study within a department or groups of departments. This area of study may be entirely in one department except for essentially related subjects or it may be a combination of departments.

Residence. Normally the candidate must expect to spend the equivalent of two full academic years in resident graduate study which may include the time spent in attaining the master's degree. One full academic year (summer sessions excluded), subsequent to the first year, must be spent in residence at this university before admission to candidacy for the Ph.D.

Foreign Language Requirement. Prior to admission to Candidacy a certificate must be filed stating that the student possesses a reading knowledge of two required languages, other than English. The two languages shall be approved in individual cases by the Supervisory Committee. The languages so approved shall be those most likely to be useful in connection with the individual student's program of study and proposed research. The certificates shall be issued by examiners designated by the Department of Foreign Languages.

A student may submit to the Graduate Council a petition to substitute for one of the required languages a program of at least nine (9) semester hours of course work to be taken as a graduate student, provided this program has the approval of the student's Supervisory Committee and is in excess of and supplementary to the ordinary program of study. The Graduate Council will act in individual cases on all such petitions.

Students planning to take the examination must register personally in the office of the Department of Foreign Languages at least three weeks in advance of the examination.

Examinations are held at the office of the Department of Foreign Languages on the second Thursday of October, February, May, July, and August at 2:00 P.M.

The foreign languages examinations may be repeated. A \$5.00 fee will be charged for the second and subsequent examinations.

Certification of reading proficiency in the chosen languages will be filed by the Department of Foreign Languages with the Graduate Office upon passing of an examination. Students who pass the foreign language examination and their committees will be notified by the Dean of the Graduate College as soon as possible. No student may be admitted to the comprehensive examinations unless such certification and notification has been made.

Comprehensive Examinations. When the student's program of study is nearing completion and his foreign language examinations have been passed, he is expected to apply for permission from his Supervisory Committee to take his Comprehensive examinations. These examinations are thorough examinations of his understanding of the fields of knowledge he is pursuing.

These examinations are both written and oral, and are formulated and administered by his Supervisory Committee. Notification of the performance of the student in these examinations is to be immediately filed in the Graduate College office. Failure of the Comprehensive examinations will be considered as final unless his Supervisory Committee recommends a re-examination after at least one semester of time has elapsed.

Admission to Candidacy. The student will be allowed to apply for candidacy for the degree of Doctor of Philosophy when he has (a) passed the comprehensive examinations in his fields of study

as prescribed by the Supervisory Committee; (b) presented the tentative title or special field of the proposed dissertation as approved by the Supervisory Committee. If a candidate fails to take the final oral examination within five years after passing the comprehensive examinations, he may be required to repeat the Comprehensive examinations and be re-admitted to candidacy a second time.

Dissertation. At any time after admission to candidacy and at least three weeks prior to the final examination, the candidate must submit to the Dean of the Graduate College two typewritten copies of his dissertation in a form approved by the Graduate Council and at least ten copies of an abstract of not over 600 words, both previously checked and approved by the members of the candidate's Supervisory Committee.

Final Examination. At least three weeks before commencement the candidate must pass a final examination. This examination must be partly oral and may be entirely so. In the oral examination, the candidate will be required to defend his dissertation. The candidate may not take the final examination until all other requirements for the degree have been satisfied. The examinations will be conducted by the candidate's Supervisory Committee previously appointed, by others as may be appointed by the Dean of the Graduate College, and certified to the latter or former provided by him. This examination will be scheduled for the convenience of all concerned. These examinations are open to the public but only appointed committee members are allowed to deliberate and vote.

Graduation. After certification that the dissertation has been accepted and that the oral examination has been satisfactorily passed, the student is eligible for graduation. He must apply for graduation through the Graduate College Office on or before the date listed in the University Calendar.

Doctor of Education Degree

It is the basic purpose of the Doctor of Education Degree Program to provide opportunity for professional persons in the field of education to do scholarly study and research. The curricula for the Doctor of Education Degree Program includes the following:

1. Administration and Supervision
2. Curriculum and Instruction
3. Guidance and Counseling
4. Elementary Education
5. Secondary Education
6. Social and Philosophical Foundations of Education

Admission to the Degree Program. Graduate students who seek admission to the Doctor of Education Degree Program must file the following in the office of the Dean of the Graduate College:

1. Application for admission
2. Transcripts of all college work completed
3. Letter of Intent
4. Application for an entrance examination
5. Six letters of recommendation

An Admissions Committee will consider applicants on the basis of:

1. A Bachelor's degree in an accredited institution and a satisfactory undergraduate record.
2. Satisfactory scholarship in any graduate work completed at Arizona State University or elsewhere.
3. A satisfactory undergraduate program in education and psychology courses.
4. Adequate background in general and professional education.
5. Scholastic aptitude and ability for the successful pursuit of a program of doctoral work in professional education.
6. Letters from persons in a position to judge readiness for doctoral work.

Degree Requirements. Upon being admitted to the Doctoral Program, the student shall register for at least one course in his field of specialization and arrange with the Dean of the Graduate College for the appointment of his Supervisory Committee. The student with his supervisory committee must then plan a program of studies which shall be filed with the Dean of the Graduate College before the end of the first semester or summer session in residence.

The Doctor of Education Degree is not conferred solely for the reason of study for a prescribed period of time nor for the satisfactory completion of course requirements. The Degree is conferred on the basis of high attainment in the study of issues and problems in the field of education, and on the basis of competence in the pursuit of independent research in specialized areas of education.

To meet the demands of these standards, students must plan to do at least three years of study beyond their Bachelor's Degree Program. The amount of time a student must spend in official residence on the campus depends to a large extent on his individual program of studies; however, in any case, he must satisfy minimal residence requirements of twenty-four semester hours within a period of fifteen consecutive months, or consecutive enrollment of four hours each term for six terms.

Transfer of credits from other recognized institutions is permissible. The number of credits accepted on transfer depends upon the objectives approved by his supervisory committee. Regardless of how many may be accepted by transfer, a sufficient number of credits must be taken at Arizona State University to assure competency in the field the student selects.

All course work taken beyond the point of admission to the Doctor of Education Degree Program must be completed, except by petition to and approval by the Graduate Council, within a period of seven consecutive years.

Only courses in which the student earns grades of A or B may be counted toward the minimum of seventy-five semester hours.

Students in the Doctor of Education Degree Program may carry a maximum of five semester hours of course work each summer term, and a maximum of fourteen semester hours of course work during any regular semester. The recommended number of semester hours is four during a single summer term and twelve during a single semester.

Comprehensive Examination. The student in the Doctor of Education Degree Program must pass a Comprehensive Examination in the foundational areas of Education, his field of specialization, and, in some cases, an appropriate foreign language recommended by his supervisory committee.

The written examination in the foundational area is approximately twelve hours long, four hours for each of the following areas: Research Foundations of Education, Psychological Foundations of Education, and Historical, Social and Philosophical Foundations of Education.

The written examination in one of the following fields of specialization is approximately eight hours long; Administration and Supervision, Curriculum and Instruction, Guidance and Counseling, Elementary Education, Secondary Education, or Social and Philosophical Foundations of Education.

The following courses carry doctoral credit: (1) Courses numbered 700 to 799 are advanced graduate courses. A minimum of twenty-four semester hours of these courses must be included in the seventy-five semester hours minimum program; (2) Courses numbered 500 to 599 are strictly graduate courses and these courses may be applied toward the minimum seventy-five semester hours; (3) Courses numbered 400g to 499g are upper division undergraduate courses which may be taken for graduate credit. A maximum of fifteen semester hours of these courses may be applied toward the minimum seventy-five semester hours credit.

The written examination in the Foreign Language, if required, is approximately four hours long. The Foreign Language approved is deemed appropriate to the major or minor field of specialization of the student.

The Comprehensive Examination must be taken near the end of, or after completion of, the student's course work and upon the recommendation of his supervisory committee. The oral phase of the examination is four hours long and should be taken one month after taking the written examination.

The student must file with the Dean of the Graduate College and the Chairman of the Committee on Graduate Standards application for the Comprehensive Examination one month before it is to be administered. The examinations are given three times each year.

Dissertation. An acceptable dissertation is required. At any time after admission to candidacy and at least three weeks prior to the final examination, the candidate must submit to the Dean of the Graduate College two typewritten copies of his dissertation in a form approved by the Graduate Council and at least ten copies of an abstract of not over 600 words, both previously checked and approved by the members of the candidate's Supervisory Committee.

Final Examination. At least three weeks before commencement the candidate must pass a final examination. This examination must be partly oral and may be entirely so. In the oral examination, the candidate will be required to defend his dissertation. The candidate may not take the final examination until all other requirements for the degree have been satisfied. The examinations will be conducted by the candidate's Supervisory Committee previously appointed, by others as may be appointed by the Dean of the Graduate College, and certified to the latter or former provided by him. This examination will be scheduled for the convenience of all concerned. These examinations are open to the public but only appointed committee members are allowed to deliberate and vote.

Upon making application for the final examination for the doctor's degree, the candidate must submit evidence of at least two years experience either in teaching or other educational services.

Graduation. After certification that the dissertation has been accepted and that the oral examination has been satisfactorily passed, the student is eligible for graduation. He must apply for graduation through the Graduate College Office on or before the date listed in the University Calendar.

Summer Session

Terms. The summer session consists of a one-week pre-session, two terms of five weeks each, and a post-session of three weeks.

Air Cooling. Most of the buildings are cooled by refrigeration systems. The other buildings are cooled by evaporative coolers.

Credit. Students are permitted to earn a maximum of six semester hours of credit each five-week session. Four semester hours is the maximum credit which may be earned in the three-week post session. In three ten-week summer sessions, the residence requirement of the University can be met. By attending summer sessions, students can graduate in three years or less.

Admission to the Summer Session. In general, applicants for admission are expected to present evidence of graduation from an approved four-year high school, or evidence of good standing in an accredited college. Mature students, over 21 years of age, are admitted without the above qualifications, but with the understanding that all admission requirements must be satisfied before they can become candidates for the bachelor's degree.

Graduate Study. The summer session offers an excellent opportunity for those who have already acquired a bachelor's degree to do graduate work for personal edification or to work for advanced degrees.

Fees and expenses. The summer school fee is \$11.25 per semester hour. Textbooks and supplies may be purchased at the University Bookstore on the campus. Board and room for the summer are furnished on campus at the prevailing rates.

Bulletin. Requests for the Summer Bulletin or other information should be addressed to the Director of Summer Session.

Extension Division

Many people who desire to continue their studies while actively engaged in their business or professional activities find it impossible to attend the regular sessions of the University. In response to this demand, the Extension Division has been established and offers two special types of service: extension courses offered at residence centers and correspondence courses. By these two methods, some regular college courses are made available to these people at a moderate cost.

Residence Center Classes

Residence centers will be organized where there is sufficient demand, when approved instructors are available, and when library or laboratory facilities are adequate to provide university-level instruction. A Residence Center and offering must be approved by the Director of Extension. Two types of programs are carried on at the Residence Centers: (1) recognized and accepted university credit courses that serve to meet degree requirements at the undergraduate and graduate levels, and (2) informal educational experiences for personal pleasure, general cultural advancement, refresher training courses, and the acquisition of new interests, without reference to university-level standards or credit. Courses taken in Residence Centers are counted as residence credit toward bachelor's degree requirements.

The fee for all extension courses is \$11.25 per semester hour, and is payable at the time of registration. For further information concerning residence center courses, write the Director of Extension.

Correspondence Courses

Through the use of the mails, the privileges of the university campus and service of the teaching faculty are extended to the student whose daily occupation prevents enrollment in the regular sessions.

Persons desiring to enroll for correspondence courses will write to the Correspondence Division for an enrollment blank and a copy of the Bulletin which gives a list of the courses offered. When this enrollment blank, properly filled out and accompanied by remittance to cover the fee, is received, the first lesson assignments will be mailed to the student.

The fee for correspondence courses is \$7.50 per semester hour of credit carried. Credit earned in correspondence courses may be applied toward the bachelor's degree; however, not more than 16

semester hours of credit in correspondence courses and/or by comprehensive examination will be accepted for credit toward the degree. Correspondence courses are not accepted for credit toward the advanced degrees.

Students who fail a course on campus, or at a residence center, are not permitted to take the same course by Correspondence.

No student doing work in residence may register for a course by correspondence without obtaining approval of the Admissions and Standards Committee. All inquiries concerning correspondence courses should be addressed to the Correspondence Division.

Courses of Instruction

Descriptions of all courses offered by the University during the regular academic year are found in the section which follows. Courses offered as "summer only" courses are not included in this section. For convenience instructional departments and divisions are arranged in alphabetical order.

Classification of Courses

The course numbering system has been designed to facilitate sorting and tabulating by machine methods.

Each College has a single digit code number as follows:

- 1.—College of Liberal Arts
- 2.—College of Education
- 3.—College of Business Administration.
- 4.—College of Applied Arts and Sciences.

Within each of the instructional departments or divisions, courses are grouped by "subject fields." Each subject field carries a two-letter code, e.g. AR for Art.

A complete list of Code Letters, Subject Fields and Departments or Divisions in which the courses are offered follows:

Code Letters	Subject Field	Department
AC	Accounting	Business Administration
AC	Architecture	Architecture
AD	Advertising	Business Administration
AE	Agricultural Economics	Agriculture
AE	Art Education	Art
AG	Agronomy	Agriculture
AH	Adult and Higher Education	Secondary Education
AH	Animal Husbandry	Agriculture
AH	Art History	Art
AM	Agricultural Mechanics	Agriculture
AN	Anthropology	Sociology and Anthropology
AR	Art	Art
AS	Air Science	Air Science
AV	Audio-Visual Education	Education
BE	Basic Courses in Education	Education
BE	Business Education	Business Administration
BI	Biology	Zoology
BO	Botany	Botany
CE	Civil Engineering	Engineering
CH	Chemistry	Chemistry
CO	Construction	Architecture

Code Letters	Subject Field	Department
DH	Dairy Husbandry	Agriculture
DR	Drama	Speech and Drama
EA	Educational Administration and Supervision	Educational Administration and Supervision
EC	Economics	Business Administration
EE	Electrical Engineering	Engineering
EE	Elementary Education	Education
EN	English	English
EP	Educational Psychology	Psychology and Philosophy
ES	Engineering Science	Engineering
ET	Entomology	Zoology
FI	Finance	Business Administration
FL	Foreign Languages	Foreign Languages
FR	French	Foreign Languages
GB	General Business Administration	Business Administration
GC	Guidance and Counseling	Education
GE	Geography	Geography
GK	Greek	Foreign Languages
GL	Geology	Geology
GR	German	Foreign Languages
HE	Health Education	Health, Physical Education, and Recreation
HI	History	History
HO	Home Economics	Home Economics
HO	Horticulture	Agriculture
HU	Humanities	Humanities
IA	Industrial Arts	Industrial Education
IE	Indian Education	Educational Services
IE	Industrial Engineering	Engineering
IN	Insurance	Business Administration
JO	Journalism	Mass Communications
KE	Chemical Engineering	Engineering
LA	Latin	Foreign Languages
LS	Library Science	Education
MA	Mathematics	Mathematics
ME	Mechanical Engineering	Engineering
ME	Medical Technology	Zoology
MG	Management	Business Administration
MK	Marketing	Business Administration
MI	Microbiology	Zoology
MP	Music Performance	Music
MS	Military Science	Military Science
MU	Music	Music
NE	Nuclear Engineering	Engineering

Code Letters	Subject Field	Department
NU	Nursing	Nursing
OA	Office Administration	Business Administration
PE	Physical Education	Health, Physical Education, and Recreation
PH	Physics	Physics
PH	Poultry Husbandry	Agriculture
PI	Philosophy	Psychology and Philosophy
PL	General Physical Science	General Physical Sciences
PS	Political Science	Political Science
PY	Psychology	Psychology and Philosophy
RE	Real Estate	Business Administration
RE	Recreation	Health, Physical Education, and Recreation
RT	Radio-Television	Mass Communications
RU	Russian	Foreign Languages
SE	Secondary Education	Education
SE	Speech	Speech and Drama
SF	Social and Philosophical Foundations	Educational Foundations
SO	Sociology	Sociology and Anthropology
SP	Spanish	Foreign Languages
SP	Special Education	Education
SS	Social Sciences	Sociology and Anthropology
TA	Aeronautics	Industrial Education
TD	Technical Design	Industrial Education
TE	Electronics	Industrial Education
TM	Mechanics	Industrial Education
ZO	Zoology	Zoology

Courses Numbered:

100-299 are freshman and sophomore level courses and are designed primarily for these students. Certain courses are closed to freshmen unless they have had the designated prerequisites. This fact may be obtained from the Catalog or from curriculum adviser prior to registration.

300-499 are junior and senior level courses and are designed primarily for those students and other advanced students. Courses designated by "g" following the number are approved for graduate credit. When approved for inclusion in an individual program of graduate study by a supervisory committee appointed by the Dean of the Graduate College, selected 300-499 courses, in addition to 400g courses, may serve the needs of individual graduate students.

500-799 are the graduate level courses open only to graduate students under the conditions posed by their respective programs of study. However, eligible seniors, with the approval of the Dean of the Graduate College, may enroll in certain courses at the 500 level.

Pro-Seminar 498g

Small group study and research for advanced students within their major area. Prerequisite: Major in the department or approval of instructor. Credit, 2 or 3 hours.

Independent Study

The course number 499 has been reserved for Independent Study courses in each of the instructional departments or divisions of the colleges at the undergraduate level. Independent Study courses are honor courses and may be taken only by outstanding senior students who have completed at least one semester in residence. Graduate students may also enroll in Independent Study as part of the program of study approved by their supervisory committee and the Dean of the Graduate College. To be eligible for an Independent Study course a student must have a cumulative scholarship index of 3.00 or better in his major or field of specialization.

An Independent Study course is designed to provide an opportunity for the superior senior student or for the graduate student to do an original study or investigation in his major or field of specialization on an individual basis with a minimum of supervision or direction. An Independent Study course is not to be regarded as a substitute for a catalog course, nor as a means for taking a catalog course on an individual basis. Courses listed in the catalog may not be taken as Independent Study courses.

Application for Independent Study courses must be made well in advance of regular registration period with the student's adviser. The application must be signed by the adviser, and approved by the instructor under whom the student will work, and by the chairman of the department or head of the division in which the course is taken. A course fee may be required.

Honors Courses

The courses listed below are reserved for students in the Honors Program of the College of Liberal Arts. Honors Programs are offered in the following majors: Anthropology, English, Foreign Languages, History, Mathematics, Philosophy, Political Science, Psychology, and Sociology. Other departments may offer majors in the Honors Program with the consent of the Honors Council.

Special Sections for Honor Students. In large basic courses having multiple sections, the suffix 'H' appearing after the section number indicates that the section is reserved exclusively for honor students.

- 298 *Honors*. Individual study in the Honors Program of the College of Liberal Arts. May be offered by any department offering an Honors major. Prerequisite: Approval of student's adviser. May be repeated for credit. Credit, 2-4 hours.
- 492 *Honors*. Individual study for upper division students in the Honors Program of the College of Liberal Arts. May be offered by any department offering an Honors major. Prerequisite: Approval of student's adviser. May be repeated for credit. Credit, 2-4 hours.
- 493 *Honor Thesis*. A thesis, or an equivalent creative project, required of all seniors in the Honors Program. Prerequisite: Approval of adviser, instructor, and Chairman of the Honors Council. Credit, 3 hours.
- 497 *Honors Colloquium*. Small group study of a subject of contemporary importance or a basic document of continuing significance. Designed to stimulate serious thought rather than to impart information for its own sake. Consists of wide reading, discussion and a term paper. Prerequisite: Approval of honors adviser. The colloquia are designed primarily for students *not* majoring in the division offering them. Credit, 2-3 hours.

Special Graduate Courses

- 500 *Research Methods*. Acquaints the student with the essential steps in the scientific method and with the techniques and skills used in research. Required for most master's degrees. Prerequisite: Admission to a Graduate Degree Program. Credit, 3 hours.
- 590 *Reading and Conference*. Independent reading and study conferences with assigned professors. Prerequisite: Admission to a Graduate Degree Program and approval of the Dean of the College in which the course is offered. Secure permit for registering from the Graduate College. Credit, 2 or 3 hours.
- 591 *Seminar*. A major in the area in which the seminar is offered. Given by departments at regular intervals. Prerequisite: Admission to a Graduate Degree Program. Credit 2 or 3 hours.
- 592 *Research*. A careful investigation of a problem under the direction of an adviser. This course may not be used as research for a thesis. Prerequisite: Admission to the Graduate Degree Program and approval of the Dean of the College in which the course is offered. Secure permit for registering from the Graduate College. Credit, 2 or 3 hours.
- 593 *Thesis*. An organized written presentation of results of study, investigation and research. Prerequisite: Admission to a Graduate Degree Program and approval of the Dean of the College in which the course is offered. Secure permit for registering from the Graduate College. Credit, 6 hours.

- 690 *Reading and Conference*. Credit, 2 or 3 hours.
- 691 *Seminar*. Credit, 2 or 3 hours.
- 692 *Research*. Credit, 2 or 3 hours.
- 700 *Research Methods*. Credit, 4 hours. For doctorate students only.
- 790 *Reading and Conference*. Credit, 4 hours. For doctorate students only.
- 791 *Seminar*. Credit, 4 hours. For doctorate students only.
- 792 *Research*. Credit, 4 hours. For doctorate students only.
- 799 *Dissertation*. For doctorate students only. No semester hours credit.
- Limitations on Special Courses*. Not more than twelve semester hours in courses 590, 592 and 593 will be accepted for the master's degree.

Prerequisites

A student registering for a course must meet the prerequisites listed for it or otherwise satisfy the instructor that he has had the equivalent preparation.

Starred Courses

In curriculum outlines, certain courses have a star placed in front of them. This indicates that the course is given both the first and second semesters of that year. The desire is to have one-half of the students take the course the first semester, and the other half the second semester.

Withdrawal of Courses

The University does not offer each year all of the courses listed in the catalog. The Schedule of Classes should be consulted for those courses offered each semester and during the summer terms.

Agriculture

PROFESSORS ROBINSON (Agric. 232), BARRETT, JUDD, V. J. MILLER,
E. L. PARKER, G. L. RICHARDSON; ASSOCIATE PROFESSORS
MOODY, L.M. PARKER; ASSISTANT PROFESSORS
FREEMAN, RASMUSSEN, RIGGINS, TAYSON

Agricultural Economics

- AE 100 *Agricultural Economics*. Economics as applied to agricultural problems. Credit, 3 hours.
- 206 *Farm and Ranch Accounts*. Accounting and business principles of farm and ranch management. Two lectures, 3 hours laboratory. Credit, 3 hours.

306 *Farm Management*. Management principles; economic theory and analysis in agricultural production and marketing. Prerequisite: AE 206. Credit, 3 hours.

308 *Agricultural Finance*. Acquisition of capital, use of credit, legal aspects of finance and management working capital. Credit, 3 hours.

310 *Agricultural Marketing*. Underlying principles, concepts, and factors that control the efficient marketing and merchandising of agricultural products. Credit, 3 hours.

402g *Land Economics and Utilization*. Land evaluation, and appraisal, economic classification, use and development. Prerequisite: Nine hours credit in Agricultural Economics or the equivalent. Credit, 3 hours.

406 *Farm and Ranch Organization*. Influence of physical, cultural, and economic resource environments on farming regions, and individual farm and ranch organization; budgeting techniques; field trips. Prerequisites: AE 306 and AH 252 or AG 234. Three lectures, 3 hours laboratory. Credit, 4 hours.

410 *Farm Labor Management*. General principles and economics of farm labor requirements related to farm management costs and income. Credit, 3 hours.

412g *Agricultural Policy*. Government and public interest in agriculture, agricultural price policies and programs. Prerequisite: Nine hours credit in Agricultural Economics or equivalent. Credit, 3 hours.

414g *Farm Cooperatives*. Organization, operation and management of agricultural cooperatives. Prerequisite: Nine hours credit in Agricultural Economics or equivalent. Credit, 3 hours.

Agricultural Mechanics

AM 122 *Agricultural Mechanics*. Mechanical skills important to agriculture. Fee, \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

126 *Farm Machinery*. Field operation of tillage and cultivating implements, planting, fertilizing, and harvesting machinery. One lecture, 3 hours laboratory. Credit, 2 hours.

227 *Agriculture Mechanics*. Design, construction, and repairing of farm equipment. Fee \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

326 *Farm Tractors*. Operation, servicing, and repairing of gasoline and diesel-powered tractors. Fee, \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

328 *Farm Structures and Equipment*. Functional requirements of farm buildings, building materials, and constructional methods. Fee, \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

428 *Welding for Shop Teachers.* Welding applicable to the farm shop, safety precautions, identification of metals by spark tests, chemical and microscopic analysis. Fee, \$5.00. One lecture, 6 hours laboratory. Credit, 3 hours.

Agronomy

AG 130 *Crop Production.* Principles of field crop production. Two lectures, 3 hours laboratory. Credit, 3 hours.

232 *Soils.* Properties of soils and their relation to crop production. Prerequisite: CH 111 or equivalent. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

234 *Irrigation Principles and Practices.* Water measurement and conveyance application and conservation of irrigation water. Prerequisite: AG 232. Credit, 3 hours.

236 *Crop Production Practices.* Recommended methods and supervised farm experience in field crop production and harvesting. One lecture, 6 hours laboratory. Credit, 3 hours.

237 *Crop Production Practices.* Continuation of AG 236. Credit, 3 hours.

246 *Conservation of Agricultural Resources.* Developing an understanding of the relationships of agricultural resources. Credit, 3 hours.

330 *Soil Fertility.* Use of fertilizers, crop rotations, and water in the management of soils. Prerequisite: AG 232. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

332 *Commercial Fertilizers.* Composition, properties, availability and economic use of commercial fertilizers and related materials. Prerequisite: AG 232. Credit, 3 hours.

338 *Range Management.* Improvement and utilization of range land. Prerequisites: AH 150; 1-BO 100. Fee, \$3.00. Credit, 3 hours.

340 *Weeds and Weed Control.* Identification of weeds and methods of control. Prerequisite: 1-BO 100. Two lectures, 3 hours laboratory. Credit, 3 hours.

342 *Grain Crops.* Production, harvesting, and utilization of grain crops. Two lectures, 3 hours laboratory. Credit, 3 hours.

344 *Alfalfa and Forage Production.* Production and storage of forage crops; pasture management and the place of forage crops in rotations and soil conservation. Two lectures, 3 hours laboratory. Credit, 3 hours.

345 *Cotton.* Production, harvesting, and utilization of cotton and its by-products. Prerequisite: 1-BO 100. Two lectures, 3 hours laboratory. Credit, 3 hours.

436 *Soil Conservation.* Soil conservation and its application to farm situations. Prerequisite: AG 232. Credit, 3 hours.

441 *Plant Breeding*. Principles and methods used in improving farm crops. Prerequisites: 1-BO 100; 1-BI 340. Credit, 3 hours.

447 *Crop Production and Management*. Crop production factors and their application to farm management. Farm plans are prepared for crop production enterprises. Prerequisite: AG 234. Credit, 3 hours.

450g *Soil Chemistry*. Chemical and mineralogical properties of soil colloids; weathering, ion exchange, soil solution reactions, and problems of acid and alkaline soils. Prerequisites: AG 232; 1-CH 225. Fee, \$5.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

452g *Soil Physics*. Physical condition of soils; water relationships, aeration, structure, and affects of tillage. Prerequisite: AG 234. Three lectures, 3 hours laboratory. Credit, 4 hours.

495g *Recent Advances in Agronomy*. Current literature and recent developments in agronomy. Prerequisite: Twenty hours in plant science. Two lectures and discussion. Credit, 2 hours.

Animal Husbandry

AH 150 *Animal Husbandry*. Livestock production, management and judging. Prerequisite to other animal husbandry courses. Two lectures, 3 hours laboratory. Credit, 3 hours.

151 *Breeds of Livestock*. History, development and characteristics of breeds of farm animals. Credit, 2 hours.

252 *Animal Feeding*. Feeds and feeding methods, digestion, and balancing rations. Prerequisites: 1-CH 111 or 113 and AH 150. Credit, 3 hours.

253 *Livestock Production Practices*. Supervised farm experience in animal feeding, breeding, fitting for show, and records. Prerequisite: AH 150. One discussion period, 6 hours laboratory. Credit, 2 hours.

254 *Livestock Production Practices*. Continuation of AH 253. Credit, 2 hours.

260 *Meats*. Slaughtering and cutting carcasses of cattle, sheep and swine. Uses of by-products, methods of handling meats, and factors affecting quality. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

350 *Livestock Judging*. Breed characteristics and comparative judging. Prerequisites: AH 150, 151. Two lectures, 3 hours laboratory. Credit, 3 hours.

359 *Swine Production*. Production, breeding, feeding, and management of swine. Prerequisites: AH 150, 252. Credit, 2 hours.

360 *Beef Production*. Production, breeding, feeding, and management of beef cattle. Prerequisites: AH 150, 252. Credit, 2 hours.

361 *Sheep Production*. Production, breeding, feeding and management of sheep. Prerequisites: AH 150, 252. Credit, 2 hours.

362 *Horse Production*. Production, feeding, management and selection of horses. Prerequisite: AH 150 or approval of instructor. Credit, 2 hours.

451 *Advanced Livestock Judging*. An advanced course in judging livestock. Prerequisite: AH 350. Fee, \$3.00. One lecture, 3 hours laboratory. Credit, 2 hours.

453g *Animal Nutrition*. Use of proteins, carbohydrates, fats, minerals, and vitamins by farm animals. Prerequisites: 1-CH 231 and AH 252 or 1-CH 464. Credit, 3 hours.

456 *Animal Breeding*. Genetics applied to animal breeding. Prerequisites: 1-BI 340; 1-ZO 100. Credit, 3 hours.

457 *Animal Physiology*. Form and functioning of body systems of farm animals. Prerequisites: AH 150 or DH 170 or PH 190; 1-ZO 100. Fee, \$3.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

458 *Livestock Diseases and Sanitation*. Sanitation and management in disease control. Prerequisites: AH 457; 1-ZO 100. Credit, 3 hours.

460g *Endocrinology*. The physiology of the glands of internal secretion, including those concerned with reproduction. Prerequisites: 1-ZO 100; 1-CH 111 or 113. Credit, 3 hours.

464 *Livestock Production and Management*. Methods of production, livestock enterprises, economics, budgeting, finance, loss prevention, and marketing. Prerequisite: AH 252. Credit, 3 hours.

495g *Recent Advances in Animal Science*. Current developments and literature in animal science and management. Prerequisites: Twenty hours in animal science or equivalent. Two hours lecture and discussion. Credit, 2 hours.

Dairy Husbandry

DH 170 *Principles of Dairy Husbandry*. Feeding, management, selection and herd improvement, artificial insemination, diseases, milking, and dairy equipment. Two lectures, 3 hours laboratory. Credit, 3 hours.

271 *Dairy Production Practices*. Supervised farm experience, attainment of proficiency in skills associated with a dairy enterprise. Prerequisite: DH 170. One discussion period, 6 hours laboratory. Credit, 2 hours.

274 *Milk and Milk Products*. Composition, properties, bacteriology, and nutritional value of dairy products. Fee \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

370 *Dairy Cattle Selection and Breeding*. Judging, classification, performance records, pedigrees and genetics applied to dairy cattle breeding. Prerequisite: DH 170. Two lectures, 3 hours laboratory. Credit, 3 hours.

373 *Animal Reproduction and Artificial Breeding*. Structure and function of the genital system in natural and artificial breeding of farm animals. Prerequisite: 1-ZO 110. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

378 *Market Milk*. Producing, assembling, processing, and marketing milk. Sanitation, quality control, legal standards, pricing, and milk plant operation. Prerequisites: DH 170; 1-MI 201. Credit, 3 hours.

474 *Dairy Production and Management*. An integration of the principles of feeding, breeding, and management in dairy operation. Prerequisites: DH 170, 271; AH 252. Three lectures. Credit, 3 hours.

Horticulture

HO 180 *Principles of Horticulture*. Fundamentals of fruit, vegetable, and flower production, and home landscaping. Two lectures, 3 hours laboratory. Credit, 3 hours.

281 *Plant Propagation*. Principles and skills in propagation of plants, using seeds, cuttings, and grafting. Prerequisites: 1-BO 100; one course in horticulture. Two lectures, 3 hours laboratory. Credit, 3 hours.

282 *Lawns and Greens*. Selection, establishment, and maintenance of turf grasses for lawn, park, and sports areas. One lecture, 3 hours laboratory. Credit, 2 hours.

284 *Ornamental Plants*. Characteristics and growth requirements of annuals, perennials, bulbs, shrubs, and trees used for landscaping. One lecture, 3 hours laboratory. Credit, 2 hours.

289 *Horticultural Production Practices*. Practical experience in horticultural production problems. Prerequisite: HO 180. Six hours laboratory. Credit, 2 hours.

380 *Landscaping*. Beautification of homes and public areas by lawns and ornamental plants. Prerequisite: HO 284. Two lectures, 3 hours laboratory. Credit, 3 hours.

385 *Tree-Fruit Production*. Production of citrus and deciduous tree fruits. Propagation, pruning, fertilizing, irrigating, pest control, and harvesting. Prerequisite: 1-BO 100. Two lectures, 3 hours laboratory. Credit, 3 hours.

386 *Small Fruits*. Production of grapes, brambles, and strawberries. Planting, pruning, irrigating, pest control, fertilizing, and harvesting. Prerequisite: HO 385. One lecture, 3 hours laboratory. Credit, 2 hours.

387 *Vegetable Crops*. Production of vegetable crops; variety selection, cultural practices, pest control and harvesting. Two lectures, 3 hours laboratory. Credit, 3 hours.

487 *Vegetable Crops*. Physiology of vegetable crops as influenced by cultural practices and environmental factors. Prerequisites: HO 387; 1-BO 360. Credit, 3 hours.

488 *Handling of Fruits and Vegetables*. Methods of harvesting, packaging, and storing fruits and vegetables. Prerequisites: 1-BO 100; HO 180 or 385. Two lectures, 3 hours laboratory. Credit 3 hours.

Poultry Husbandry

PH 190 *Poultry Husbandry*. Poultry management and application to local and regional conditions. Credit, 3 hours.

292 *Poultry Production Practices*. Supervised farm experience in poultry feeding, handling eggs, poultry raising for meat production, sanitation practices, and disease prevention. Prerequisite: PH 190. Six hours laboratory. Credit, 2 hours.

390 *Selection and Culling of Poultry*. Selecting poultry for production. Practice in culling flocks. Prerequisite: PH 190. One lecture, 3 hours laboratory. Credit, 2 hours.

391 *Poultry Production and Management*. Economics of production factors; marketing of poultry products; profit calculations. Prerequisite: PH 190. Three lectures with field trips. Credit, 3 hours.

392 *Poultry Breeding and Hatching*. Principles and practices. Prerequisite: PH 190. Two lectures, 3 hours laboratory. Credit 3 hours.

393 *Poultry Diseases and Sanitation*. Health problems of poultry. Description and classification of poultry diseases, their diagnosis, control and prevention. Prerequisite: PH 190. One lecture, 3 hours laboratory. Credit, 2 hours.

495g *Recent Advances in Poultry Science*. Current literature and recent developments in poultry science and management. Prerequisite: Twenty hours in animal science or equivalent. Two hours lecture and discussion. Credit, 2 hours.

Air Science

PROFESSOR BRYANT (MPE Anx 173); ASSISTANT
PROFESSORS ARMSTRONG, LANG, MEYER,
MONOGHAN, PANAS, RANKIN

Air Science

In conjunction with AS 101 and AS 202, a student must enroll concurrently in an academic course as prescribed by the Department of Air Science. A list of approved academic courses may be obtained at the time of registration.

AS 101 *Basic Air Science*. One hour leadership laboratory. Credit, 0.5 hours.

102 *Basic Air Science*. Elements and potentials of air power, air vehicles and principles of flight, military instruments of national security, and professional opportunities in the United States Air Force. Two hours lecture, 1 hour leadership laboratory. Credit, 1.5 hours.

201 *Basic Air Science*. Elements and evolution of aerial warfare, employment of air forces, and space operations. Prerequisite: AS 102. Two hours lecture, 1 hour leadership laboratory. Credit, 1.5 hours.

202 *Basic Air Science*. One hour leadership laboratory. Credit, 0.5 hours.

301, 302 *Advanced Air Science*. Staff organization and functions, communicating, instructing, techniques of problem solving, Air Force leadership and the military justice system. Prerequisite: Basic Air Science or equivalent. Four hours lecture, 1 hour leadership laboratory. Credit, 3 hours each semester.

311, 312 *Advanced Air Science*. Weather, navigation, introduction to international relations, military aspects of world political geography and the Air Force officer. Prerequisites: AS 301, 302. Four hours lecture, 1 hour leadership laboratory. Credit, 3 hours each semester.

Architecture

PROFESSOR ELMORE (EC 317); ASSOCIATE PROFESSORS ELLNER, WHIFFEN; ASSISTANT PROFESSORS DOUTHIT, JAKOB, LOWENSTEIN, SHAFER; INSTRUCTORS GERCKENS, STUDER;

Architecture

AC 100 *Introduction to Architecture*. Development of understanding of our physical environment through a study of the forms, functions and determinants of today's architecture, its continuity with the past, and its relation to the developing present. A brief examination of architecture as a profession is included. Credit, 2 hours.

101 *Fundamentals of Architecture*. Exploration of concepts introduced in AC 100. For architecture students only. Prerequisite: AC 100. Credit, 2 hours.

121, 122 *Drawing and Design*. Elements of composition and fundamentals of mechanical and freehand drawing with emphasis on architectural design applications. Two lectures, 6 hours studio. Credit, 3 hours each semester.

223, 224 *Architectural Design*. A sequence of design projects requiring synthesis of all knowledge and understanding attained at second-year level. Twelve hours studio. Credit, 4 hours each semester.

241 *Delineation*. Techniques for design studies and presentations. Elective. Prerequisite: AC 223. Six hours studio. Credit, 3 hours.

261 *Statics*. Basic structural concepts; physical principles and conditions controlling design of structural elements. Prerequisite: 1-MA 118 or 119. Credit, 3 hours.

262 *Mechanics of Materials*. Properties of materials; stress analysis; principles of structural design. Prerequisite: AC 261. Credit, 3 hours.

300 *Domestic Architecture*. History, design, construction, financing, and ownership of houses; legal and ethical functions and responsibilities of parties to the residential construction process. For other than architecture students. Credit, 2 hours.

301 *American Architecture*. Architecture in the United States from early colonial times to the present day, with the social, economic and aesthetic factors that have affected it. Credit, 3 hours.

311, 312 *Historical Architecture*. Derivation of architectural criteria and values through comparative analyses of structural, aesthetic, and social characteristics of significant buildings. Development of understanding of architecture as satisfaction of the cultural and practical needs of a people, place, and time. Credit, 3 hours each semester.

325, 326 *Architectural Design*. A sequence of design projects requiring synthesis of all knowledge and understanding attained at third-year level. Prerequisite: AC 224. Five afternoons a week. Credit, 5 hours each semester.

333 *Survey of Urban Design*. Analysis of twentieth century policies and programs relative to public housing, urban renewal, area development by private enterprise, and the construction of new towns. Emphasis on critical appraisal of completed projects in Europe and America. Elective. Credit, 2 hours.

334 *Survey of Industrial Design*. History, theory and processes of design and production of objects associated with architecture. Elective. Credit, 2 hours.

351, 352 *Materials and Techniques*. Nature of materials and techniques of their use in architectural design and construction and in design and production of objects associated with architecture. Working drawings and specifications; codes and other regulations ; supervision of construction. Two lectures, 4 hours studio. Credit, 3 hours each semester.

363, 364 *Structures*. Theory and practice of design of statically determinate structures in wood, steel, and concrete. Prerequisite: AC 262. Credit, 3 hours each semester.

371, 372 *Mechanical and Electrical Systems*. Water supply and drainage; heating, ventilating, and air conditioning; acoustics; electrical systems; lighting; refrigeration; building communications systems. Credit, 3 hours each semester.

413, 414 *Modern Architecture*. Application of derived criteria and values to the understanding of contemporary architecture, with an examination of its roots in the technical, social, and aesthetic innovations of the last two centuries. Prerequisite: AC 312. Credit, 3 hours each semester.

427, 428 *Architectural Design*. A sequence of design projects requiring synthesis of all knowledge and understanding attained at fourth-year level. Prerequisite: AC 326. Five afternoons a week. Credit, 5 hours each semester.

431 *Landscape Materials and Techniques*. Characteristics of landscape and related materials, and techniques of their use in and with architecture. Credit, 2 hours.

432 *Community Planning*. History, principles, and problems of urban planning. Prerequisite: AC 431. Credit, 3 hours.

435 *Architecture Workshop*. A concentrated study of practical and theoretical aspects of architecture carried on in a full-time workshop and required of all students during the summer following completion of AC 326 or AC 428. Required. Credit, 6 hours.

436 *Architecture Workshop*. Continuation of AC 435. Elective. Prerequisite: AC 435. Credit, 6 hours.

465, 466 *Structures*. Advanced structural design; statically indeterminate structures; special systems. Prerequisites: AC 364 and IMA 120. Credit, 3 hours each semester.

467 *Structural Systems*. Advanced structural design; statically indeterminate structures; special systems. Prerequisite: CE 321, 322. Credit, 3 hours.

481 *Design and Construction Processes*. Functions, problems, and joint operating processes of the architect, structural engineer, mechanical engineer, electrical engineer, contractor and others who are individually and collectively involved in the creation of buildings. For other than architecture students. Prerequisite: senior standing. Credit, 3 hours.

Fifth Year Courses

415 *Architectural Philosophies Seminar*. Definition and examination of the student's personal philosophy of architecture as a culmination of all previous studies in the area. Credit, 2 hours.

429 *Architectural Design*. A sequence of design projects requiring synthesis of all knowledge and understanding attained at fifth-year level. Prerequisite: AC 428. Five afternoons a week. Credit, 5 hours.

456 *Architectural Techniques Seminar*. Research and investigation into specific materials or techniques. Prerequisite: AC 352. Credit, 2 hours.

482 *Professional Practice*. Legal, ethical, business and management procedures involved in architectural practice and in the construction industry. Prerequisite: AC 352. Credit, 3 hours.

492 *Thesis Research*. Selection of thesis subject. Development of program and preparatory research. Prerequisite: AC 428. Credit, 2 hours.

493 *Thesis*. A final project demonstrating maturity achieved in the entire curriculum. Written, oral, and graphic presentation to the faculty in architecture. Prerequisite: Completion of all other degree requirements. Credit, 12 hours.

Construction

CO 101 *Construction Principles*. Functions, characteristics, and scope of the construction industry. Survey of the theory and practice of contracting and its responsibilities and relationships to various elements of the American economy. Credit, 2 hours.

157 *Construction Drawing*. Fundamentals of architectural and engineering drawing applied to construction. Two lectures, 4 hours studio. Credit, 3 hours.

191 *Construction Materials and Techniques*. Characteristics of natural and manufactured materials of basic construction. Sources, processing, procurement, economics and methods of use. Industry standards, regulatory codes controlling strength, durability and quality. Credit, 2 hours.

221 *Mechanics*. Basic structural concepts; properties of materials; stress analysis; principles of structural design. Prerequisite: 1-MA 118 or 119. Credit, 4 hours.

291 *Construction Systems and Materials*. Continuation of CO 191, including products, practices, and services of vendors, subcontractors, and specialty trades. Credit, 2 hours.

301 *Construction Accounting*. Application of basic accounting principles to construction operations. Theory and mechanics of cost reporting. Fiscal procedures and financial controls. Prerequisite: 3-AC 101, Credit, 3 hours.

322 *Structures*. Design theory and practice of statically determinate structures in wood, steel, and concrete. Foundations, building systems, rigging, concrete form design, and related architectural and construction applications. Prerequisite: CO 221. Credit, 4 hours.

383 *Construction Estimating*. Principles and theories of estimating, mathematics of estimating, quality survey techniques, classification of work, organization of detail, unit cost determinations. Credit, 3 hours.

384 *Construction Estimating*. General building estimating systems. Heavy construction estimating methods. Relationship of the

estimate to field operations and fiscal controls. Simulation of actual estimating and bidding procedures. Survey of estimating for the sub-trades. Prerequisite: CO 383. Credit, 3 hours.

391 *Construction Equipment*. Characteristics, capabilities, limitations, and use of standard construction tools, builder's equipment and heavy construction machinery. Fundamentals of supervision, economics of ownership, measurement of productivity, fleet operations, and maintenance programs. Credit, 3 hours.

471g *Special Construction Problems*. Guided individual student projects applying academic theory to solution of typical problems in the construction industry. Prerequisite: ES 400. Credit, 3 hours.

490g *Pre-Plans and Methods*. Principles of planning, organizing, scheduling, and controlling construction projects. Analysis and evaluation of production methods. Work engineering techniques. Prerequisite: CO 384. Credit, 3 hours.

495g, 496g *Construction Operations*. Legal, ethical, business and management procedures; processes and organization for efficient conduct of construction operations. Budgets, fiscal planning and control, procurement of materials and equipment, labor relations, project co-ordination, superintendence and on the job management. Prerequisite: Senior standing or consent of the instructor. Credit, 3 hours.

Art

PROFESSORS WOOD (Arts 328), HARTER, KLOSTER; ASSOCIATE PROFESSORS FINK, GOO, SCHAUMBURG, WADDELL; ASSISTANT PROFESSORS BECK, FAILING, FULLINGTON, HALE, HOPKINS, JACOBSON, TAYLOR

Art

AR 111 *Drawing and Composition*. Drawing and sketching as applied to the realistic and expressive representation of objects, landscapes, buildings, animals, etc., including a study of perspective. Four hours a week. Credit, 2 hours.

114 *Life Drawing*. Development of skill and expressiveness in drawing the basic form, construction, and action of the human figure from live models. Fee, \$5.00. Six hours a week. Credit, 3 hours.

123 *Beginning Painting*. Composition, color and technical mastery of painting media. Six hours a week. Credit, 3 hours.

131 *Sculpture*. Modeling, casting, mold making and building armatures; carving in wood or plastic. Prerequisites for art majors: AR 114, 141. Fee, \$4.00. Six hours a week. Credit, 3 hours.

141 *Basic Design*. Explores sources of design inspiration and principles fundamental to all the visual arts. Individual student

design studies are developed in studio and workshop experimentation with color, surface, and form in a variety of materials and techniques. Six hours studio. Credit, 3 hours.

142 *Basic Design*. Continuation of AR 141. Individual student projects oriented toward architecture, industrial design, painting, sculpture, crafts, and other visual arts. Six hours studio. Credit, 3 hours.

161 *Ceramics*. The nature of clay and glazes, hand-forming methods, throwing on the wheel, decorative processes, glaze application, and firing. Prerequisite for art majors: AR 141. Fee, \$5.00. Six hours a week. Credit, 3 hours.

181 *Lettering*. Construction, spacing, and arrangement of Roman and Gothic letters. Analysis of italics, script, and miscellaneous letter forms. Four hours a week. Credit, 2 hours.

182 *Commercial Art*. Practical problems in six major graphic media used in advertising. Recommended also for journalism and business administration majors. Prerequisite: AR 181. Fee, \$2.00. Six hours a week. Credit, 3 hours.

191 *Photographic Art*. Photography as an art medium. Fee, \$10.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

211 *Advanced Drawing*. Emphasis on composition and exploration of drawing media. Prerequisite: AR 111. Four hours a week. Credit, 2 hours.

214 *Life Drawing*. Continuation of AR 114. Emphasis on figure composition. Prerequisite: AR 114. Fee, \$5.00. Six hours a week. Credit, 3 hours.

222 *Water Color*. Painting in gouache and transparent water color. Emphasis on techniques, composition, and color. Prerequisites for art majors: AR 111, 142. Six hours laboratory. Credit, 3 hours.

223 *Advanced Painting*. Advanced problems in oil painting. Prerequisite: AR 123. Six hours a week. Credit, 3 hours.

231 *Advanced Sculpture*. Experimenting with various materials and working from model. Prerequisite: AR 131. Fee, \$5.00. Six hours a week. Credit, 3 hours.

241 *Space Design*. Creative design with emphasis on volume and space relationships. Construction in a variety of materials. Continuing use of hand tools and machine tools. Prerequisite: AR 141. Fee, \$5.00. Six hours laboratory. Credit, 3 hours.

261 *Ceramics*. Continuation of AR 161. Emphasis on decoration and glazing of wheel-thrown ware. Prerequisite: AR 161. Fee, \$5.00. Six hours a week. Credit, 3 hours.

271 *Crafts*. Contemporary design employing materials such as metal, wood, textiles, mosaics, and copper enameling. Prerequisite for art majors: AR 141 or 142. Fee, \$10.00. Wood, metals, copper enamel, and textile paint furnished. Six hours a week. Credit, 3 hours.

281 *Advanced Lettering*. Emphasis on arrangements and spacing. Prerequisite: AR 181. Four hours a week. Credit, 2 hours.

282 *Advanced Commercial Art*. Continuation of AR 182. Fee, \$2.00. Six hours a week. Credit, 3 hours.

284 *Fashion Design*. Designing and constructing fashions. A survey of manufacturers, retailers, designers and illustrators. Prerequisites for art majors: AR 114, 141. Six hours a week. Credit, 3 hours.

285 *Fashion Illustration*. Emphasis upon sketching and rendering. Prerequisites: AR 114, 142. Six hours a week. Credit, 3 hours.

291 *Darkroom Theory and Technique*. The theory of the action of light upon photographic materials. Print finishing for display or reproduction. Prerequisite: AR 191 or equivalent. Fee, \$10.00. One lecture, 6 hours laboratory. Credit, 3 hours.

311 *Advanced Drawing*. Continuation of AR 211. Prerequisite: AR 211. Four hours a week. Credit, 2 hours.

314 *Advanced Life Drawing*. Emphasis on form and anatomical structure of figure and head. Various mediums and techniques. Prerequisite: AR 214. Fee, \$5.00. Six hours a week. Credit, 3 hours.

322 *Advanced Water Color*. Prerequisite: AR 222. Six hours laboratory. Credit, 3 hours.

323 *Advanced Painting Problems*. Problems for those with a serious interest in easel painting or murals. Prerequisite: AR 223. Six hours laboratory, 1 hour research. Credit, 3 hours.

331 *Advanced Sculpture*. Continuation of AR 231. Prerequisite: AR 231. Fee, \$5.00. Six hours a week. Credit, 3 hours.

332 *Advanced Sculpture*. Continuation of AR 331. Introduction to welded sculpture, portrait modeling, and other processes. Prerequisite: AR 331. Fee, \$4.00. Six hours a week. Credit, 3 hours.

344 *Environmental Design*. Initial exploration of the design of interior and exterior living areas, model construction; presentation drawings. Prerequisites: AR 111, 142. Fee, \$2.00. Six hours a week. Credit, 3 hours.

351 *Graphic Arts Processes*. Modern printmaking processes in etching, engraving, aquatint and serigraphy. Prerequisites: AR 111, 114, 141. Fee, \$3.00. Six hours a week. Credit, 3 hours.

361 *Advanced Ceramics*. Advanced production methods, glaze formula interpretation, some experimental work in clays and glazes. Prerequisites: AR 141, 261. Fee, \$5.00. Six hours a week. Credit, 3 hours.

362 *Advanced Ceramics*. Continuation of AR 361. Emphasis on development of individual style. Fee, \$5.00. Six hours a week. Credit, 3 hours.

370 *Advanced Crafts*. Correlation between material and design. Problems in copper enameling, use of wood, mosaics, metal raising and individual projects in the various crafts. Prerequisite: AR 271. Fee, \$3.00. Six hours a week. Credit, 3 hours.

371 *Advanced Crafts*. Students specialize in a particular craft medium or technique. Prerequisite: AR 370. Fee, \$3.00. Six hours a week. Credit, 3 hours.

372 *Contemporary Jewelry Design*. Theory of three-dimensional design as adapted to contemporary jewelry, with individual problems in silver, ebony, and gemstones. Prerequisites: AR 141, 142. Fee, \$2.00. Four hours a week. Credit, 2 hours.

381 *Advanced Lettering*. Recommended only to those having a special interest in lettering. Prerequisite: AR 281. Four hours a week. Credit, 2 hours.

382 *Advertising Design*. Creative design as applied to the solution of graphic arts problems. Prerequisite: AR 282. Fee, \$2.00. Six hours a week. Credit, 3 hours.

384 *Advanced Fashion Design*. Designing clothes with relation to price ranges and materials. Style forecasting. Prerequisite: AR 284. Six hours a week. Credit, 3 hours.

385 *Advanced Fashion Illustration*. Illustrating clothes and accessory merchandise for newspaper, magazine, and catalog advertising. Prerequisite: AR 285. Six hours a week. Credit, 3 hours.

391 *Advanced Photography*. The manipulation and interpretation of light in all its studio and darkroom aspects. Prerequisite: AR 191. Fee, \$10.00. One lecture, 6 hours laboratory. Credit, 3 hours.

411g *Drawing Techniques of the Old Masters*. Historical techniques of drawing from early Renaissance to the present. The making and use of materials and tools including silver point, listre ink, quill pen, pastels and chiaroscuro drawings, as used by Michelangelo, Rembrandt, Tiepolo and other masters. Prerequisites: AR 114, 211. Fee, \$2.00. Four hours a week. Credit, 2 hours.

414g *Advanced Life Drawing*. Continuation of AR 314. Anatomical research, one hour additional each week. Group criticism. Prerequisites: AR 114, 314. Fee, \$5.00. Six hours laboratory, 1 hour outside preparation. Credit, 3 hours.

421g *Painting Mediums and Techniques*. Designed to acquaint the student with materials in all varieties of painting. Experimental problems in oil, lacquer, pastel, encaustic, acetate, paints, mosaic, and others. Fee, \$2.50. Four hours a week. Credit, 2 hours.

422g *Advanced Water Color*. More advanced problems in picture construction. Prerequisite: AR 322. Six hours a week. Credit, 3 hours.

423g *Advanced Painting*. Portrait and figure painting from model in oil, gouache, tempera or water color. Prerequisites: AR 223, 314. Fee, \$4.00. Six hours a week. Credit, 3 hours.

425g *Figure Painting*. Prerequisite: AR 423. Fee, \$4.00. Four hours a week. Credit, 2 hours.

432g *Advanced Sculpture*. For those with serious interest in the art of sculpture. Prerequisite: AR 231. Fee, \$5.00. Six hours a week. Credit, 3 hours.

444g *Advanced Environmental Design*. Continuation of AR 344. Fee, \$2.00. Six hours a week. Credit, 3 hours.

451g *Graphic Arts Processes*. Advanced printmaking processes in etching, engraving, aquatint and serigraphy. Prerequisite: AR 351. Fee, \$3.00. Six hours a week. Credit, 3 hours.

452g *Graphic Arts Processes*. Advanced printmaking processes in woodcut and lithography. Prerequisite: AR 352. Fee, \$3.00. Six hours a week. Credit, 3 hours.

461g *Advanced Ceramics*. Studio problems adapted to meet individual needs. Curriculum problems, procedures, and techniques for teachers. Advanced research for the individual potter. Prerequisite: AR 361 or equivalent. Fee, \$5.00. Six hours a week. Credit, 3 hours.

472g *Advanced Metal Design*. Research in three-dimensional design including experimentation in "lost wax" with application to jewelry design. Prerequisites: AR 141, 142, 372. Fee, \$3.00. Four hours a week. Credit, 2 hours.

473g *Native Crafts*. Research and practice in preparation and use of native materials in basket weaving, weaving, silversmithing, and gem-setting. Fee, \$10.00. Six hours a week. Credit, 3 hours.

482g *Advertising Design and Production*. The creation of printed advertising from the first rough visuals to the working drawings used for reproduction. Prerequisite: AR 382. Six hours a week. Credit, 3 hours.

484 *Advanced Fashion Design*. Students may specialize in designing clothes for special types, for the junior miss, or for children. Prerequisite: AR 384. Six hours a week. Credit, 3 hours.

485 *Advanced Fashion Illustration*. Specialization in desired areas. Emphasis on layout, rendering, and processes. Six hours a week. Credit, 3 hours.

521 *Studio Problems and Techniques*. Advanced study in the fields of painting, sculpture, jewelry design, graphics and ceramics. Fee for jewelry design, \$5.00. Six hours a week. May be repeated for credit. Credit, 3 hours.

580 *Creative Terminal Project*. Must be done in one of the five major areas of concentration in the MFA degree program. Must be approved by the student's committee before undertaken, and

before completion, the student must submit a complete report. A public exhibition approved by the committee must precede the final examination. Selected materials from the exhibit may be retained by the University on indefinite loan. Credit, 10 or 15 hours.

Special Graduate Courses, AR 500, 590, 591, 592, 593. See page 226.

Art Education

AE 301, 302 *Public School Art*. Emphasis on self-understanding through the use of art, concurrent with the study of the art-work of children of all ages from early childhood to mid-adolescence. Fee, \$2.00. Four hours a week. Credit, 2 hours each semester.

311 *Art Supervision in the Elementary School*. Exploration of theory, materials, organization, methods, and curriculum for the elementary art specialist or consultant; the Art Supervisor's responsibility in human relations and communications. Credit, 2 hours.

420g *Crafts for the Elementary School Teacher*. Practical laboratory experiences stressing inexpensive and salvage materials that children can use. Combinations of materials and specific knowledges in mosaic, paper mache, clay, wood, wire, etc. Fee, \$5.00. One lecture, 3 hours laboratory. Credit, 2 hours.

480g *Methods of Teaching Art*. Methods of instruction, theory organization and presentation of appropriate content in art. Required of all art education majors. Prerequisite: 2-SE 311 or concurrently. Credit, 3 hours.

511 *History and Theory of the Teaching of Art*. The teaching of art from Plato to Kepes; history of the great insights into the nature of creative expression. Prerequisites: AE 201 and 2-BE 222, or equivalent. Credit, 3 hours.

Special Graduate Courses, AE 500, 590, 591, 592, 593. See page 226.

Art History

AH 102 *Introduction to Art*. Development of understanding and enjoyment of art and its relationship to everyday life through the study of painting, sculpture, architecture, and design. Some laboratory experience. Credit, 2 hours.

211 *Western Art to the Renaissance*. A survey of western art to the Renaissance. Credit, 3 hours.

212 *Renaissance Art*. Continuation of AH 211. A survey of the art of the Renaissance in Italy and Northern Europe. Credit, 3 hours.

313 *Contemporary Art*. European and American art from Realism to the present time. Credit, 3 hours.

315 *History of Fashion*. The evolution of costume from early Egypt to the present including its relationship to the civilization and social customs of the time. Credit, 3 hours.

321 *American Art*. The cultural unfolding of America as reflected in the significant trends in American painting, sculpture, and architecture. Credit, 3 hours.

413g *Primitive Art*. Relation of early art forms from prehistoric and neolithic to Oceanic, African, and pre-Columbian to contemporary art expression. Credit, 3 hours.

415g *Southwestern Indian Art*. The unique arts and crafts of the Southwestern American Indians from pre-historic times as related to their historical background and social customs. AN 221 or 332 recommended. Credit, 3 hours.

416g *Mexican Art*. The art of Mexico and related Central American cultures from the pre-historic to the contemporary schools. Prerequisite: AH 313, or equivalent. Credit, 3 hours.

417g, 418g *Oriental Art*. First semester, the art of the Near East, Middle East, and India; the second semester, the art of China, Korea, Japan. Prerequisite: AH 211. Credit, 3 hours each semester.

441g, 442g *Aesthetics*. The mature appreciation and understanding of the arts emphasizing the relationships of art, music, philosophy, and literature. Intended to integrate and give meaning to studio skills for majors in art or music, and to teachers and all who wish to increase understanding of modern arts. Credit, 2 hours each semester.

466g *Museology*. The problems of museum directorship and curatorship, including technical analysis of works of art, authentication, conservation, museum organization and public relations. Prerequisite: Nine hours of Art History, or approval of instructor. AN 364 recommended. Credit, 3 hours.

Special Graduate Courses, AH 500, 590, 591, 592, 593. See page 226.

Botany

PROFESSOR RUSSELL (LSC 378); ASSOCIATE PROFESSORS
DYCUS, JOHNSON; ASSISTANT PROFESSORS BURGESS,
LEATHERS, NORTHEY

Botany

BO 100 *General Botany*. Brief survey of lower plant life. More detailed study of flowering plants. Fee, \$4.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

170 *The Flora of Arizona*. The identification of Arizona plants, and methods of collecting, preserving, and mounting. Prerequisite: BO 100 or BI 100. Fee, \$3.00. One lecture, 6 hours laboratory or field trip, one week-end trip. Credit, 3 hours.

210 *Special Techniques in Botany*. Approval of instructor and chairman of the department required. May be repeated for credit. Fee, \$3.00. Credit, 1 hour.

250 *Plant Anatomy*. A detailed study of flowering plants, relating structure and function in the case of stems, leaves, roots, flowers, fruits, and seeds. Prerequisite: BO 100. Fee, \$4.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

280 *General Plant Pathology*. The principles and agents of disease, including field observations and methods of control. Prerequisite: BO 100. Fee, \$5.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

325 *Economic Botany*. Man's dependence upon and economic interest in plants throughout the world. Prerequisite: Approval of instructor. Credit, 3 hours.

410g *Plant Physiology*. An investigation of plant growth, nutrition, food synthesis, respiration, and reproduction. Prerequisites: BO 100; CH 231. Fee, \$5.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

420g *Plant Ecology*. Plant associations in relation to the major environment factors. Prerequisite: BO 170 or approval of instructor. Fee, \$4.00. Three lectures, 3 hours laboratory or field trip, one week-end field trip. Credit, 4 hours.

440g *Morphology and Classification of the Algae*. Morphology, taxonomy and economic importance of the algae. Prerequisite: BO 100. Fee, \$2.00. One lecture, 3 hours laboratory including field trips. Credit, 2 hours.

444g *General Mycology*. Morphology, taxonomy, and economic aspects of fungi with primary emphasis on the lower fungi and ascomycetes. Prerequisite: BO 100. Fee, \$4.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

447g *Morphology and Classification of the Bryophytes and Pteridophytes*. Morphology, taxonomy, and economic importance of the mosses, ferns and other vascular plants exclusive of the Angiosperms and Gymnosperms. Prerequisite: BO 100. Fee, \$2.00. One lecture, 3 hours laboratory including field trips. Credit, 2 hours.

450g *Plant Microtechnique*. Methods of handling plant materials for cytological and anatomical examination. Prerequisite: BO 100. Fee, \$5.00. One lecture, 6 hours laboratory. Credit, 3 hours.

460g *Physiology of Growth and Reproduction*. Interaction of environmental, metabolic and hormonal factors in vegetative and reproductive phases of plant behavior. Prerequisites: BO 410 and CH 231. Fee, \$5.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

471g *Grasses*. Principles underlying the classification and naming of grasses. Prerequisite: BO 170 or approval of instructor. Fee, \$4.00. One lecture, 6 hours laboratory, including one weekend field trip. Credit, 2 hours.

472g *Cacti and Succulents of Arizona*. Identification of the principle desert cacti and succulents in the area. Prerequisite: BO 100 or equivalent. Fee, \$3.00. One lecture and 3 hours field work, or 6 hours field work. Credit, 2 hours.

475g *Principles of Taxonomy*. The basic principles of flowering plant taxonomy, including angiosperm phylogeny, the preparation of monographs and similar subjects. Prerequisite: BO 100. Fee, \$3.00. Credit, 3 hours.

520 *Plant Ecological Methods*. Methods for collecting, compiling, and analyzing data used in the study of plant communities. Prerequisite: BO 420. Fee, \$5.00. Two lectures, 3 hours laboratory or field trip. Credit, 3 hours.

526 *Advanced Plant Ecology*. Plant communities of the world; their structure, developmental processes, history, and prognosis. Prerequisite: BO 420. Fee \$3.00. Credit, 3 hours.

564 *Plant Metabolism*. Study of phenomena common to a wide range of plants: Enzyme systems, energy transformations, responses involving light, plant growth reactions. Prerequisites: CH 231, BO 462. Fee, \$5.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

572 *Taxonomy of the Higher Fungi*. Principles of collecting, preserving and identifying ascomycetous and basidiomycetous fungi. Consideration of the economic importance and recognition of the edible and poisonous mushrooms. Prerequisite: BO 444. Fee, \$4.00. Two lectures, 6 hours laboratory, including field trips. Credit, 4 hours.

575 *Advanced Plant Systematics*. The interpretation of plant ranges and related data as they concern the evolution and taxonomy of the flowering plants. Prerequisite: BO 475. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

Special Graduate Courses, BO 500, 590, 591, 592, 593. See page 226.

Microbiology

MI 102 *Elements of Microbiology*. A fundamental study of micro-organisms, including parasitic worms, with an emphasis on species of medical importance. Includes fundamental diagnosis, cultivation and handling of human pathogens. Not open to biology and medical technology majors. Fee, \$5.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

103 *Microbiology*. Medical bacteriology and its applications to nursing arts. Two lectures, 3 hours laboratory. Credit, 3 hours.

201 *Microbiology*. Bacteria, molds, and other micro-organisms, and their application in industrial, agricultural, hygienic and domestic problems. Prerequisites: CH 111; BI 100 or equivalent. Credit, 3 hours.

202 *Microbiology Laboratory*. The principles and laboratory techniques used in identifying and handling of micro-organisms. Prerequisite: MI 201 or concurrently. Fee, \$5.00. Three hours laboratory. Credit, 1 hour.

410g *Advanced Microbiology*. A comparative study of the systematic and pathogenic relationships of micro-organisms with a consideration of the physiological activities of the micro-organisms involved. Prerequisites: MI 202 and CH 231 and approval of instructor. Fee, \$6.00. Three lectures, 6 hours laboratory. Credit, 5 hours.

420g *Immunology*. Principles of immunity and their application to diagnosis, systematics and allergies. Prerequisites: MI 202 and CH 231 or equivalent. Fee, \$7.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

530 *Epidemiology*. Dissemination, incidence and virulence of the etiological agents of human disease in the community, and factors influencing them; principles basic to control. Prerequisite: Ten hours of microbiology. Credit, 2 hours.

560 *Bacterial Physiology*. Study of fermentation, respiration and other metabolic processes of bacteria. Prerequisites: Eight hours of microbiology and CH 465, or equivalent. Fee, \$7.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

570 *Systematic Bacteriology*. Classification and identification of bacteria. Prerequisite: Eight hours of microbiology. Fee, \$7.00. One lecture, 6 hours laboratory. Credit, 3 hours.

580 *Pathogenic Bacteriology*. Study of the etiology of bacterial disease. The pathology, diagnosis and epidemiology of human pathogenic bacteria. Prerequisites: MI 202 and CH 231. Fee, \$7.00. Three lectures, 6 hours laboratory. Credit, 5 hours.

585 *Virology*. Principles of diagnosis and pathology of viruses and rickettsiae. Prerequisite: MI 580. Fee, \$7.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

Business Administration ACCOUNTING

PROFESSORS BURTON (BA 202F), LOWE; ASSOCIATE PROFESSORS KRUEGER, SANDERS; ASSISTANT PROFESSORS A. R. BEALS, DeCOSTER, HILL, HUIZINGH

Accounting

AC 101 *Elementary Accounting*. Introduction to the theory and practice of accounting applicable to the accounting cycle. Includes journals and ledgers, transactional documents, departmental procedures, and the voucher system. Three lectures, 2 hours laboratory. Credit, 3 hours.

102 *Elementary Accounting*. A continuation of AC 101. Accounting theory and practice applicable to partnerships, corporations, cash, receivables, inventories, fixed assets, liabilities, and manufacturing accounts. Three lectures, 2 hours laboratory. Credit, 3 hours.

201 *Intermediate Accounting*. Accounting theory and practice applicable to corporate net worth accounts, investments, reserves, and income. Prerequisite: AC 102. Credit, 3 hours.

202 *Intermediate Accounting*. Accounting theory and practice applicable to current assets, fixed assets, liabilities, and sources and applications of funds. Prerequisite: AC 102. Credit, 3 hours.

322 *Mathematics of Finance*. Compound interest and annuities, bond valuation, amortization, and income tax problems. Prerequisite: GB 161. Credit, 2 hours.

331 *Cost accounting*. Specialized accounting procedures applicable to job order and process cost manufacturing operations. Prerequisite: AC 102. Credit, 3 hours.

332 *Accounting for Engineers*. Industrial accounting, includes job, process, standard, and estimated costs. Enrollment restricted to students in the College of Applied Arts and Sciences. Credit, 4 hours.

383 *Advanced Accounting*. Accounting methods and procedures applicable to partnerships, joint ventures, installment sales, and consignments. Prerequisite: AC 202. Credit, 3 hours.

409g *Governmental and Institutional Accounting*. Specialized accounting methods and procedures applicable to federal, state, and municipal governmental units, and religious, charitable and non-profit organizations. Prerequisite: AC 201, 202. Credit, 3 hours.

415g *Financial Statement Analysis*. Analytical methods applied to financial statements for the guidance of management. Prerequisite: AC 102. Credit, 3 hours.

432g *Advanced Cost Accounting*. Extension of cost accounting methods and procedures to standard, estimated, and distribution cost systems. Prerequisite: AC 331. Credit, 3 hours.

441g *Budgetary Control*. Installation and administration of a budgetary control system, analysis of results obtained, and the use and interpretation of such results by management. Prerequisites: AC 201, 202, and 331. Credit, 2 hours.

442g *Controllership*. An analysis of the functions of the controller and the organization of his department. Consideration is given to the responsibilities of the controller as a part of the administrative group and to the scope of the problems with which he deals. Prerequisites: AC 201, 202, 331. Credit, 2 hours.

447g *Accounting Systems*. Adaptation and installation of an accounting system to meet the particular needs of any given business operation. Prerequisites: AC 201, 202, and 331. Credit, 2 hours.

451 *Federal and State Income Tax*. Laws and regulations. Preparation of tax returns. Income tax procedures. Prerequisites: AC 201, 202. Credit, 3 hours.

452 *Federal and State Income Tax*. A continuation of AC 451. An introduction to estate taxes, gift taxes, miscellaneous taxes, and refund claims. Prerequisite: AC 451. Credit, 3 hours.

472g *Consolidations and Mergers*. Theory and practice applicable to the consolidation of parent and subsidiary financial statements and the merging of corporate interests. Prerequisite: AC 383. Credit, 2 hours.

481g *Auditing Theory and Practice*. Auditing standards, procedures, programs, working papers, internal control, and the ethical and legal responsibilities of the certified public accountant. Prerequisite: AC 383. Credit, 3 hours.

482g *Auditing Theory and Practice*. Continuation of AC 481. Practical application of auditing standards and practices to an audit case with practice in the writing of an audit report. Prerequisite: AC 481. Credit, 3 hours.

500 *Accounting Survey and Analysis*. Basic accounting concepts and procedures essential to the development of administrative competence. The determination of periodic income. Preparation and interpretation of financial statements. Cost accounting. Open only to students without previous credit in accounting. Credit, 3 hours.

501 *Managerial Accounting*. Use of accounting data in the managerial decision-making process and in the analysis and control of business operations. Prerequisite: AC 500 or equivalent. Credit, 2 hours.

505 *Law in Professional Accounting*. Law applicable to the various forms of business organizations and the transactions conducted by these business entities. Prerequisite: GB 305. Credit, 2 hours.

521 *Advanced Income Tax Procedures*. Interpretation of federal income tax laws. Rules and regulations applicable to partnerships, corporations, reorganizations, fiduciaries, and gifts. Attention given to court decisions and internal revenue procedures. Prerequisite: AC 452. Credit, 2 hours.

522 *Advanced Income Tax Procedures*. Interpretation of federal income tax laws. Rules and regulations applicable to individuals, partnerships, corporations, reorganizations, fiduciaries, and gifts. Attention given to research procedure applicable to particular tax situations. Prerequisite: AC 452. Credit, 2 hours.

551 *Advanced Accounting Theory*. Critical analysis of the generally accepted accounting theories and principles. Credit, 2 hours.

552 *Problems in Income Determination*. Analysis of problems in the calculation and disclosure of the periodic income of business enterprises. Credit, 2 hours.

560 *C.P.A. Problems*. Complex accounting problems related to accounting theory and practice with emphasis on assets, liabilities, net worth, partnerships, corporations, and sources and application of funds. Credit, 2 hours.

561 *C.P.A. Problems*. Complex accounting problems related to accounting theory and practice with emphasis on cost and governmental accounting, consolidations, and other advanced problems. Credit, 2 hours.

562 *C.P.A. Problems*. Complex professional problems related to ethics, auditing standards, procedures, and internal control, financial statement presentation, letters of opinion, and tax practice. Credit, 2 hours.

Special Graduate Courses, AC 590, 591, 592, 593. See page 226.

ECONOMICS

PROFESSOR HEADINGTON; ASSOCIATE PROFESSORS FARRIS, GRAVES, LOWE, PADALIS, PLANTZ; ASSISTANT PROFESSORS CAUTHORN (BA 307), SANDMEYER

Economics

EC 201 *Principles of Economics*. Descriptive analysis of the structure and functioning of the American economy. Emphasizes basic economic institutions and the factors determining income and employment levels. Credit, 3 hours.

202 *Principles of Economics*. Price determination and income distribution in a capitalistic economy. Investigation of current economic issues with particular emphasis on labor-management relations, agriculture, international trade, and government regulation of business. Prerequisite: EC 201. Credit, 3 hours.

321 *Labor Economics*. Historical and theoretical analysis of labor problems and labor relations. Labor force wage theories, and practices. Employment and unemployment. Government regulations. Prerequisite: EC 202. Credit, 3 hours.

331 *Comparative Economic Systems*. Economic theories and practices of capitalism, socialism, communism, and fascism. Prerequisite: EC 202. Credit, 3 hours.

336 *International Economics*. Principles and practices of international finance. Techniques of international payments. Exchange rates and their determination. Economic aspects of major international organizations. Prerequisite: EC 202. Credit, 2 hours

341 *Public Finance*. Principles and practices of taxation, public expenditures, credit, budgetary policy. Prerequisite: EC 202. Credit, 3 hours.

401g *Intermediate Price Analysis*. Value and distribution theory. Price and output decisions of business firms under conditions of competition, monopolistic competition, oligopoly, and monopoly. Prerequisite: EC 202. Credit, 3 hours.

402g *Economics of Income and Employment*. Analysis of determinants of aggregate level of employment, output and income of an economy. Prerequisite: EC 202. Credit, 3 hours.

412g *Business Cycles*. Historical, statistical and analytical study of business cycle theory. Comparison of theories of leading economists. Methods of control of cyclical fluctuations. Prerequisite: GB 321 or concurrent registration. Credit, 2 hours.

441g *History of Economic Thought*. Development of economic doctrines. Theories of mercantilism, physiocracy, classicism, neo-classicism, Marxism, and contemporary economics. Prerequisite: 12 hours of economics or approval of instructor. Credit, 3 hours.

451g *Economics of Public Utilities*. Economic, legislative, and administrative problems in the regulation of public utility rates and service standards. Study of public utility costs, pricing policies, rates, plant utilization, and competition. Prerequisite: EC 202. Credit, 3 hours.

453g *Government and Business*. Development of public policies toward business. Anti-trust activity. Economic effects of government policies. Prerequisite: EC 202. Credit, 3 hours.

461g *Current Economic Problems*. Discussion of current economic issues. Oral and written reports on assigned topics. Prerequisite: 12 hours of economics or approval of instructor. Credit, 3 hours.

500 *Business Economics*. Fundamentals of micro- and macro-economic analysis. Price and output determination in various market structures. Functional distribution of income. Theory of income and employment. Open only to students without previous credit in economics. Credit, 3 hours.

501 *Managerial Economics*. An approach to management problems from an economic point of view. Includes the application of economic analysis to decision-making in various areas of business policy development. Credit, 2 hours.

502 *Advanced Economic Analysis*. Value, price, and distribution theories. National income analysis and application to public policy. Recent developments in economic theory. Prerequisites: EC 401, 402. Credit, 3 hours.

503 *International Economic Theory*. Problems of balance-of-payments, commercial policies of the major nations, international economic organizations in theory and practice. Credit, 2 hours.

504 *Fiscal Policy*. Fiscal theory and its appropriate role in determining the economic policies of government. Credit, 2 hours.

Special Graduate Courses, EC 590, 591, 592, 593. See page 226.

GENERAL BUSINESS ADMINISTRATION

PROFESSORS DAUTEN (BA 207B), OSBORN, OVERMAN, PETERS;
ASSOCIATE PROFESSORS BECKER, DEMAREST, EDMOND-
SON, SUMMERS; ASSISTANT PROFESSORS OPPITZ

Finance

FI 301 *Money and Banking.* Functions of money, monetary systems, credit functions, banking practices and policies. Prerequisite: EC 202. Credit, 3 hours.

305 *Credits and Collections.* Principles and current practices in the field of commercial credit. Organization of the credit department. Evaluation of the various sources of credit information, analysis of credit risk. Credit, 3 hours.

325 *Business Finance.* The financial structure of various types of business organizations, including sole proprietorships, partnerships, and corporations. Methods of securing and managing funds to meet short- and long-term capital requirements. Prerequisites: AC 102; EC 202. Credit, 3 hours.

403g *Personal Finance.* Financial problems and institutions affecting individuals; borrowing, saving, insurance, investment, financial agencies. Not open to students in the College of Business Administration. Credit, 3 hours.

441 *Investments.* Analysis and evaluation of various types of securities. Principles of sound investment policy Prerequisite: FI 325. Credit, 3 hours.

451g *Bank Organization and Management.* Management of bank funds. Credit policies. Credit analysis. Commercial, agricultural, real estate, consumer, and security loans. Handling of distressed loans. Investment portfolios of banks, bank earnings, expenses, and dividend policies. Prerequisite: FI 301. Credit, 3 hours.

461g *Cases in Business Finance.* Case problems in financing of business. Analysis of various types of financing. Prerequisite: FI 325. Credit, 3 hours.

501. *Financial Institutions.* Comprehensive analysis of American financial institutions, both private and governmental; their influence upon the operations of the economy; their relationships to the individual enterprise. Extensive reading and intensive analysis of cases. Credit, 2 hours.

521 *Banking and Monetary Management.* Current policies and problems in commercial and central banking. Prerequisite: FI 301. Credit, 2 hours.

542 *Security Analysis.* Investigation of the securities of representative corporations in major industries. Analysis of financial statements and of pertinent economic data. Security markets. Investment management. Prerequisite: FI 501. Credit, 2 hours.

General Business Administration

GB 101 *Introduction to Business*. The organization, functions, activities, and role of business in the American economic system. Orientation of the student to business terminology, practices, problems, and career opportunities. Not open to students who have received credit in EC 202 and MG 301. Credit, 3 hours.

161 *Mathematics of Business*. Mathematical problems encountered in business, including compound interest and annuities. Prerequisite: 1-MA 116 or equivalent. Credit, 3 hours.

221 *Business Statistics*. Descriptive statistics, averages, dispersion, elementary statistical inference, index numbers, time series, and measurement of relationships as applied to business and economic problems. Prerequisite: GB 161. Three lectures, 2 hours laboratory. Credit, 3 hours

233 *Business Communication*. The development of psychologically sound business communications in correct and forceful English. All outside assignments must be in typewritten form. Prerequisite: 1-EN 102. Credit, 3 hours.

301 *Mechanized Data Processing*. Solution of business data processing problems by means of the keypunch, sorter, accounting machine, and summary punch. Uses and limitations of punched card equipment in business data processing. Credit, 3 hours.

302 *Electronic Data Processing*. Elements of stored program computers. File access concepts. Flow charting. Computer applications. Elementary coding. Credit, 3 hours.

305 *Business Law*. Contracts, sales, agency, partnerships, corporations, negotiable instruments, personal property, real property, and federal and state regulation of business. Credit, 3 hours.

306 *Business Law*. A continuation of 305. Prerequisite: GB 305. Credit, 3 hours.

322 *Intermediate Business Statistics*. Theory and application of probability and statistical inference in quantitative business analysis. Prerequisite: GB 221, or approval of instructor. Three lectures, 2 hours laboratory. Credit, 3 hours.

341 *Transportation*. Analysis of economic principles and legislative practices in the regulation of rates and services of rail, motor, air and pipeline transportation. The theory of rates, discrimination, reasonableness, economic costs, and public policy toward transportation agencies. Prerequisite: EC 202. Credit, 3 hours.

345 *Industrial Traffic Management*. Analysis of the business relationships between shippers and carriers with respect to rates and services in the transportation of goods by rail, highway, water, and air. The role and organization of traffic management as a function in business enterprise Prerequisite: EC 202. Credit, 3 hours.

371 *Principles of Hotel Administration.* The development and organization of the hospitality industry. A survey and evaluation of hotel and motel services. Responsibilities and procedures of the departments of food, maintenance, engineering, and the front office. Career opportunities in hotel administration. Credit, 2 hours.

372 *Hotel Office Procedures and Control.* Control procedures applicable to hotels and motels; the uniform system of accounting; inventory control; guest histories; transcripts, supervision of office personnel. Prerequisite: GB 371. Credit, 2 hours.

402g *Data Processor Programming.* Advanced programming techniques. Program debugging. Auto-coding. Sorting. Re-run. Large random-access storage. Actual program runs on computer. Prerequisite: GB 302. Credit, 3 hours.

407g *Data Processing Systems.* Sources, cost, value of information. Information systems analysis and design. Feasibility studies. Planning computer applications and controls. Prerequisite: GB 302. Credit, 3 hours.

422g *Advanced Business and Economic Statistics.* Application of advanced statistical methods in the analysis of business and economic problems; emphasis on multi-variate and multi-factor analysis, and non-parametric methods appropriate to time series and static data. Prerequisite: GB 322 or equivalent. Credit, 3 hours.

431g *Business Report Writing.* The organization and preparation of reports of the types used in business. Techniques of collecting, interpreting, and presenting information useful to management. Prerequisite: GB 233. Credit, 2 hours.

451g *Business Research Methods.* The nature and purposes of research. The problem of acquiring knowledge. Validation and the minimization of error. Definition of meaningful questions. Relevant data. Prerequisite: GB 221. Credit, 3 hours.

460 *Commercial Motor Transportation.* Highway systems of the U.S., motor carrier operations, and the regulation of motor transportation. Costs, rates, services, taxes, weights and sizes, coordination and consolidation. Relationships with competitive modes of transportation. Prerequisite: GB 341. Credit, 3 hours.

462g *Problems in Transportation and Traffic.* Case problems in transportation operations and traffic management of transportation firms. Selection of equipment, pricing, control, finance, labor relations, organization, and location of transportation operations. Prerequisite: GB 341. Credit, 3 hours.

471 *Hotel Organization and Management.* Buying, building, or leasing facilities. Organizing for efficient operation. Control of income and expenditures. Financial statement analysis. Risks and insurance. Prerequisite: GB 372. Credit, 3 hours.

472g *Hotel Policies and Problems.* Profitable food and beverage operation. Forecasting staff and material requirements. Analysis of payroll costs. Case study of current operating problems. Prerequisite: GB 471. Credit, 2 hours.

522 *Managerial Statistics.* The role of sampling and statistical control procedures in administrative decision-making under uncertainty. Applications covered include inventory control, statistical quality control, accounting controls, capacity determination, and industrial experimentation. Prerequisite: GB 221 or approval of instructor. Credit, 3 hours.

Special Graduate Courses, GB 590, 591, 592, 593. See page 226.

Insurance

IN 251 *Principles of Insurance.* Coverages available, buying methods, procedures in settling claims, insurance companies, and vocational opportunities. Prerequisite: GB 101. Credit, 3 hours.

321 *Life Insurance.* Fundamentals of life insurance including types of contracts, functions of various contracts, company organization, rate making, selection of risks and other home office operations. Governmental supervision of life insurance companies. Prerequisite: IN 251. Credit, 3 hours.

331 *Property Insurance Principles and Coverages.* Policies and principles of fire and casualty insurance. For students planning to make careers in agency or home office work as well as those needing a fundamental knowledge of insurance for business. Prerequisite: IN 251. Credit, 3 hours.

425g *Current Problems in Insurance.* An analysis of major problems and issues in the insurance industry. Prerequisite: Nine hours of insurance. Credit, 2 hours.

432g *Property Insurance Administration.* Rate making, reserves, financial statements, investments, underwriting, claims, prevention, and surveys. For students planning careers in agency or home office work. Prerequisite: IN 331. Credit, 3 hours.

451g *Social Insurance.* Insurance coverages provided by state and federal governments: social security, unemployment insurance, workmen's compensation, and other social or governmental insurance plans. Prerequisite: IN 321. Credit, 2 hours.

501 *Managerial Insurance.* Evaluation of insurance coverages and theory related to managerial decisions. Credit, 2 hours.

Real Estate

RE 251 *Real Estate Principles.* The regulations, practices, legal aspects, and professional ethics of the real estate business. Prerequisite: EC 202. Credit, 3 hours.

302 *Real Estate Management.* Management of residences, apartments, and commercial properties. Consideration of professional standards, methods of business promotion, leasing, insuring, and maintaining properties as an agent of the owners. Prerequisites: AC 102; RE 251. Credit, 3 hours.

331 *Real Estate Finance.* Sources and availability of funds. Management, servicing, and repayment of loans. Prerequisite: RE 251. Credit, 2 hours.

401g *Real Estate Appraisal.* The factors affecting the value of real estate. Theory and practice of appraising and preparation of the appraisal report. Techniques in appraisals. Prerequisite: RE 251. Credit, 2 hours.

411g *Real Estate Law.* Legal practices as they apply to the real estate field in general and to the field of titles, mortgages, lending, and trust work in particular. Prerequisites: RE 302; GB 306. Credit, 3 hours.

441g *Real Estate Land Development.* Neighborhood and city growth. Municipal planning and zoning. Development of subdivisions. Agricultural land utilization. Prerequisites: EC 202; RE 411 or equivalent. Credit, 3 hours.

461g *Current Real Estate Problems.* Recent developments in the field of real estate, finance, taxation, zoning, planning government regulations, and government assistance programs. Prerequisite: RE 302, or equivalent. Credit, 3 hours.

MANAGEMENT

PROFESSOR DAVIS (BA 109C); ASSOCIATE PROFESSORS CAMPBELL, GREENWOOD, McSPARRIN, REUTER; ASSISTANT PROFESSORS BLOMSTROM, HUNERYAGER, KLASSON

Management

MG 301 *Principles of Management.* The fundamentals of organization and administration. Planning, organizing, directing, coordinating and controlling business activity. Credit, 3 hours.

311 *Personnel Administration.* Personnel selection, placement, training, promotion, wage incentives, absenteeism, and counseling. Prerequisite: MG 301. Credit, 3 hours.

331 *Industrial Management.* The principal functions, departmental activities, and policies of manufacturing firms. Organization for production and analysis of production methods. Prerequisite: MG 301. Credit, 3 hours.

335 *Methods Management.* Role of management in methods improvement. The productivity concept as it relates to business

efficiency. Development of employee attitudes supporting productivity. Process charts. Methods improvement in the work environment. Class practice in methods analysis. Prerequisite: MG 331. Credit, 3 hours.

338 *Industrial Safety*. Safety methods in industry. Safety codes compensation. inspection, safety educational program, industrial facilities to care for injured workmen, health hazards and protective measures, safeguards on equipment and buildings to prevent accidents. Prerequisite: MG 301. Credit, 2 hours.

413g *Wage and Salary Management*. Installation and administration of a complete wage and salary program, including objectives, policies, organization, control, job evaluation, wage surveys, and winning acceptance for an integrated program. Prerequisite: MG 311. Credit, 3 hours.

422g *Employee Training and Supervision*. A study of the principles of supervision, the techniques of leadership, adjustment of grievances, policy interpretation, group attitude and morale, training and learning processes, and counseling techniques. Prerequisite: MG 311. Credit, 2 hours.

423g *Industrial Relations and Collective Bargaining*. The processes and procedures of collective bargaining. The scope and negotiation of union contracts. Prerequisite: EC 321. Credit, 3 hours.

432g *Production Control*. Production planning and budgeting. Development of the production control system, including product development, materials control, plant and equipment analysis, production standards and methods, personnel and supervision. Control of production quantity through routing, scheduling, and dispatching. Measurement of production efficiency. Prerequisite: MG 331. Credit, 2 hours.

433g *Managerial Decision-Making*. Role of probability and desirability in management decision-making. Decision theory and models. The decision process. Communication networks and input-outputs in decision-making. Class performance of business games. Prerequisite: MG 301. Credit, 3 hours.

434g *Management Responsibility in Society*. Developments arising from separation of ownership and management and the growth of professional management. The limits of management authority. Relation of profit and service objectives to a business society. Prerequisite: MG 301. Credit, 3 hours.

451g *Human Relations in Business*. Human aspects of business, as distinguished from economic and technical aspects, and how they influence efficiency, morale, and management practice. Prerequisite: MG 301. Credit, 3 hours.

463 *Business Policies*. Analysis of problems encountered by management in its daily operations. Investigation of sound business principles and practices. Prerequisites: MG 301; FI 325. Credit, 3 hours.

491g *Operations Research*. A study of the scientific methods which make available to executive departments, a quantitative basis for decisions regarding the operations under their control. Early development, value, mathematical analysis, methods, personnel and organization for effective operations research. Credit, 3 hours.

501 *Management Policies and Procedures*. An analysis of managerial techniques. Evaluation and application of such tools of management as job analysis, merit rating, time and motion study, and the personnel audit. The development of an operating philosophy of management. Credit, 2 hours.

502 *The Development of Management Thought*. The origin and growth of management concepts. The contribution of leaders in scientific management. Organizational theory, management philosophy, and techniques. Prerequisite: MG 501 or equivalent. Credit, 2 hours.

503 *Cases in Human Relations*. The development of effective work groups in business. Analysis of cases in organizational relationships. Group dynamics, effects of change and informal organization. Prerequisite: MG 451 or MG 501 or equivalent. Credit, 2 hours.

520 *Problems in Personnel Management*. Selecting, developing, maintaining, and utilizing a competent labor force. Case studies of personnel problems. Preparation of a written personnel program. Prerequisite: MG 501. Credit, 3 hours.

522 *Labor Relations and Public Policy*. The development of state and federal legislation. Analysis of recent decisions of courts and labor bonds. The legal rights and duties of employers, unions, and the public. Credit, 2 hours.

581 *Cases in Industrial Management*. Actual management problems are studied by the case method. Experience in managerial decision-making. Credit, 2 hours.

MARKETING

PROFESSORS NIELANDER (BA 102A), HARRIS, HOOK; ASSOCIATE
PROFESSOR ZACHER; ASSISTANT PROFESSORS
SCHMIDT, SMITH

Advertising

AD 301 *Advertising Principles*. Advertising as a communications tool in marketing and business management. Consideration of creative methods, survey of media, measurements of effectiveness, and coordination with other aspects of the sales and promotional program. Prerequisite: MK 300 or 1-JO 110. Credit, 3 hours. (Same as 1-JO 275.)

311 *Advertising Campaigns*. Planning and preparation of advertising for the printed media, including newspapers, magazines and direct mail. Practice in layout and copy writing. Study of typography, printing and photoengraving. Prerequisite: AD 301. Credit, 2 hours.

312 *Advertising Campaigns*. Analysis and selection of printed media. Scheduling of advertisements. Development and execution of the complete advertising campaign. Prerequisite: AD 301. Credit, 2 hours.

322 *Retail Promotion and Display*. Planning and budgeting of promotional activities in the retail store. Preparation of advertising for various media. Creation of window and interior displays. Coordination of promotion with merchandising and sales efforts. Prerequisites: AD 301; MK 321. Credit, 2 hours.

371 *Radio and Television Advertising*. Techniques and problems of radio and television as advertising media including program selection and planning, preparation of continuity, and coordination with other forms of advertising. Prerequisite: AD 301. Credit, 3 hours. (Same as 1-RT 371.)

453g *Advertising Campaign Problems*. Problems in the planning and preparation of advertising for various media. Includes layout, copy, and the complete production process. Prerequisite: AD 311. One hour lecture, two hours laboratory. Credit, 2 hours.

461g *Advertising Management*. A study of advertising planning media selection, and the creation of advertising matter, including preparation of complete advertising campaigns and the solving of typical advertising problems. Prerequisite: AD 301. Credit, 3 hours.

472g *Radio-Television Station Management*. Background in the organization, procedures, and policies of radio-television stations. Financial and creative basis of station operation. Consideration of personnel and production problems, relationship with advertising agencies, networks and sponsors. Prerequisite: AD 301 and 1-RT 332 or 336. Credit, 3 hours (Same as 1-RT 472.)

Marketing

MK 300 *Principles of Marketing*. Principles and trends in the distribution of goods and services. Prerequisite: EC 202 or concurrent registration. Credit, 3 hours.

310 *Principles of Selling*. Techniques of personal selling. Organization, presentation, and analysis of sales interviews. Credit, 3 hours.

321 *Principles of Retailing*. Survey of store operations including buying, pricing, selling, control, and store services; markup and expense relationships; store organization and system. Prerequisites: MK 300; AC 102. Credit, 3 hours.

323 *Retail Buying and Merchandising.* Retail store buying procedures; group buying; central buying; and use of resident buying offices. Coordination of the buying function with merchandise budgets, personal selling and other promotional activities. Prerequisite: MK 321. Credit, 2 hours.

332 *Wholesaling.* Analysis of the wholesaling structure and study of problems encountered in the operation of a modern wholesale establishment. Prerequisite: MK 300. Credit, 2 hours.

334 *Industrial Marketing.* An analysis of the marketing structure for industrial products. Product lines, channels of distribution, selling, pricing, and warehousing problems. Prerequisite: MK 300. Credit, 2 hours.

335 *International Marketing.* Principles and practices of international trade. Import-export procedures. Distribution and financing practices in foreign markets. Prerequisite: MK 300. Credit, 2 hours.

355 *Purchasing.* Practices and problems confronting the purchasing agent, including sources of supply, market information, material specification and inspection, control records, inventories, stores, and the purchase budget. Prerequisites: MK 300; MG 301. Credit, 3 hours.

401g *Public Relations.* The role of public relations in business, government, and social institutions, with emphasis on policy formulation. Credit, 3 hours.

411g *Sales Management.* Organization of the sales department; sales planning; selection, training, control, and compensation of the sales force. Prerequisite: MK 300. Credit, 3 hours.

412 *Sales Promotion Policies.* Analysis of sales appeals. The coordination of personal selling with other types of sales promotion. Methods of developing a clientele, including the locating of new markets. Prerequisite: MK 300 and MK 310. Credit, 2 hours.

423g *Retail Store Control.* Retail sales and profit analysis. Establishing forecasts, standards, methods of measurement of results, and determining control action for merchandise, expenses, capital investment, and personnel operations. Prerequisite: MK 321. Credit, 3 hours.

424g *Retail Store Management.* Problems of store management including location, layout, customer services, personnel, and operational factors as they affect successful retailing. Prerequisite: MK 423. Credit, 3 hours.

460g *Marketing Policies.* Practices and problems confronting the marketing executive and the development of techniques found useful in their solution. Prerequisite: MK 300. Credit, 3 hours.

471g *Price Policies.* Relationship of demand, costs, and price to marketing decisions. Evaluation of objectives underlying the formulation of price policies. Prerequisite: MK 300. Credit, 2 hours.

483g *Marketing Research*. Use of marketing data in solving marketing problems. Determining consumer demand, sales potentials, and quotas. Evaluation and presentation of findings. Prerequisite: MK 300 and GB 221. Credit, 3 hours.

501 *Marketing Management*. Analysis of marketing problems from the management point of view. Credit, 2 hours.

502 *Public Relations Policies*. Case analysis of problems encountered in maintenance of favorable relationships between business organizations and the public. Development of sound public relations policies. Prerequisite: MK 401. Credit, 2 hours.

522 *Sales Analysis and Control*. An analytical approach to marketing problems, particularly in the interpretation of findings from sales analysis. Credit, 2 hours.

563 *Cases in Marketing*. Methodology and techniques as applied to the solution of marketing management problems. Credit, 2 hours.

OFFICE ADMINISTRATION AND BUSINESS EDUCATION

PROFESSOR TATE (BA 304C); ASSOCIATE PROFESSORS BOGGS, KALLAUS; ASSISTANT PROFESSORS DAWKINS, GRyder, JACKS, MCCREADY, ROSS; INSTRUCTOR KIRKPATRICK

Business Education

BE 301 *Vocational Education in American Schools*. The basic principles and philosophies of vocational education. Relationship of vocational education to general education. History and legislation. Credit, 3 hours.

480g *Methods of Teaching Business Subjects*. Methods of instruction, organization, and presentation of appropriate content in typewriting, shorthand, bookkeeping, business machines, and basic business courses. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

490g *The Work Study Program in the Business Occupations*. To provide preparation for teachers of the work-study program for business occupations. Methods and procedures in developing and co-ordinating a work-study program in the secondary schools and the preparation of materials for instruction. Registration subject to approval of instructor. Credit, 3 hours.

491g *Organization and Management of Extension Courses*. Adult training under the provisions of the Distributive Education Reimbursable Program. Community survey techniques to determine needs for training. Personnel and materials for conducting classes. Credit, 3 hours.

492g *Guidance for Business and Distributive Education.* Occupational surveys and job analysis to determine community opportunities and requirements for employment. Placement, follow-up, and counseling for problems encountered by student workers. Legislation affecting business occupations. Credit, 3 hours.

501 *Foundations of Business Education.* The history, philosophy, principles and objectives of business education. Problems of curriculum and curriculum evaluation. Contribution of business education to general education. Registration subject to approval of instructor. Credit, 2 hours.

502 *Administration and Supervision of Business Education.* Departmental and classroom problems related to curriculums, equipment, guidance, in-service training, and personnel. The regulation of vocational business education programs by state and federal agencies. Credit, 3 hours.

503 *Tests and Measurements in Business Education.* Constructing, administering, and evaluating tests in secretarial and general business subjects. Diagnostic testing for remedial teaching in these subjects. Credit, 3 hours.

511 *Improving Instruction in Secretarial Subjects.* Modern methodology in teaching typewriting, shorthand, and office practice courses. The psychology of skill building and techniques of office production. Credit, 2 hours.

513 *Improving Instruction in Bookkeeping and General Business Subjects.* Evaluation of methodology and materials used in teaching bookkeeping, general business, and related subjects. The place of basic business education in general education. Credit, 2 hours.

Special Graduate Courses, BE 590, 591, 592, 593. See page 226.

Office Administration

OA 101 *Basic Typewriting.* Mastery of the keyboard. Development of speed and accuracy. Tabulation, centering, and business letters. Fee \$2.00. One lecture, 2 hours laboratory. Credit, 2 hours.

113 *Shorthand.* The basic principles of reading and writing shorthand. Dictation of practiced material. Two lectures, 2 hours laboratory. Credit, 3 hours.

143 *Business Machines.* Instruction and practice in addition, subtraction, multiplication, and division on full-key, ten-key, and rotary calculators. Fee, \$2.00. One lecture, 2 hours laboratory. Credit, 2 hours.

201 *Advanced Typewriting.* Building skill in typing office problem materials to meet business production standards. Use of electric machines. Prerequisite: OA 101. Fee \$2.00. Two lectures, 2 hours laboratory. Credit, 3 hours.

214 *Shorthand*. Building dictation speed with unpracticed material, and a review of shorthand principles. Prerequisite: OA 113. Two lectures, 2 hours laboratory. Credit, 3 hours.

232 *Records Systems and Filing*. Administration of records systems; analysis and application of various filing systems in the business office. One lecture, 2 hours laboratory. Credit, 2 hours.

312 *Transcription*. Increased speed in sustained dictation and the transcription of mailable business correspondence. Prerequisite: OA 113. Three lectures, 2 hours laboratory. Credit, 4 hours.

331 *Secretarial Procedures*. Instruction and practice in performing various office duties, including methods of handling mail, arranging itineraries, procuring office supplies, using the telephone, and improving human relations. Prerequisite: OA 312. Two lectures, 2 hours laboratory. Credit, 3 hours.

344 *Office Appliances*. Theory and practice in the selection and operation of dictating and transcribing machines, duplicating machines, copying machines, and proportional spacing typewriters. Prerequisite: OA 201. One lecture, 2 hours laboratory. Credit, 2 hours.

351 *Principles of Office Management*. Relationship of the office function to the business enterprise including office location and layout, selection of office equipment and supplies, principles of office organization, supervision of office personnel, employee training programs, office services, and control of office output. Credit, 3 hours.

452g *Office Systems and Procedures*. Methods of establishing, analyzing, standardizing, and controlling administrative systems and procedures including: work simplification, forms analysis, work-flow charting, layout and space analysis, office manuals. Prerequisite: OA 351. Credit, 3 hours.

Chemistry

PROFESSORS EYRING (Phys. Sci. C204), BATEMAN, BROWN,
BURGOYNE, FUCHS, ROBINS; ASSOCIATE PROFESSOR
WHITEHURST; ASSISTANT PROFESSORS ARONSON,
ASAI, CARPENTER, GALASYN, MOORE, WALLING,
YUEN, ZASLOW; INSTRUCTOR
J. H. WILCOX

Chemistry

CH 101, 102 *Introduction to Chemistry*. Introduction to inorganic, organic and biochemistry. May not be used as a prerequisite for more advanced courses in chemistry. Fee, \$4.00 each semester. Three lectures, 1 quiz, 2 hours laboratory. Credit, 4 hours each semester.

111* *College Chemistry*. Fundamental principles of chemistry. Prerequisite: Concurrent registration in MA 116. Fee, \$4.00. Three lectures, 2 quizzes, 3 hours laboratory. Credit, 5 hours.

113* *General Chemistry*. Fundamental principles of chemistry. Prerequisite: MA 116 or high school mathematics equivalent. Fee, \$4.00. Three lectures, 1 quiz, 2 hours laboratory. Credit, 4 hours.

114* *General Chemistry*. Chemistry of metals, nonmetals, and carbon. Prerequisite: CH 111 or 113. Fee, \$4.00. Three lectures, 1 quiz, 2 hours laboratory. Credit, 4 hours.

115* *General Chemistry and Qualitative Analysis*. Qualitative separation and identification of common cations and anions. Prerequisite: CH 111 or 113. Fee, \$5.00. Three lectures, 2 quizzes, 4 hours laboratory. Credit, 5 hours.

121 *Qualitative Analysis*. Qualitative separation and identification of common cations and anions. Prerequisite: CH 114. Fee, \$5.00. Two quizzes, 4 hours laboratory. Credit, 2 hours.

225 *Quantitative Analysis*. Principles and methods of volumetric and gravimetric analysis. Prerequisite: CH 114 or 115. Primarily for students in agriculture, pre-medicine, pre-dentistry, medical technology. Fee, \$6.00. Two lectures, 1 quiz, 6 hours laboratory. Credit, 4 hours.

231* *Elementary Organic Chemistry*. Survey of the compounds of carbon, including representative groups of aliphatic and aromatic series. For students of home economics, agriculture and biology. Prerequisite: CH 111 or 113. Fee, \$4.00. Three lectures, 1 quiz, 2 hours laboratory. Credit, 4 hours.

300 *Glass Blowing*. Laboratory techniques in glass blowing. Prerequisite: Approval of instructor. Fee, \$8.00. Four hours laboratory. Credit, 1 hour.

301, 302 *Modern Chemistry*. Designed for secondary science teachers but useful for scientists, engineers, qualified high school graduates, college students and others who wish to be brought up to date in chemistry. Eighty TV lectures each semester. Credit, 3 hours each semester.

327 *Quantitative Analysis*. Principles and methods of volumetric and gravimetric analysis. Prerequisite: CH 114 or 115. Required of B.S. chemistry majors. Fee, \$6.00. Two lectures, 1 quiz, 9 hours laboratory. Credit, 5 hours.

331*, 332 *General Organic Chemistry*. Chemistry of organic compounds. Prerequisite: CH 114 or 115. Fee, \$6.00 each semester. Three lectures, 3 hours laboratory. Credit, 4 hours each semester.

341* *Elementary Physical Chemistry*. Properties of solids, liquids, gases, solutions, equilibrium, colloidal state. For premedical, biology, agriculture, etc. students. Prerequisites: CH 225 and 231 or 331. Fee, \$5.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

421g *Instrumental Analysis*. Theory and applications of instrumental methods to chemical analysis. Electrical and optical techniques. Prerequisite: CH 442 (or concurrently). Fee, \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

423g *Analytical Chemistry*. Theoretical principles of analytical chemistry. Prerequisite: CH 442 (or concurrently). Credit, 3 hours.

425g *Metallurgy*. Extraction of metals, crystals and atomic structure, phase transformations, tests and properties of high temperature metals and refractories, and introduction to spectroscopy. Prerequisite: 4-ES 351. Credit, 3 hours. (Same as 4-ES 452.)

431g *Qualitative Organic Analysis*. Systematic identification of organic compounds. Prerequisite: CH 225 or 327 and 332. Fee, \$8.00. One lecture, 6 hours laboratory. Credit, 3 hours.

435g *Organic Laboratory Methods*. Methods of organic synthesis. Emphasis on general types of organic reactions and laboratory techniques employed in preparation, isolation and purification of complex organic products. Prerequisite: CH 332. Fee, \$8.00. One lecture, 1 conference, 5 hours laboratory. Credit, 3 hours.

441g*, 442g *General Physical Chemistry*. Gases, liquids, solids, solutions, equilibrium, phase rule, electrochemistry, thermodynamics, atomic structure, radioactivity, and colloids. Prerequisites: CH 225 or 327, or 4-KE 211; PH 112; MA 212. Credit, 3 hours each semester.

443, 444 *General Physical Chemistry Laboratory*. Physical chemical experiments. Prerequisite: CH 441 (or concurrently). Fee, \$6.00. Three hours laboratory. Credit, 1 hour each semester.

446g *Radioisotope Methodology*. Radioactivity and detection of nuclear radiations. Quantitative measurements, tracer techniques and study of methods used in agriculture, medicine, industrial radiochemistry and related fields. Especially adapted to meet the needs of persons majoring in fields other than chemistry. Prerequisite: CH 225. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

447g *Radiochemistry*. Radioactivity, natural and artificial radioisotopes, nuclear reactions, isolation of isotopes, nuclear energetics, measurement of radioactivity, tracer techniques and other applications. Prerequisite: CH 441 (or concurrently). Credit, 2 hours.

448g *Radiochemistry Laboratory*. Radiation measurements, tracer methods, quantitative identification of isotopes, and other procedures applicable to chemical, physical, engineering and biological problems. Prerequisite: CH 447 (or concurrently). Fee, \$6.00. One conference, 5 hours laboratory. Credit, 2 hours.

451g *Inorganic Chemistry*. Atomic structure, periodic relationships, chemical bonding, nomenclature, aqueous and non-aqueous chemistry. Prerequisite: CH 225 or 327. Credit, 3 hours.

452g *Inorganic Chemistry Laboratory*. Preparation and purification of typical inorganic substances with emphasis on methods and techniques. Prerequisite: Approval of instructor. Fee, \$6.00. One lecture, 3 hours laboratory. Credit, 2 hours.

461g, 462g *General Biochemistry*. Fundamental chemistry and metabolism of major biological materials and their role in the biochemical processes of living organisms. Prerequisite: CH 332. Credit, 3 hours each semester.

464g* *Elementary Biochemistry*. Chemistry of animal and plant life including biological compounds, tissues, foods and digestion, enzymes, etc. Prerequisite: CH 231 or 332. Credit, 3 hours.

465g *Biochemistry Laboratory*. Qualitative and quantitative chemistry of carbohydrates, fats, proteins, enzymes; milk, blood and urine analysis. Prerequisite: Approval of instructor. Fee, \$6.00. Three hours laboratory. Credit, 1 hour.

466g *Biochemical Techniques*. Application of recent techniques of isolation and analysis to biochemical materials and processes. Prerequisites: CH 225, 461, and 465. Fee, \$8.00. One lecture, 3 hours laboratory. Credit, 2 hours.

480g *Principles of Geochemistry*. Occurrence of elements and isotopes in the earth and principles governing their distribution. Prerequisite: Approval of instructor. Three lectures, 3 hours laboratory. Fee, \$2.00. Credit, 3 hours.

511, 512 *Chemistry for In-service Teachers*. An integrated approach to the concepts and principles of chemistry. Prerequisite: Approval of instructor. Credit, 3 hours each semester.

514 *Recent Advances in Chemistry*. Survey of background material and treatment of recent developments in chemistry to refresh and augment training of secondary school chemistry teachers. Prerequisite: Approval of instructor. Credit, 3 hours.

515 *Techniques in Teaching Chemistry*. Experience in solving of problems; preparation of reagents, demonstrations, experiments, and projects; and organization and operation of stock-rooms and laboratories. Prerequisite: Approval of instructor. Credit, 2 hours.

525 *Optical Methods of Chemical Analysis*. Theoretical and practical considerations involving the use of optical instruments for chemical analysis with special emphasis on emission and absorption spectroscopy. Prerequisite: CH 442. Fee, \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

526 *X-Ray Methods of Analysis*. Theoretical and practical considerations involving the use of x-ray diffraction and spectroscopy for chemical and structural analyses. Prerequisite: CH 442. Fee, \$8.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

527 *Electrical Methods of Chemical Analysis*. Theoretical and practical considerations of polarography, potentiometric, amperometric, and conductometric titrations. Prerequisite: CH 442. Fee, \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

528 *Topics in Analytical Chemistry*. Prerequisite: CH 423. Credit, 3 hours.

531 *Organic Quantitative Analysis*. Micro and semi-micro quantitative analysis of organic compounds. Prerequisite: CH 431. Fee, \$6.00. One lecture, 6 hours laboratory. Credit, 3 hours.

533 *Structure and Mechanism in Organic Chemistry*. Prerequisites: CH 332, 442. Credit, 3 hours.

534 *Heterocyclic Compounds*. Chemistry of organic heterocyclic compounds containing nitrogen, sulfur, and other hetero atoms. Prerequisite: CH 332. Credit, 3 hours.

535 *Topics in Organic Chemistry*. Stereoisomerism, carbohydrates, and polymers. Prerequisite: CH 332. Credit, 3 hours.

536 *Organic Medicinal Compounds*. Chemistry of selected types of organic medicinal compounds. Prerequisite: CH 332. Credit, 3 hours.

545 *Chemical Thermodynamics*. Classical approach. Prerequisite: CH 442. Credit, 3 hours.

546 *Statistical Thermodynamics*. Statistical methods applied to chemical problems. Prerequisite: CH 545. Credit, 3 hours.

547 *Quantum Chemistry*. Principles of quantum theory with survey of approximation methods as applied to chemical problems. Prerequisite: CH 442. Credit, 3 hours.

548 *Chemical Kinetics*. Kinetic theory and rate processes. Prerequisite: Approval of instructor. Credit, 3 hours.

549 *Topics in Physical Chemistry*. Prerequisite: Approval of instructor. Credit, 3 hours.

553 *Inorganic Chemistry*. An advanced course in the principles of inorganic chemistry. Prerequisite: CH 442. Credit, 3 hours.

554 *Inorganic Chemistry*. Systematic descriptive inorganic chemistry. Prerequisite: CH 553. Credit, 3 hours.

556 *Topics in Inorganic Chemistry*. Prerequisite: CH 553. Credit, 3 hours.

563 *Biochemistry*. Proteins with special reference to the enzymes and their mechanism of action. Prerequisite: CH 462. Credit, 3 hours.

Special Graduate Courses, CH 500, 590, 592, 593. See page 226.

*In each of the following groups credit is allowed for one course only: CH 111 or 113; CH 114 or 115; CH 225 or 327; CH 231 or 331; CH 341 or 441; CH 461 or 464.

Education

ELEMENTARY EDUCATION

PROFESSORS O'BEIRNE (Library 8), MANNING, PODLICH; ASSOCIATE PROFESSORS BOYD, BYERS; ASSISTANT PROFESSORS BOETTO, CROUCH, DUDEK, FRENCH, MORRIS, O'BRIEN, OLMSTED

Elementary Education

EE 211 *Children's Literature*. Folk and modern literature for elementary school children; a study of types; wide reading. Credit, 3 hours.

212 *Creative Activities for the Young Child*. Emphasis on sensory-perceptual experiences through story telling, rhythms and play activities. Opportunities to observe play behavior of children from two to nine in laboratory situations. Credit, 3 hours.

311 *Social Living in Early Childhood Education*. Emphasizes social studies, special days and holidays, construction of creative instructional materials and resources. Credit, 3 hours.

312 *Teaching the Young Child*. Considers all aspects of curriculum. Philosophy principles, practices, problems, and evaluation in the integrated experience program. Prerequisite: EE 311. Credit, 3 hours.

313 *Child Development*. Growth and development of the elementary school child. Identification of patterns of behavior. Observation of children in many situations. Credit, 3 hours.

314 *The Teaching of Reading*. Reading for the classroom teacher, involving the application of expanding resources in the solving of reading problems. Designed primarily for classroom teachers in terms of reading techniques, procedures and organizational plans. Credit, 3 hours.

322 *Language Arts in Early Childhood Education*. Factors affecting growth in language arts areas; instructional methods and materials in teaching reading, speech, listening, and writing. Proficiency in handwriting required. Credit, 3 hours.

333 *Language Arts in the Middle and Upper Elementary Grades*. A continuation of the developmental reading program for elementary majors. Integrated treatment of study and recreatory types of reading, listening, speaking, cursive writing, spelling, creative and formal type writing. Credit, 3 hours.

344 *Elementary Curriculum*. Curriculum types or designs, social studies in curriculum. Curriculum principles, practices, and problems. Credit, 3 hours.

355 *Social Studies in the Elementary School*. The core function of social studies, scope and sequence, unit organization, methods of instruction, materials and resources for learning. Credit, 3 hours.

366 *Observation and Participation in the Elementary School.* Provides an opportunity for students to observe and work directly with elementary children in a classroom situation. Includes a critical evaluation of the student's experiences. Credit, 3 hours.

411g *Teaching in the Kindergarten.* Origin, organization and administration of Kindergartens, equipment and supplies; philosophical and psychological foundations; community resources; gathering and preparing learning materials. Credit, 3 hours.

422g *Teaching in the Kindergarten.* Planning learning environment; developing learning activities; organizing the school day; interpreting children's growth to parents. Credit, 3 hours.

433g *Phonetics and the Reading Process.* The relationship of the oral and aural factors in the teaching of reading. Prerequisite: EE 314. Credit, 2 hours.

451g *Current Reading Practices.* Special consideration given to the implementation of selected factors for classroom practice. Credit, 3 hours.

452g *Production of Reading Aids.* Production and correlation of tape recordings, individual reading laboratories, phonetic devices and self-instructional devices. Credit, 3 hours.

455g *Materials and Resources for Learning.* Enrichment materials and community resources as related to centers of interest or units of work. Credit, 3 hours.

466g *Reading Problems.* Practical suggestions for diagnosis of the reading and language problems encountered in the teaching of reading. Credit, 2 hours.

478 *Directed Teaching in the Elementary School.* The relationship of theory and practice in methods of teaching; the practice of teaching; practice in guidance, measurement, extra-curricular activities, and classroom management procedures. Credit, 1-16 hours.

479 *Problems of Teachers in Early Childhood Education.* Individual problems encountered by students in their observations and practice teaching experiences; appraisal of teacher-education backgrounds; bridging of gaps in teacher-education backgrounds. Prerequisite or co-requisite: EE 478. Credit, 3 hours.

489 *Problems of Teachers in the Middle and Upper Elementary Grades.* Individual problems encountered by students in their observations and practice teaching experiences; appraisal of teacher-education backgrounds; bridging of gaps in teacher-education backgrounds. Prerequisite or co-requisite: EE 478. Credit, 3 hours.

511 *Elementary Curriculum Development.* Criteria of appraisal, typical curriculum problems, curriculum construction and improvement. Prerequisite: EE 344, or equivalent. Credit, 3 hours.

513 *Child Development*. Physical, intellectual, social-emotional growth from birth to age ten; application of scientific facts in understanding developmental patterns, maturation, and behavior of the preschool and primary grade child. Credit, 3 hours.

522 *Developmental Social Experiences in Early Childhood Education*. Materials, techniques, aesthetic expression, creative activities and values in the integrated curriculum. Credit, 3 hours.

525 *Improving Reading and Language in Early Childhood Education*. Strengths and weaknesses of current programs. Significant problems and trends. Development of a balanced and articulated program of reading. Prerequisite: EE 322 or equivalent. Credit, 3 hours.

526 *Improving Reading and Language in the Upper Elementary Grades*. Strengths and weaknesses of current programs. Significant problems and trends. Development of a balanced and articulated program of reading. Prerequisite: EE 333 or equivalent. Credit, 3 hours.

527 *Improving the Teaching of Arithmetic in the Elementary School*. Strengths and weaknesses of current programs. Significant problems and trends. Development of a balanced and articulated program of arithmetic. Prerequisite: MA 305 or equivalent. Credit, 3 hours.

528 *Improving the Teaching of Social Studies in the Elementary School*. Strengths and weaknesses of current programs. Significant problems and trends. Development of a balanced and articulated program of social studies. Prerequisite: EE 345 or equivalent. Credit, 3 hours.

529 *Improving the Teaching of Science in the Elementary School*. Strengths and weaknesses of current programs. Significant problems and trends. Development of a balanced and articulated science program. Prerequisite: PL 320 or equivalent. Credit, 3 hours.

533 *Evaluation of Children's Literature*. Social and educational concepts expressed in literature and changes in values and principles that are needed. Prerequisite: At least one course in literature. Credit, 3 hours.

544 *Play Education*. Treatment of the philosophies of play. Practical application to the utilization of rhythms, plays, and games. Credit, 3 hours.

555 *Modern Practices in Early Childhood Education*. Trends and practices, instructional and resource material, methods and techniques in Early Childhood Education. Credit, 3 hours.

556 *Administration of Reading Programs*. The organization and administration of reading programs with emphasis given to the professional responsibilities of the director; selection of equipment, in-service training and evaluation of the program. Credit, 3 hours.

557 *Clinical Practice in Reading*. Designed to familiarize the advanced student with the various diagnostic techniques and procedures at a professional clinical practice. Credit, 2 hours.

566 *Early Childhood Education*. Pre-school education in Europe and America; similarities and differences in philosophies, objectives and curricula. Credit, 3 hours.

711 *History of Curriculum Development in the Elementary School*. Elementary school curriculum from colonial times to the present with concomitant attention to the philosophical assumptions and theories of learning which influenced the selection of content. Prerequisite: EE 511 or equivalent. Credit, 4 hours.

722 *Issues in Elementary Education*. Problems, trends, issues and research in elementary education, and their relationship in modern educational practices. Credit, 4 hours.

Special Graduate Courses. EE 590, 591, 592, 593, 690, 691, 692, 790, 791, 792.

SECONDARY EDUCATION

PROFESSORS JELINEK, McGRATH, RICE; ASSOCIATE PROFESSORS FULLERTON (Main 202), BULLINGTON, HAGGERSON, PILLSBURY, ROVER; ASSISTANT PROFESSORS GRIFFITH, KAISER, KIESOW

Adult and Higher Education

AH 511 *Adult Education*. The historical development, objectives, scope, trends, and significance of adult education. The philosophy and trends of adult education in relation to desirable present and future local public school programs. Credit, 2 hours.

522 *Higher Education in the United States*. Designed for the graduate student interested in the organization and structure of higher education. Involves study of purposes, programs, issues, trends, controls, and personnel. Credit, 2 hours.

533 *Principles of Higher Education*. Current issues and trends in instruction in the field of higher education. Credit, 3 hours.

555 *Inter-Cultural Education*. The administration and organization of inter-cultural education for interchanges and technical assistance of higher education in other countries. Credit, 3 hours.

566 *International Education*. Education in the world community with special reference to cross-cultural problems of foreign students preparing for teaching abroad. Credit, 3 hours.

711 *Adult Education*. Existing types, methods, and administration of adult programs. Emphasis is given to ways and means of implementing adult activity and to the use of adult activity in

the study and improvement of educational services provided in local communities. Each student will participate in a research study of some area of adult education. Prerequisite: AH 511. Credit, 4 hours.

Special Graduate Courses. AH 590, 591, 592, 593, 690, 691, 692, 790, 791, 792.

Secondary Education

SE 310 *The Secondary School.* History of the American Secondary School. Obligations and opportunities of secondary school teachers. Personal and educational requirements of secondary school teachers. Issues in secondary education. Credit, 2 hours.

311 *Principles and Curricula of Secondary Schools.* Principles, functions, objectives, curricula, problems and trends in secondary education. Prerequisite: BE 333. Credit, 3 hours.

411 *Methods of Teaching and Evaluating in the Secondary School.* Procedures, methods, techniques, and instruments of teaching and evaluating in secondary schools. Prerequisite: SE 311. Credit, 4 hours.

433 *Directed Teaching in the Secondary School.* The relationship of theory and practice in methods of teaching; practice of teaching; practice in guidance, measurement, extra-curricular activities, and classroom management procedures. Prerequisite: SE 311 and SE 411. Credit, 1-16 hours.

444g *The Junior High School.* The development, population, organization, curriculum, purposes and methods of the Junior High School, with a major emphasis upon curriculum. Prerequisite: BE 333. Credit, 3 hours.

455g *Core Curriculum Methods and Materials.* Philosophy and principles of core curriculum and its implementation. Methods and materials utilized in integrating student experiences. Prerequisite: BE 333. Credit, 3 hours.

466g *Safety Education.* Various phases of safety education: home, school, and on-the-job. Emphasis on special interests of class members. Credit, 3 hours.

477g *Driver Education.* The preparation of instructors for the secondary school. Includes the study of the automobile, Arizona laws pertaining to motor vehicles, and behind-the-wheel instruction. Prerequisite: SE 466g and a valid driver's license. Fee, \$7.50. Lectures and laboratory. Credit, 3 hours.

488g *Organization and Administration of Safety Education.* Procedures and planning for the curriculum, organization, and administration of safety education programs. Credit, 3 hours.

511 *The Junior College.* The development, population, organization, curriculum, purposes, and methods of the Junior College. Credit, 3 hours.

522 *Secondary School Curriculum Development.* The social processes, issues, principles, patterns, and procedures in curriculum development. Prerequisites: SE 311, 411 and 433. Credit, 3 hours.

533 *The Improvement of Instruction in the Secondary School.* Improving instruction in terms of the interests and needs of individuals and groups in the class. Prerequisites: SE 311, 411 and 433. Credit, 3 hours.

544 *Reading Problems in the Secondary School.* Methods for meeting the reading and language problems encountered by junior and senior high school pupils. Prerequisites: SE 311, 411 and 433 or undergraduate major in elementary education. Credit, 3 hours.

555 *Student Activities in the Secondary School.* The development, purposes, and principles of student activities as they are related to the educational program of the secondary school. Prerequisites: SE 311, 411 and 433. Credit, 3 hours.

566 *Evaluating Secondary School Programs.* Development of evaluative criteria. Group and individual work in evaluation, using schools and classes of those enrolled as the source of problems for discussion and analysis. Prerequisite: SE 433. Credit, 3 hours.

577 *Recent Issues and Trends in Secondary Education.* Recent committee reports, problems facing American secondary schools, and recent issues. Prerequisite: SE 433. Credit, 3 hours.

588 *Human Relations in the Secondary Schools.* Human relations problems in the school resulting from the interaction of teachers, pupils, administrators, laymen, and non-professional staff. Prerequisite: SE 433. Credit, 3 hours.

711 *Secondary Curriculum Development.* Factors bearing upon the development of a qualitative learning environment in the secondary school; the evaluation of research and the individual study of fundamental problems in secondary curriculum development. Prerequisite: SE 433 and 522. Credit, 4 hours.

722 *Improvement of Instruction in the Secondary School.* Factors bearing upon the improvement of instruction in the secondary school; the evaluation of research and the individual study of fundamental problems in the improvement of instruction in the secondary school. Prerequisite: SE 433 and 533. Credit, 4 hours.

Special Graduate Courses. SE 590, 591, 592, 593, 690, 691, 692, 790, 791, 792. See page 226.

EDUCATIONAL ADMINISTRATION AND SUPERVISION

PROFESSORS WOCHNER (Main 212), ASHE, LEWIS, MENKE,
RICHARDSON; ASSOCIATE PROFESSORS DEEVER, DOYLE;
ASSISTANT PROFESSOR FORBES

Educational Administration and Supervision

EA 466g *School-Community Relationships*. Principles, philosophy, and techniques for improving the educational program through school-community action. Special attention given to the role of all school personnel in coordinating school-community experiences. Credit, 2 hours.

474g *School Law*. The legal relationships regarding principals, supervisors, teachers, pupils, and parents. Includes topics on teachers' contracts, dismissals, tenure, retirement, pupil injuries, and liability of personnel. Credit, 2 hours.

522 *Public School Administration*. The history and development of public school administration in the United States, current organizational patterns for public education at local, county, state and national levels; the administrator's responsibilities in all phases of education. Fee, \$5.00. Credit, 4 hours.

533 *Instructional Leadership in the Elementary School*. Curricular practices and the processes used by administrative and supervisory leaders who plan, organize, and coordinate the professional activities of elementary school teachers in improving pupil-learning experiences. Prerequisite: EE 511. Credit, 3 hours.

535 *Instructional Leadership in the Secondary School*. Curricular practices and the processes used by administrative and supervisory leaders who plan, organize, and coordinate the professional activities of secondary school teachers in improving pupil-learning experiences. Prerequisite: SE 522. Credit, 3 hours.

544 *Public School Finance*. School budget procedures, accounting, revenues, state and county finance, and problems relating to financing public education. Prerequisite: Admission to Educational Administration program. Credit, 3 hours.

555 *School Plant Planning and Maintenance*. School building needs, educational planning for facilities, responsibilities of architects, duties of contractors, the equipping and furnishing of school buildings. Prerequisite: Admission to Educational Administration program. Credit, 3 hours.

566 *Human Relationships in Educational Administration*. The administrator's professional relationships with teachers, parents, pupils, and other educational leaders within the district. Factors in human relationships including communication skills, morale, authority, and perception through the case approach. Prerequisite: Admission to Educational Administration program. Credit, 3 hours.

568 *Supervision of Student Teaching.* Experiences and content for those planning to become supervisors of student teaching in teacher education programs. Also serves as in-service training for those already working in student teaching. Credit, 2 hours.

571 *School Business Management.* Purchasing, budgeting, accounting, payroll management, auditing, financial reporting, insurance, and administration of non-teaching personnel and services. Prerequisite: EA 544. Credit, 3 hours.

572 *School Insurance Programs.* Analysis of specific types of school insurance, procedures, and issues to consider in planning comprehensive insurance coverage for school districts. Prerequisite or co-requisite: EA 571. Credit, 2 hours.

573 *School Personnel Administration.* Organization for personnel services; development of policy to govern selection, orientation, placement, remuneration, transfers, separations; and development of morale among instructional and non-instructional personnel. Prerequisite: Admission to Educational Administration program. Credit, 3 hours.

577 *Elementary School Principalship.* Problem and laboratory approaches used to provide application of administrative principles and procedures to the administrative activities of elementary school principals. Prerequisite: Admission to Educational Administrative program and EA 533. Credit, 3 hours.

578 *Secondary School Principalship.* Problem and laboratory approaches used to provide application of administrative principles and procedures to the administrative activities of secondary school principals. Prerequisite: Admission to Educational Administration program and EA 535. Credit, 3 hours.

611 *Interdisciplinary Forces Affecting Educational Administration.* The inter-related nature of educational administration and the behavioral sciences. Prerequisite: 15 semester hours, Educational Administration. Credit, 3 hours.

622 *Public School Surveys.* The history and development of public school surveys, with a critical study of current practices, trends, and objectives. Practical experience provided in collecting and preparing survey data. Prerequisite: EA 522 and six additional hours in school administration. Credit, 2 hours.

674 *Legal Aspects of School Administration.* The legal relationships between school districts and other governmental units, boundary changes, bonding, and districts' responsibilities determined from constitutional, statutory, administrative, case and common law. Prerequisite: EA 474. Credit, 2 hours.

675 *State and County School Systems.* The function and responsibilities of state departments of education, of county or other intermediate districts. Prerequisite: Admission to Educational Administration program. Credit, 2 hours.

679 *Administration of the Junior College.* The organization and administration of public junior colleges with special emphasis

upon procedures, practices, and problems encountered in their operation. Prerequisite: Admission to Educational Administration program. Credit, 2 hours.

683 *Field Work*. Individual laboratory work in schools; related to the work of principals, supervisors, business managers, or superintendents. Prerequisite: Permission of Adviser. Credit, 4 hours.

684 *Internship*. Formalized administrative and supervisory experiences gained through direct working relationship with a school administrator or supervisor. Generally acquired through continuous application of time. Prerequisite: Permission of Adviser. Credit, 3-6 hours.

711 *Administrative Leadership*. Recent research pertaining to the administrative relationships with people. Emphasis given to teaching personnel, classified personnel, boards of education, and individuals or groups in the community. Prerequisite: 30 semester hours Educational Administration, or permission of instructor. Credit, 4 hours.

722 *Administration of Instructional Improvement*. Recent research relating to administrative and supervisory responsibilities for the improvement of the educational program. Emphasis given to effective processes of administrators, supervisors, consultants, and coordinators. Prerequisite: 30 semester hours Educational Administration, or permission of instructor. Credit, 4 hours.

733 *Administrative Management*. Recent research relating to school management. Emphasis given to the areas of school finance, law, building, transportation, food services, and supply management. Prerequisite: 30 semester hours Educational Administration, or permission of instructor. Credit, 4 hours.

784 *Internship*. Designed for selected doctoral candidates who can devote full time to an intern relationship within one or more school districts. Participants limited to those meeting criteria for departmental and district selection. Prerequisite: Permission of Department Chairman. Credit, 6-12 hours.

Special Graduate Courses. EA 590, 591, 592, 593, 690, 691, 692, 790, 791, 792. See page 226.

EDUCATIONAL PSYCHOLOGY AND GUIDANCE

PROFESSORS DAVIS (Lyc. 32), HEIMANN, STOUT, ASSOCIATE
PROFESSORS BAKER, GAFFNEY, SCHUTZ, STAFFORD

Educational Psychology

EP 411g *Educational Measurements and Evaluation*. Evaluation techniques and group tests of ability and achievement with special emphasis upon the interpretation and use of test results in the improvement of instructional and administrative procedure. Credit, 3 hours.

422 *Educational Psychology*. Psychology facts and laws particularly relevant to the problems of education. Prerequisite: 1-PY 100. Credit, 3 hours.

433g *Educational Statistics*. Designed as a terminal course for education majors not going on for advanced study, and as an introductory course for education majors at the graduate level. Descriptive statistics, the normal curve, introduction to chi square and correlational techniques, and the presentation and interpretation of statistical data in educational literature. Credit, 3 hours.

511 *Educational Psychology*. The psychological basis of education; development of human abilities; individual differences; the relationship of school activities to personality development; and introduction to learning and transfer of training. Prerequisite: BE 333. Credit, 3 hours.

522 *Directed Learning*. Theories of learning and experimental investigations in the field of human learning, with special emphasis on their applications to teacher-learning situations in the school. Prerequisite: EP 511. Credit, 3 hours.

525 *Individual Measurements in Education*. Individual test administration and experience in interpreting the results of the test to school personnel. Prerequisites: EP 411, 511, and approval of instructor. Credit, 3 hours.

533 *Statistical Methods in Education*. Appropriate statistical methods for analyzing educational data. Probability and small sample theory, chi square, correlation-regression techniques, analysis of variance, discriminant analysis and analysis of co-variance. Prerequisite: EP 433. Credit, 3 hours.

544 *Appraisal and Evaluation Techniques*. Factors involved in the construction of tests—formal and informal, old and new types. Practice in discovering and formulating objectives and in constructing techniques for ascertaining the extent of achievement of these objectives. Prerequisites: EP 411 and 433. Credit, 3 hours.

555 *Factor Analysis and Techniques of Data Processing*. Theory and methods of computation in factor analysis, application of modern data processing methods to large sample researchers, group testing programs, and pupil accounting. The coding and analysis of the mass data collected in such studies, using punch card procedures. Prerequisites: EP 411 and 433, or equivalents. Credit, 3 hours.

566 *Recent Studies in Educational Psychology*. A critical psychological analysis of school activities emphasizing what the literature has to say about application of current personality theory to the educative process. Prerequisite: Six hours of Educational Psychology. Credit, 3 hours.

711 *Educational Psychology*. Theory and research in educational psychology, and their implications for educational practice. Credit, 4 hours.

Special Graduate Courses. EP 590, 591, 592, 593, 690, 691, 692, 790, 791, 792. See page 226.

Guidance and Counseling

GC 411g *The Guidance Role of the Teacher.* An overview of the guidance services in schools with emphasis on the role of the teacher. Credit, 3 hours.

511 *Principles of Guidance.* The areas of guidance with consideration of the interrelation of the various guidance services found in schools. Prerequisite to other courses in the guidance sequence. Credit, 3 hours.

522 *Guidance Testing.* Standardized tests and their application in counseling psychology. The contribution of testing to the vocational, educational, and personal problems of youth. Prerequisite or co-requisite: GC 511. Credit, 3 hours.

533 *Educational and Occupational Information.* Selection, utilization, and evaluation of educational and occupational information materials. Familiarization with standard labor market data and materials, and sources of information concerning training opportunities. Prerequisite or co-requisite: GC 511. Credit, 2 hours.

544 *Analysis of the Individual.* Guidance techniques employed in the appraisal of the individual, including the interview, observation, rating scales, records and reports, autobiographies and other personal documents, case study, and case conference as applied to the secondary school. Prerequisite or co-requisite: GC 511. Credit, 3 hours.

555 *Techniques of Child Study.* Guidance techniques employed in the appraisal and study of children, including tests, interviews, inventories, records and reports, observations, rating scales, and the case study. Prerequisite or co-requisite: GC 511. Credit, 3 hours.

566 *Group Guidance.* Principles and techniques of group procedures used in the guidance program with emphasis on their application in group guidance courses. Prerequisites: GC 511, 522, 533, 544 or 555. Credit, 3 hours.

577 *Counseling.* Principles and application of counseling techniques with particular emphasis on the counseling interview. Prerequisites: GC 511, 522, 533, 544 or 555. Credit, 3 hours.

578 *Organization and Administration of Guidance Programs.* Organizational procedures and patterns, and administrative relationships of school personnel functioning in the guidance program. Prerequisites: GC 511, 522, 533, 544 or 555; and/or co-requisite 566, 577. Credit, 2 hours.

579 *Supervised Practice in Guidance.* Assignment in a public school guidance program and opportunity for experience under supervision. May also include experience in Guidance Center. Prerequisite: Approval of instructor. Credit, 2-6 hours.

580 *Practicum in Counseling*. Supervised experience in the campus Guidance Center. Includes counseling, testing, writing case reports, participation in case conferences, and utilization of occupational information materials. Credit, 1-6 hours.

780 *Practicum in Counseling*. Supervised experiences in counseling, testing, writing case reports, participation in case conferences, and utilization of occupational information materials. Credit, 1-6 hours.

Special Graduate Courses. GC 590, 591, 592, 593, 690, 691, 692, 790, 791, 792. See page 226.

EDUCATIONAL FOUNDATIONS

PROFESSOR AUSTIN; ASSOCIATE PROFESSORS WEISS (Matt. Hall 21), ABBOTT, BARNES, HELMSTADTER, HOOVER, MURRA, RALSTON; ASSISTANT PROFESSORS BELOK, MARTIN, MEADOR, OSWALT

Basic Education

BE 111 *Exploration of Education*. Social and ethical implications of modern day science as they relate to the education student, the profession of teaching, the historical development of American Public Education and the social factors influencing the school. Credit, 3 hours.

222 *Psychological Foundations of Education*. Childhood and youth; physical, motor, intellectual, social, emotional and moral development of students, and the observing, recording, and interpreting of human behavior; functional concepts of learning; modern theories of education. Prerequisite: BE 111. Credit, 3 hours.

333 *Issues in Teaching: An Interdisciplinary Approach*. Educationally significant historical, philosophical, psychological, and sociological issues through the methods of science. Prerequisite: BE 222. Credit, 3 hours.

522 *Education Workshop*. In-service workshop for teachers, supervisors, and administrators with emphasis on selected problems of interest to those enrolled. Credit, 3 or 6 hours.

533 *Conference in Education*. Seminar experiences in special conferences conducted by outstanding leaders in education. Individual conferences, reports, group work, and work on individual problems. Credit, 1-3 hours.

611 *Applied Project in Education*. A written project in the field of specialization. Required of students enrolled in the Ed. S. Program. Credit, 6 hours.

Special Graduate Courses. BE 500, 590, 591, 592, 593, 600, 690, 691, 692, 700, 790, 791, 792, 799. See page 226.

Social and Philosophical Foundations

SF 411g *History of American Education*. The social life, ideas, and institutions that have given direction to education in the United States. A background for understanding and evaluating present educational problems. Credit, 3 hours.

422g *Educational Sociology*. Education in relation to social institutions. Considers methods of gathering data in social research, the family, problems of educational reconstruction, social relationships, and social measurements. Credit, 3 hours.

433g *Philosophy of Education*. The philosophical foundations of contemporary educational ideas. Introductory considerations for the development of a philosophy of education. Credit, 3 hours.

511 *School and Society*. The interrelationship of school and society and the place of education in social change. Prerequisites: SF 433 or one from EE 479, 489; SE 444. Credit, 3 hours.

522 *Education and Democratic Values*. Education as a moral enterprise in which the school seeks to cultivate selected values by the subject matter and methods it employs in its program. Prerequisites: SF 433, or one from EE 479, 489; SE 444. Credit, 2 hours.

533 *Comparative Education in the Western World*. The educational systems and ideas of the leading nations of western Europe, the Soviet Union, and the British Commonwealth, with implications for education in the United States. Credit, 3 hours.

534 *Comparative Education in Asia, Africa, and Latin America*. Educational goals and methods for the technologically underdeveloped regions. Educational systems and ideas in Latin America, Asia, and Africa. Implications for education in the United States. Credit, 3 hours.

544 *Philosophic Foundations of Education*. The major points of view in contemporary educational thought, with considerable emphasis on the basic issues in general philosophy which are foundational to philosophies of education. Prerequisites: SF 433, or one from EE 479, 489; SE 444. Credit, 3 hours.

555 *Education Classics*. Selected documents from the past for the purpose of finding useful suggestions for dealing with present educational problems. Prerequisites: SF 433, or one from EE 489; SE 444. Credit, 2 hours.

566 *History of Education*. The development of educational institutions and ideas, in the Western World, from ancient times to the twentieth century. Credit, 3 hours.

711 *Historical and Social Foundations of Education*. Institutions, human relations and social forces influencing the nature of educational problems current in American society, with focus on historical and cultural perspectives. Prerequisite: SF 544. Credit, 4 hours.

722 *Recent Developments in Philosophy of Education.* Trends in contemporary educational thought. Prerequisite: SF 544. Credit, 4 hours.

Special Graduate Courses. SF 590, 591, 592, 593, 690, 691, 692, 790, 791, 792. See page 226.

EDUCATIONAL SERVICES

PROFESSORS ABRAHAM (Main 101), BENEDICT, VERGIS;
ASSISTANT PROFESSORS BELL, FIELDING, ROESSEL

Audio-Visual Education

AV 411g *Audio-Visual Materials and Procedures in Education.* Principles underlying the selection and use of materials for instructional purposes. Laboratory experiences include the operation of equipment and the selection, preparation, and evaluation of audio-visual materials. Two hours class, 3 hours laboratory. Credit, 3 hours.

412g *Audio-Visual Practices.* Application of principles emphasized in AV 411. Development of teaching aids and resource units. Prerequisite: AV 411. Credit, 2 hours.

422g *Radio and Television in Education.* For students and teachers interested in making more effective use of radio and television broadcasts in the classroom situation. Designed to acquaint teachers with the possibilities available and the means of adapting materials for learning experiences. Credit, 3 hours.

511 *Photography in Public Education.* A laboratory course in the fundamentals of photography and darkroom procedure. For the teacher who wishes to use photography in preparing instructional materials. Fee, \$10.00. One hour class, 3 hours laboratory. Credit, 2 hours.

522 *Production of Audio-Visual Materials.* Making of photographs, slides, filmstrips, motion pictures, and recordings. Preparation of scripts. Technical problems of production. Prerequisite: AV 511. Fee, \$10.00. One hour class, 3 hours laboratory. Credit, 2 hours.

533 *Administration of Audio-Visual Programs.* The qualifications and duties of the director, preparing the budget, buying equipment, handling materials, in-service training, and evaluation of the program. Credit, 2 hours.

544 *Graphic Arts in Education.* Graphic techniques, including lettering, simple sketching, cartooning, silk-screen and other duplicating processes. Credit, 3 hours.

555 *Educational Television*. Designed to acquaint teachers with methods of teaching via television. Planning, preparation, and production of telecourses. Credit, 3 hours.

Special Graduate Courses. AV 590, 591, 592, 593, 690, 691, 692, 790, 791, 792. See page 226.

Indian Education

IE 311 *Indian Education*. Foundations and history of Indian Education and present day implications. Credit, 3 hours.

322 *Methods and Materials for Teaching Indian Children*. Materials and methods particularly suited to the education of Indian students. Effective use of local and tribal materials in the classroom. Experimentation with new ideas provided. Credit, 3 hours.

333 *Curriculum and Practices for Indian Education*. Curriculum problems and recommended practices for Indian Education. Review of past and present Bureau of Indian Affairs and public school curriculums. Specific techniques examined for curriculum improvement in Indian Education. Credit, 3 hours.

490g *Problems of Teachers of Indian Children*. Current issues, trends and general problems encountered by teachers of Indian children. Oral English, written English, and reading receive special emphasis. Current research reviewed and evaluated. Credit, 3 hours.

511 *School-Community Relations in Indian Education*. Specific techniques and methods utilized in realizing harmonious and effective relations between the school with Indian children and the community in which these children live. Credit, 3 hours.

522 *Education of Indian Adults*. Methods used to establish Indian Adult Education; principles involved in determining course selection and course content; successful Indian Adult Education programs and their essential ingredients. Credit, 3 hours.

533 *Guidance for the Indian Student*. Problems faced in providing adequate guidance services for Indian students and the necessity for cultural understanding in guidance. Consideration given to the effect of tribal values and their relationship to effective guidance. Credit, 3 hours.

544 *Community Development in Indian Education*. Methods and techniques for initiating community development programs in Indian communities; the role and responsibilities of school personnel, community leaders, and individuals. Credit, 3 hours.

Special Graduate Courses. IE 590, 591, 592, 593, 690, 691, 692. See page 226.

Special Education

SP 311 *Orientation to Education of Exceptional Children*. Exceptional child categories, including gifted, mentally retarded,

sight, hearing, speech, emotionally disturbed, and others. This orientation will include observation of exceptional children in classroom situations. Credit, 3 hours.

420g *Speech Correction for the Classroom Teacher.* The role of the teacher in understanding and aiding speech and hearing development in normal and speech-defective children with emphasis upon the recognition and prevention of disorders. May not be counted toward the major in speech and drama. Credit, 3 hours. (Same as 1-SE 420g.)

455g *Education of the Hearing-Handicapped.* Curriculum and techniques in pre-schools primary and intermediate levels. Consideration of the psychological correlates of hearing handicaps and their effect upon the child, the family and the community. Philosophy and methods of language and speech development. Credit, 3 hours.

456g *Education of the Hearing-Handicapped.* Language and speech development, reading techniques and the teaching of elementary subjects to the hearing handicapped. Prerequisite: SP 455. Credit, 3 hours.

511 *Workshop in Education of the Exceptional Child.* Exceptional children, consisting of the following groups: Mentally retarded; gifted; emotionally maladjusted; visual, speech, and hearing handicaps; orthopedically handicapped; bilingual; others. The workshop method is followed, including the participation of consultants and speakers, films, other audio-visual aids, visits to appropriate schools and other institutions, and cooperation with organizations working in these fields. Credit, 6 hours.

522 *Experience in Exceptional Child Clinics.* Provides experience with exceptional children in cooperating clinics, organizations, and institutions in Arizona which work with mentally retarded, orthopedic, sight, speech, hearing, bilingual, and other areas in special education. Pre-registration necessary. Prerequisites: SP 511 and teaching experience. Credit, 6 hours.

523 *Participation with Gifted Children.* Intensified study and participation with gifted children in either a campus or community setting. The course will be organized around both a college class for background study and research and a special class of gifted children. Prerequisites: SP 511 or experience in working with exceptional children in this category, and teaching experience. Credit, 6 hours.

524 *Participation with Cerebral Palsy Children.* Intensified study and participation with cerebral palsy children in either a campus or community setting. This course will be organized around both a college class for background study and research and a special class of cerebral palsy children. Prerequisites: SP 511 or experience in working with exceptional children in this category, and teaching experience. Credit, 6 hours.

533 *The Bilingual Child*. Spanish-American and Indian Children, including their educational needs, material and methods appropriate to their backgrounds and language problems. Credit, 3 hours.

544. *The Orthopedically Handicapped Child*. Orthopedically handicapped children, including their needs and characteristics, appropriate materials and teaching methods, teacher qualifications, educability, definitions, and terminology. Among the specific categories to be covered in this course are children with orthopedic, cardiac, tubercular, and glandular handicaps. Credit, 3 hours.

555 *The Child with Hearing Problems*. Children with hearing disabilities of either a partial or complete nature, including their needs and characteristics, appropriate materials and teaching methods, teacher qualifications, educability, definitions, and terminology. Study of the hearing-handicapped child in the regular classroom situation and in special classes. Credit, 3 hours.

566 *The Visually Handicapped Child*. Visually handicapped children, including their needs and characteristics, appropriate materials and teaching methods, teacher qualifications, definitions, and terminology. Credit, 3 hours.

577 *The Mentally Retarded Child*. Mentally retarded children, appropriate materials and methods, teacher qualifications, educability, and special problems. Credit, 3 hours.

588 *The Gifted Child*. Gifted children, including their needs and characteristics, appropriate materials and methods, and teacher qualifications. Emphasis is placed on the techniques and values related to acceleration, enrichment, and special classes, and to the research of Terman, Hollingworth, Witty, and others. Credit, 3 hours.

Special Graduate Courses, SP 590, 591, 592, 593, 690, 691, 692, 790, 791, 792. See page 226.

LIBRARY SCIENCE

PROFESSOR BATCHELOR (Lib. 102); ASSISTANT PROFESSOR
MOFFIT

Library Science

LS 213 *Library in the Modern School*. A classroom teacher's introduction to school library materials, organization and services. Special emphasis on most frequently used ready-reference materials and on procedures for using the library in teaching. No credit on Library Science minor. Credit, 3 hours.

223 *Books, Libraries, and Society*. Librarianship as a profession; its leaders, organizations, objectives, and varieties of present day services. Orientation of the student to his place in the profession. Credit, 3 hours.

441g *Dewey Decimal Classification*. The principles and applications of subject classification, cross indexing, and the assigning of Cutter numbers. Credit, 2 hours.

442g *Descriptive Cataloging*. The purpose and principles of cataloging library materials with emphasis upon the use of both printed and typewritten cards. Knowledge of touch-typing necessary. Prerequisite: LS 441 or concurrent registration. One lecture, 3 hours laboratory. Credit, 2 hours.

461g *Library Book Selection*. Criteria, problems, and policies in the selection of books for the school and public library. Attention given to guides and aids, publishers, dealers, and reading interests of the patron, and others. Credit, 2 hours.

463g *Library Materials for Children*. Books and related materials for children's libraries and in the elementary school program. Criteria for selection and procedures for integrating vital materials into the school curriculum and/or free-reading program in both the school and public library. Prerequisite: LS 461 or approval of instructor. Credit, 3 hours.

464g *Library Materials for Adolescents*. Books and related materials for youth libraries and in the secondary school program. Criteria for selection and procedures for integrating vital materials into the school curriculum and/or free-reading program in both the school and public library. Prerequisite: LS 461 or approval of instructor. Credit, 3 hours.

471g *Basic Reference Resources*. Content and use of the basic ready-reference works such as encyclopedias, dictionaries, periodical indexes, biographical dictionaries, atlases, yearbooks, directories, handbooks, and general bibliographies. Credit, 3 hours.

481g *Library Administration*. Organization and administration of the school and small public library, its backgrounds, activities, functions, personnel, materials, and equipment. Prerequisites: LS 441, 442, 461, 471. Credit, 3 hours.

493g *Library Science Workshop*. Selected library problems, directed by the regular staff and/or visiting specialists. For in-service librarians with no fewer than 15 credits in Library Science. Others by approval of the instructor. Credit, 3 hours.

511 *Cataloging Administration*. The administrative problems of maintaining a cataloging department with special emphasis on the problems of centralized cataloging for the school district and/or public library system. Prerequisites: LS 441 and 442. Credit, 2 hours.

522 *Bibliography in Subject Fields*. Critical evaluation of the most frequently used reference materials in the humanities, the sciences, and the social sciences. Special emphasis on government publications. Prerequisite: LS 471 or approval of instructor. Credit, 3 hours.

533 *Current Library Problems.* Professional reading and discussion on current issues in librarianship as related particularly to supervision in school districts and/or public library systems. Prerequisite: LS 481 or approval of instructor. Credit, 2 hours.

544 *Reading and Communication.* The integration of instructional materials with classroom procedures. Methods for teaching library skills. Reader guidance techniques and the total reading program of the school. Credit, 3 hours.

Special Graduate Courses. LS 590, 591, 592, 593. See page 226.

Engineering

PROFESSORS LEE P. THOMPSON (EC 111), BARKSON, BEAKLEY, GAMBRELL, KERSTEN, OSTLE, PIAN, REISER, RICE, RIESE, STAFFORD, SUTTON, T. B. THOMPSON, TURNBOW; ASSOCIATE PROFESSORS ALLEN, AVERY, AX, DITSWORTH, FRY, MANTHART, NEWLIN, NUTT, RUFF, STEIN, STEINMANN, WALLACE, WOOLDRIDGE; ASSISTANT PROFESSORS CRAIG, HILL, KLOCK, MELVIN, RUSSELL, WALLACK, WILCOX, ZIMMER; INSTRUCTORS AUTORE, BORGIO, HAWLEY, TARTAR

Chemical Engineering

KE 211, 212 *Chemical Process Calculations.* Principles of physics and chemistry applied to the formulation of material and energy balances for process industries. Prerequisites: 1-CH 114, ME 102. Co-requisite: 1-MA 121. Credit, 2 hours each semester.

320 *Metallurgy.* Metallurgy of iron, steel and non-ferrous alloys; atomic and crystal structure; welding, brazing, and soldering. For non-engineering majors. Prerequisite: 1-CH 114. Two lectures, 3 hours laboratory. Credit, 3 hours.

321 *Metallurgy.* Metallurgy of iron, steel and alloys: atomic structure, crystal structure, and micro-structure of materials. Prerequisites: 1-CH 114, 1-PH 251. Two lectures, 3 hours laboratory. Credit, 3 hours.

331 *Transport Processes.* Development and application of the principles of momentum, energy, and mass transfer. Prerequisite: KE 212. Co-requisite: 1-MA 220. Credit, 4 hours.

332 *Chemical Engineering Operations.* Process operations including distillation, extraction, absorption, drying, crystallization, filtration, materials handling and preparation. Prerequisite: KE 331. Credit, 4 hours.

422 *Metallurgy.* Extraction of metals, crystal and atomic structure, phase transformations, tests and properties of high temper-

ature metals and refractories, and introduction to spectroscopy. Prerequisite: KE 321 or 1-CH 441. Two lectures, 3 hours laboratory. Credit, 3 hours. (Same as 1-CH 425.)

441, 442 *Chemical Process Principles*. Physio-chemical principles including thermodynamics and kinetics applied to the process industries. Prerequisite: 1-CH 441. Credit, 3 hours each semester.

445g *Nuclear Materials Processing*. Chemical processing of nuclear materials for the production and recovery of fuel. Separation and recovery of radioactive by-products. Co-requisite: KE 332. Credit, 3 hours.

451, 452 *Chemical Engineering Laboratory*. Operation, control and design of experimental and industrial process equipment. Co-requisite: KE 332. Six hours laboratory. Credit, 2 hours each semester.

461g *Process Control*. Process dynamics, instrumentation, and feedback applied to automatic process control. Prerequisites: 1-MA 220, ES 371 or KE 331. Credit, 3 hours.

462 *Process Design*. Application of economic principles to optimize equipment selection and design; development and design of process systems. Prerequisites: KE 331, 441. Credit, 3 hours.

471g *Applied Chemistry*. Application of chemistry to agriculture, mining, water, sanitation, and fuels. Credit, 3 hours.

474g *Chemical Technology*. Selected processes and operations in which fundamental physio-chemical and mathematical principles are applied. Prerequisites: KE 332, 441. Credit, 3 hours.

521 *Extractive Metallurgy*. Principles and unit processes by which metals are extracted from their naturally occurring ores and other raw material sources. Credit, 3 hours.

571 *Electrochemical Engineering*. Principles of electrochemical reactions applied to selected topics such as chemical production, electroplating, electro dialysis, and fuel cells. Prerequisite: 1-CH 442. Credit, 3 hours.

572 *Fuel and Energy Utilization*. Fuel costs in the supply of electrical power and steam generation; trends in the use of nuclear energy. Credit, 3 hours.

581 *Chemical Process Analysis*. Mathematical analysis and development of chemical process operations. Credit, 3 hours.

Special Graduate Courses, KE 500, 590, 591, 592, 593. See page 226.

Civil Engineering

CE 241 *Surveying*. Theory and field work in construction and land surveys. Prerequisite: 1-MA 118. One lecture, 6 hours laboratory. Credit, 3 hours.

311 *Materials of Engineering*. Structural and behavioral characteristics, engineering properties measurement, and applications of engineering materials. Prerequisite: CE 321. One lecture, 3 hours laboratory. Credit, 2 hours.

321 *Structural Mechanics*. Introduction to various methods of structural analysis such as area moment, slope deflection, moment distribution, and work-energy with discussion of principles of reciprocity and superposition to provide the necessary analytical tools requisite to rational structural design. Prerequisite: ES 321. Three lectures, 3 hours laboratory. Credit, 4 hours.

342 *Surveying*. Precise traverse triangulation, azimuth determination, and leveling; errors and correction; plane coordinate systems. Elements of photogrammetry, topographic mapping, hydrographic, mine, and special surveys. Prerequisite: CE 241. One lecture, 6 hours laboratory. Credit, 3 hours.

343 *Surveying and Geodesy*. Methods of geodetic surveying. Adjustment of observations. Geodetic positions. Map projections. Prerequisite: CE 342. One lecture, 6 hours laboratory. Credit, 3 hours.

344 *Route Surveying*. Simple, compound and transition curves, reconnaissance, preliminary, and location survey. Calculation of earthwork. Prerequisite: CE 241. Two lectures, 3 hours laboratory. Credit, 3 hours.

380 *Hydraulic Engineering*. Analysis of flow in pressure conduits and open channels. Applications in irrigation, drainage, hydroelectric power, river navigation, flood control, and multiple-purpose projects. Three lectures, 3 hours laboratory. Prerequisite: ES 371. Credit, 4 hours.

381 *Hydrology*. Elementary meteorology, climatology, hydrologic cycle, precipitation, evaporation and transpiration, hydrograph analysis; subsurface water; frequency analysis; water law. Co-requisite: ES 371. Credit, 2 hours.

423 *Structural Design*. Planning and design of metal structures such as plate girders, industrial or mill type buildings, and simple frames. Selected details and drawings required. Prerequisite: CE 321. Three lectures, 3 hours laboratory. Credit, 4 hours.

424 *Structural Design*. Planning and design of concrete structures such as simple bridges, with and without pre-stressed members, retaining walls, and reinforced concrete frames. Selected details and drawings required. Prerequisite: CE 321. Three lectures, 3 hours laboratory. Credit, 4 hours.

431g *Theory of Structures*. Analysis of girders, arches, and bents. Methods of analysis include generalized area moment, slope deflection, moment distribution, and virtual work. Prerequisite: CE 321 or ES 422. Credit, 3 hours.

432g *Theory of Structures*. Analysis of continuous frames, complex frames, multi-story buildings, towers and frames with bent and curved members. Prerequisite: CE 431. Credit, 3 hours.

441g *Photogrammetry*. Mapping and surveying using aerial photographs and stereoscopic plotters. Prerequisite: CE 342. One lecture, 6 hours laboratory. Credit, 3 hours.

451 *Soil Mechanics*. Index properties and engineering characteristics of soils. Compaction, shear, compressibility, and permeability. Prerequisites: CE 311 and 321. Two lectures, 3 hours laboratory. Credit, 3 hours.

452g *Soil Mechanics*. Applications of soil mechanics to retaining walls, slope stability, highways, earth dams, and foundations. Prerequisite: CE 451. Two lectures, 3 hours laboratory. Credit, 3 hours.

461 *Sanitary Engineering*. Elements of surface and ground water hydrology, design of impoundment and distribution systems, water quality requirements, and fundamentals of water treatment processes. Prerequisite: CE 380. Credit, 3 hours.

462 *Sanitary Engineering*. Design of domestic and storm sewer systems, fundamentals of waste treatment processes and plant design. Solid waste disposal. Prerequisite: CE 380. Credit, 3 hours.

463g *Sanitary Chemistry Laboratory*. Chemical and biological analysis of water, sewage, and industrial wastes; laboratory procedures for the control of water and sewage treatment processes. Prerequisite: CE 461. Two lectures, 3 hours laboratory. Credit, 3 hours.

471g *City Planning*. Municipal organization and administration; public health, public utilities, services, zoning, replanning, critical studies. Prerequisite: Approval of instructor. Credit, 3 hours.

472 *Highway Engineering*. Highway, intersection and interchange design and geometrics. Administration, planning and operation. Co-requisite: CE 451. Credit, 3 hours.

473g *Municipal Engineering*. Engineering and legal problems of the city engineer, city government, city surveys, subdivision design, building codes, legal procedures for making public improvements. Prerequisite: Approval of instructor. Credit, 3 hours.

481g *Hydraulic Structures*. Principles of design of dams, spillways, gates, control structures, energy dissipators, channels and transitions, conduits; economic aspects. Prerequisite: CE 380. Credit, 3 hours.

482g *Hydraulics of Open Channels*. Basic principles; theory of uniform, gradually varied, rapidly varied, and unsteady flow. Prerequisite: CE 380. Credit, 3 hours.

525 *Structural Design*. Design of simple and continuous bridges with constant or variable moments of inertia utilizing steel, concrete, prestressed concrete and/or composite structural members. Prerequisites: CE 423, 424. Two lectures, 3 hours laboratory. Credit, 3 hours.

526 *Structural Design*. Structural design of buildings and frames (elastic and plastic). Methods of framing, wind and earthquake forces; special systems. Prerequisites: CE 423 and 424. Co-requisite: CE 431. Two hours lecture, 3 hours laboratory. Credit, 3 hours.

527 *Concrete Structures*. Elastic, ultimate strength and yield line theory. Deflection, torsion, shrinkage and plastic flow. Prestressed concrete; special systems. Prerequisites: CE 423 and 424. Credit, 3 hours.

528 *Structural Design*. Continuous truss, arch, and suspension systems. Prerequisite: CE 533. Two lectures, 3 hours laboratory. Credit, 3 hours.

529 *Structural Design*. Special problems in structural design to include continuous prestressed concrete structures, complex plastic frames with non-static loads, and other selected topics. Prerequisites: CE 526 and 527. Two lectures, 3 hours laboratory. Credit, 3 hours.

533 *Theory of Structures*. Analysis of box frames, truss frames, vierendeel trusses and trusses in general. Secondary stresses, Castigliano theorem, superposition theorem, reciprocal theorem, and relaxation. Prerequisites: CE 431. Credit, 3 hours.

534 *Theory of Structures*. Three dimensional analysis of beams, arches, bents, frames, towers, and trusses. Prerequisite: CE 431. Credit, 3 hours.

535 *Plate Structures*. Analysis and design of plate structures. General theory of circular and rectangular plates. Investigation of folded plates. Prerequisite: CE 431g and 1-MA 462g. Two lectures, 3 hours laboratory. Credit, 3 hours.

536 *Shell Structures*. Analysis and design of shell structures. General theory of cylindrical spherical and parabolic shells. Prerequisite: CE 535. Two lectures, 3 hours laboratory. Credit, 3 hours.

553 *Theoretical Soil Mechanics*. Fundamental structure and properties of soils. Formation of soils, clay mineralogy, and soil structure. Theory of consolidation. Prerequisite: CE 451. Two lectures, 3 hours laboratory. Credit, 3 hours.

554 *Theoretical Soil Mechanics*. Shear strength of soils and shear test techniques. Earth pressure theories, and stability of slopes. Prerequisite: CE 451. Two lectures, 3 hours laboratory. Credit, 3 hours.

555 *Applied Soil Mechanics*. Application of theoretical soil mechanics to engineering problems. Loads on retaining walls, anchored bulkheads, footings, pile foundations. Site investigation and sampling techniques. Prerequisite: Approval of instructor. Two lectures, 3 hours laboratory. Credit, 3 hours.

556 *Seepage and Earth Dams.* The flow of water through soils. Pore water pressure. Emphasis on flow nets and the design of earth dams. Prerequisite: CE 451. Two lectures, 3 hours laboratory. Credit, 3 hours.

561 *Theory and Design of Water Treatment Facilities.* Theory and design of processes used in the supply and treatment of water. Prerequisite: CE 461 or equivalent. Credit, 3 hours.

562 *Theory and Design of Waste Treatment Facilities.* Theory and design of waste treatment and disposal systems. Prerequisite: CE 462 or equivalent. Credit, 3 hours.

563 *Sanitary Engineering Processes Laboratory.* Laboratory study of unit processes involved in water and waste treatment. One lecture, 3 hours laboratory. Prerequisite: Approval of instructor. Credit, 2 hours.

567 *Atmospheric Pollution.* Study of selected topics including atmospheric composition and dynamics, origins and chemistry of contamination, biological significance, analytical measurement, engineering control methods and air pollution legislation. Prerequisite: Approval of instructor. Credit, 1-3 hours.

568 *Epidemiology and Public Health Engineering.* Study of selected topics including biology and transmission of diseases, mathematical theory of epidemics, sanitation and public health administration. Prerequisite: Approval of instructor. Credit, 1-3 hours.

571 *Transportation Engineering.* Highway, airfield, and railroad administration; planning and design. Consideration of utilization, velocities and flow patterns. Prerequisite: CE 451 and CE 472. Credit, 3 hours.

572 *Design of Highway and Airport Pavements.* Design practices, materials, and testing of flexible and rigid pavements. Prerequisites: CE 451 and CE 472. Two lectures, 3 hours laboratory. Credit, 3 hours.

581 *Hydrology.* Advanced hydrologic principles. Hydrologic measurements, statistical analysis of data; design storms, flood routing; ground water theory. Prerequisite: CE 381. Credit, 3 hours.

583 *Flood Management.* Floods and their causes; flood forecasting; social, economic and administrative aspects; design of flood control works. Prerequisite: CE 380. Credit, 3 hours.

584 *Theoretical and Applied Hydraulics.* History of hydraulics; hydraulic similitude; pressure conduits; waves and surges; mechanics of sediment transport. Special topics. Prerequisite: CE 380. Credit, 3 hours.

585 *Hydraulic Laboratory.* Experimental investigations of hydraulic model laws, open channel models, hydraulic structures, sediment transport, energy dissipation. Prerequisite: Approval of instructor. Credit, 1-3 hours.

587 *Hydraulic Design*. Analytical and experimental investigation of problems of typical hydraulic design. Prerequisite: Approval of instructor. Credit, 1-3 hours.

588 *Water Resources Development*. Engineering, administrative and economic problems of a regional water resources development program. Evaluation of a river basin in the area. Prerequisite: Approval of instructor. Credit, 3 hours.

Special Graduate Courses. CE 500, 590, 591, 592, 593. See page 226.

Electrical Engineering

EE 301 *Electrical Networks*. Mathematical analysis of networks and linear systems. Prerequisites: ES 231, 1-MA 220. Three lectures, 3 hours laboratory. Credit, 4 hours.

302 *Electrical Networks*. Continuation of EE 301. Prerequisite: EE 301. Credit, 3 hours.

326 *Numerical Methods*. Numerical analysis and digital computer applications. Prerequisite: 1-MA 220. Two lectures, 3 hours laboratory. Credit, 3 hours.

331 *Electronic Engineering*. Electronic theory circuits. Prerequisite or co-requisite: EE 301. Three lectures, 3 hours laboratory. Credit, 4 hours.

332 *Electronic Engineering*. Continuation of EE 331. Three lectures, 3 hours laboratory. Prerequisites: EE 301, 331. Credit, 4 hours.

341 *Electromagnetic Fields*. Field theory. Prerequisite: ES 231, 1-MA 362 or 460. Credit, 3 hours.

362 *Energy Conversion*. Energy conversion with emphasis on electro-mechanical methods. Prerequisite: EE 301. Credit, 3 hours.

401 *Electrical Networks*. Design and analysis of 2 and 4 terminal passive networks. Prerequisite: EE 302. Three lectures, 3 hours laboratory. Credit, 4 hours.

402g *Electrical Networks*. Analysis of passive networks. Prerequisite: EE 401. Credit, 3 hours.

410g *Pulse Techniques*. Analysis and synthesis of pulse circuits. Prerequisites: EE 302, 332. Credit, 3 hours.

420g *Switching Networks*. Application of Boolean algebra to the analysis and design of switching networks. Credit, 3 hours.

421g *Digital Computers*. Arithmetic operations. Prerequisite: EE 420. Two lectures, 3 hours laboratory. Credit, 3 hours.

422g *Digital Computers*. Arithmetic operations digital computer components, and circuits. Prerequisites: EE 332 and 420. Credit, 3 hours.

425g *Analog Computers*. Electrical analogs of physical systems. Prerequisite: EE 302. Two lectures, 3 hours laboratory. Credit, 3 hours.

426g *Numerical Methods*. A continuation of EE 326. Credit, 3 hours.

429g *Computing Techniques*. Direct analog principles; basic digital computing methods and differential analyser methods. Prerequisite: EE 301. Credit, 3 hours.

435g *Communication Theory*. Information transmission, modulation, and noise. Three lectures, 3 hours laboratory. Prerequisite: EE 332; Prerequisite or co-requisite: EE 401. Credit, 4 hours.

445g *Microwaves*. Microwave devices and systems. Prerequisite: EE 341. Three lectures, 3 hours laboratory. Credit, 4 hours.

450g *Electron Devices*. Electron device theory. Prerequisites or co-requisites: EE 341 and PH 361. Credit, 3 hours.

461g *Electrical Machinery*. Continuation of EE 362. Three lectures, 3 hours laboratory. Prerequisite: EE 362. Credit, 4 hours.

462g *Motor Applications and Control*. Application of d-c and a-c motors and associated control circuits. Prerequisite or co-requisite: EE 461. Two lectures, 3 hours laboratory. Credit, 3 hours.

471g 472g *Electric Power Systems*. Elements of power-system analysis. Prerequisite: EE 362. Credit, 3 hours each semester.

475g *Economics of Public Utilities*. Economic, legislative, and administrative problems in the regulation of public utility rates and service standards. Public utility costs, pricing policies, rates, plant utilization, and competition. Credit, 3 hours.

480g *Feedback Control Systems*. Closed-loop electrical, mechanical, and hydraulic control systems. Prerequisites: EE 302, 362. Three lectures, 3 hours laboratory. Credit, 4 hours.

485g *Industrial Electronics*. Theory and application of electronics to the industrial field. Prerequisite: EE 331 and prerequisite or co-requisite: EE 461. Two lectures, 3 hours laboratory. Credit, 3 hours.

490 *Electroacoustics*. Acoustical theory. Prerequisite: EE 341. Credit, 2 hours.

495g *Magnetics*. Theory and design of cores, coils, magnetic amplifiers, toroidal transformers, linear and non-linear inductors and associated circuitry. Prerequisites: EE 302, 362. Two lectures, 3 hours laboratory. Credit, 3 hours.

EE 501 *Passive Networks*. Analysis and synthesis of linear one-port networks. Prerequisites: EE 401 and 1-MA 461. Credit, 3 hours.

EE 502 *Passive Networks*. Analysis and synthesis of linear two-port networks, including approximation techniques. Prerequisite: EE 501. Credit, 3 hours.

503 *Active Networks*. Analysis and synthesis of quasi-linear networks containing general active elements. Prerequisite: EE 480, 502. Credit, 3 hours.

510 *Pulse Techniques*. Continuation of EE 410. Prerequisite: EE 410. Credit, 3 hours.

520, 521 *Design of Digital Systems*. Boolean algebraic equations and sequential circuit theory. Prerequisite: EE 420. Credit, 3 hours each semester.

522 *Digital Computer Design*. Design of circuitry for electronic digital computers. Prerequisites: EE 410, 420. Credit, 3 hours.

523 *Control Computers*. Computers for process control. Prerequisites: EE 422, 425. Credit, 3 hours.

525 *Analog Computer Design*. Design of circuitry of electronic analog computers. Prerequisite: EE 425. Credit, 3 hours.

526 *Conversion Techniques*. Theory of sampling, quantizing and coding. Current analog-digital conversion techniques. Prerequisites: EE 420, 425. Credit, 3 hours.

530 *Wave Theory*. Development of the engineering quantum approach to the theory of solid-state devices. Prerequisite: EE 450. Credit, 3 hours.

531, 532 *Solid State Devices*. Theory of solid-state devices. Prerequisite: EE 530. Credit, 3 hours each semester.

535 *Advanced Electronics*. Signal-flow graphs, parametric amplification, active filters. Prerequisites: EE 332, 401. Credit, 3 hours.

536 *Noise Theory*. Analysis and filtering of random signals in communications. Prerequisite: EE 435. Credit, 3 hours.

541 *Electromagnetic Fields*. Electromagnetic fields, forces, matter, and energy, in stationary and moving systems. Prerequisite: EE 341. Credit, 3 hours.

542 *Electromagnetic Waves*. Radiation and propagation, wave guides, antennas, reflection, refraction, diffraction. Prerequisite: EE 541. Credit, 3 hours.

543 *Antennas*. Analysis and synthesis of various radiating structures and systems. Prerequisite: EE 541. Credit, 3 hours.

544 *Electromagnetic Theory*. Selected topics from current literature. Prerequisite: EE 541 or equivalent. Credit, 3 hours.

545 *Microwave Tubes*. Ion dynamics, space charge, and analysis of magnetrons, klystrons, and traveling wave tubes. Prerequisites: EE 445, 541. Credit, 3 hours.

546 *Electromagnetic Waves in Ionized Media*. Wave propagation in ionized media, with applications to magnetohydrodynamics and space communication. Prerequisite: EE 541. Credit, 3 hours.

- 550 *Applied Operational Math in Electrical Engineering.* Application of various transforms to advanced Electrical Engineering problems. Prerequisite: 1-MA 462 or equivalent. Credit, 3 hours.
- 560 *Electrical Machinery.* Topics in d-c and a-c machinery and controls. Prerequisite: EE 461. Credit, 3 hours.
- 562 *Symmetrical Components.* Theory and application of symmetrical components to the analysis of power systems and machines. Prerequisite: EE 461. Credit, 3 hours.
- 564 *Power System Stability.* Transient and steady-state stability limits of power systems. Prerequisites: EE 461, 471. Credit, 3 hours.
- 566 *Protective Systems.* Theory and application of protective relays and other devices to power systems and machines. Credit, 3 hours.
- 568 *Synchronous Machines.* Prerequisite: EE 461. Credit, 3 hours.
- 570 *Power-Systems.* Theory and application of power-system apparatus. Prerequisite: EE 471. Credit, 3 hours.
- 572 *High-Voltage Engineering.* High-voltage sources, breakdown, measurements, and transmission. Prerequisite: EE 471. Credit, 3 hours.
- 574 *Unconventional Power Sources.* Energy conversion devices and systems other than conventional rotating machines. Prerequisite: EE 461. Credit, 3 hours.
- 575 *Analysis of Power Networks.* Tensor and Matrix methods applied to problems involving extensive complex circuits. Prerequisite: EE 471. Credit, 3 hours.
- 580 *Feedback Control Systems.* Continuation of EE 480, with emphasis on system design. Prerequisite: EE 480. Credit, 3 hours.
- 581 *Random Process Control.* Application of probability theory in control systems. Prerequisite: EE 480. Credit, 3 hours.
- 582 *Information Theory.* Discrete systems and continuous signals; signal space and noise reduction. Credit, 3 hours.
- 583 *Sampled-data Systems.* Theory and operation of systems in which data are transmitted in discrete form. Prerequisite: EE 480. Credit, 3 hours.
- 584 *Analysis of Control Components.* Transfer functions of hydraulic, pneumatic, mechanical, and electrical devices. Prerequisite: EE 480. Two lectures, 3 hours laboratory. Credit, 3 hours.
- 585 *Guidance Systems.* Theory, design, and analysis of guidance systems. Prerequisite: EE 480. Credit, 3 hours.

586 *Non-Linear Systems*. Non-linear vibrations and oscillations in physical systems. Prerequisite: EE 480. Credit, 3 hours.

Special Graduate Courses, EE 500, 591, 592, 593. See page 226.

Engineering Science

ES 211 *Engineering Mechanics*. Force systems, resultants, equilibrium, distributed forces, beams, fluid statics, friction, virtual work, and first and second moments of areas and masses. Prerequisite: ME 102; Co-requisite: 1-MA 212. Credit, 3 hours.

231 *Electrical Science*. Concepts and inter-relations of electromagnetic field theory and network theory. Prerequisite: 1-MA 212. Credit, 4 hours.

312 *Engineering Mechanics*. Kinematics: Rectilinear and curvilinear motion, relative velocities and accelerations, moving frames of reference. Kinetics: Newton's laws, plane motion of rigid bodies; work-energy and impulse-momentum principles, conservation of energy and momentum; impact; variable mass systems. Co-requisite: 1-MA 220. Credit, 3 hours.

320 *Man and Machine*. How the processes of mechanical invention and technical progress affected, and were in turn affected by, the evolution of social forms and institutions. Credit, 2 hours.

321 *Mechanics of Materials*. Concepts of stress and strain, Hooke's law; strength and deflection of axial force members, shafts in torsion and beams in flexure; combined stress; stability of columns. Prerequisite: ES 211; co-requisite: 1-MA 220. Credit, 3 hours.

350 *Theory of Material Properties*. Kinetic theory. Atomic structure. Structure of gases, liquids, and solids. Elasticity, plasticity, viscosity, thermal conductivity, diffusion, specific heat, and electrical conductivity. Prerequisites: ES 321, 381, 1-PH 361. Credit, 2 hours.

371 *Fluid Mechanics*. Formulation of the laws of fluid mechanics from those of dynamics and thermodynamics. Consideration of ideal and real fluids. Prerequisites: ES 312, 381, or 1-CH 441. Credit, 3 hours.

381 *Thermodynamics*. Study of work, heat and energy, transformations and relation to the states of matter. Laws, concepts and modes of analysis common to all application of thermodynamics in engineering. Prerequisite: 1-MA 212. Credit, 3 hours.

400 *Technical Communications*. Composition for technical papers, reports and scientific articles suitable for publication. Oral and written presentation. Credit, 3 hours.

421 *Vibrations*. Harmonic and periodic motion: damped and undamped free vibrations, forced vibrations. Many degrees of freedom; coupled vibration; Holzer and Rayleigh methods. Prerequisites: ES 312, 1-MA 220. Credit, 3 hours.

422 *Mechanics of Materials*. Shear flow theory, shear center, statically indeterminate members, and energy methods. Prerequisite: ES 321. Credit, 2 hours.

465g *Applied Vector Analysis and Matrices*. Vectors, matrices and tensors, with applications to engineering analysis. Prerequisite: 1-MA 460. Credit, 3 hours.

471, 472 *Engineering Research and Development*. Projects of a research design or development nature. A student will define the problem, select a method of approach, develop the theory, design an experiment to check the theory, set up the experiment, collect and analyze the data, and compare results with the theory. Each project will terminate with a critical report of the work performed and a proposed program for further research. Two lectures, 3 hours laboratory. Credit, 3 hours each semester.

473 *Fluid Mechanics*. Fluid metering, gas dynamics, shock theory, and boundary layer study. Prerequisite: ES 371. Credit, 3 hours.

483 *Heat Transfer*. Heat transfer by conduction, convection, and radiation; mass transfer, diffusion; analogs; techniques to solve engineering problems. Prerequisite: ES 473. Credit, 3 hours.

513, 514 *Dynamics*. Kinematics and kinetics, exterior ballistics and planetary motion; momentum and energy theorems; gyroscopes; Hamilton's Principle, and Lagrange's equations. Prerequisite: ES 312. Credit, 3 hours each semester.

515 *Vibrations*. Many degree of freedom systems and continuous systems. Credit, 3 hours.

517 *Non Linear Oscillations*. Free and forced oscillations with non-linear restoring forces. Self-sustained oscillations. The stability of non-linear oscillations; limit cycles, relaxation oscillations. Credit, 3 hours.

522, 523 *Mechanics of Materials*. Beams on an elastic foundation. Reciprocal theorem, Castigliano's theorem with application to rings. Theory of plates and shells including analysis of stress and deformation in plates bent by transverse loads; vibration of plates; stresses in cylindrical and axially symmetrical shells. Credit, 3 hours each semester.

524, 525 *Theory of Elasticity*. Stress and strain in three dimensions; plane stress and plane strain; rectangular and circular plates and cylinders, effects of holes; torsion of non-circular sections and non-uniform shafts. Solutions by complex variables. Wave propagation. Credit, 3 hours each semester.

527 *Plasticity*. Mechanics of materials beyond the range of Hooke's Law. Limit analysis. Theory of flow and fracture of solids. Credit, 3 hours.

529 *Theory of Elastic Stability*. Stability analysis of bars under separate or combined axial, lateral, and torsional loading. Buckling of plates. Selected topics. Credit, 3 hours. (Same as 1-PH 423.)

572, 573, 574, 575 *Fluid Mechanics*. Development of the laws of fluid motion; potential field theory; airfoils, wing theory and cascades; gas dynamics, normal and oblique shock waves, method of characteristics and small perturbations, viscous fluid motion, hydrodynamic and compressible boundary layers, statistical theory of turbulence and shear flows, flow through porous media. Credit, 3 hours each semester.

582 *Thermodynamics*. Laws of thermodynamics; relations between properties and aspects of the second law; stability criteria and introduction of the thermodynamics of irreversible processes. Credit, 3 hours.

583 *Kinetic Theory of Gases and Statistical Mechanics*. Kinetic theory of the ideal gas, transport phenomena, distribution of molecular velocities; Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics. Prerequisite: ES 582. Credit, 3 hours.

584 *Thermodynamics*. Thermodynamics of chemistry; thermodynamics of special systems including radiation and thermo-electric effects; Nernst postulate; thermodynamics of irreversible processes. Credit, 3 hours.

585, 586, 587 *Heat Transfer*. Conduction of heat, steady and unsteady heat flow, function theory, relaxation techniques, and electrical analogs; convection and thermal boundary layer theory, dimensional analysis; radiation. Credit, 3 hours each semester.

Special Graduate Courses, ES 500, 590, 591, 592, 593, 700, 791, 792, 793. See page 226.

Industrial Engineering

IE 300 *Industrial Engineering*. An introduction to the concepts, scope and utilization of industrial engineering. Prerequisite: Approval of instructor. Credit, 2 hours.

311, 312 *Engineering Economy*. Economic evaluation of engineering alternatives. The effects of risk, uncertainty and strategy on managerial economic decisions. Prerequisite: MA 120. Credit, 2 hours each semester.

321 *Methods and Motion Study*. Schematic models, principles of motion economy and time standards. Laboratory practice in analyzing job situations. (Not open to engineering students.) Two lectures, 3 hours laboratory. Credit, 3 hours.

322 *Work Analysis and Design*. Analysis, design and operation of work systems; their relationship to job evaluation and wage payment systems. Prerequisite: Junior standing in engineering or approval of instructor. Two lectures, 3 hours laboratory. Credit, 3 hours.

371 *Statistical Quality Control*. The application of statistical methods to the control of quality of manufactured product. Prerequisite: MA 226 or approval of instructor. Credit, 2 hours.

431g, 432g *Engineering Administration*. Engineering organization and administration; delegation of authority and responsibility; effective utilization of resources; compensation structure, labor-management relations. Prerequisite: Senior standing in engineering. Credit, 3 hours each semester.

435 *Engineering Law*. Influence of contract, property, and tort law upon engineering activities; contracts, agency, partnerships, corporations, liens, and expert testimony. Credit, 2 hours.

437g *Job Evaluation and Compensation*. Methods employed and current research in the analysis and evaluation of work assignments; determination of compensation. Prerequisite: IE 321 or IE 322. Credit, 2 hours.

439g *Supervision and Labor*. Inter-relationship of supervisory personnel and employees; organization, operation, and characteristics of labor. Credit, 2 hours.

461g, 462g *Design of Industrial Operations*. Planning and design of production systems; methods of control; analysis and evaluation. The case-study method is used, as well as mathematical models and computing techniques. An integrated two-semester design problem is required, including the submission of a final report. 1st semester—3 lectures, 3 hours laboratory; 2nd semester—2 lectures, 6 hours laboratory. Prerequisites: IE 312, 322, 472. Co-requisite: IE 431, 432. Credit, 4 hours each semester.

471g, 472g *Engineering Statistics*. Probability; statistical theory and methods; applications in engineering analysis. Prerequisite: MA 212. Credit, 3 hours each semester.

475g *Operations Research*. The philosophical and historical aspects of operations research and systems analysis. An introduction to the methodologies developed for or adapted to the field. Prerequisite: IE 471 or MA 437. Credit, 2 hours.

511 *Topics in Engineering Economy*. A further examination of concepts introduced in IE 311 and 312. Prerequisite: IE 312. Credit, 3 hours.

521 *Human Engineering*. Analysis, design, and control of human performance in man-machine environments; consideration of physiological and psychological factors as related to system reliability. Credit, 3 hours.

522 *Work Design*. A critical analysis of current problems, new approaches and advanced concepts in work analysis and design. Prerequisite: IE 321 or 322. Credit, 3 hours.

531 *Topics in Engineering Administration*. Continuation of IE 432. Consideration of the quantitative, philosophical and sociological aspects of engineering management. Prerequisite: IE 432. Credit, 3 hours.

533 *Project Engineering*. Responsibilities of the project engineer in product research and development. Credit, 1-3 hours.

561 *Analysis of Industrial Operations*. An extensive and intensive analysis of industrial operations for optimum utilization of resources. Credit, 3 hours.

571 *Quality Control*. The concept of total quality control including problems of organization, advanced techniques, and current research. Prerequisite: IE 472. Credit, 3 hours.

573 *Reliability Engineering*. An examination of the philosophy and techniques of reliability engineering; relationship between reliability and quality control. Prerequisite: IE 472. Credit, 3 hours.

575 *Topics in Operations Research*. Personnel and organization for effective operations research; construction of mathematical models and their application to industrial problems; recent developments. Prerequisite: IE 475. Credit, 3 hours.

577 *Systems Analysis*. Analytical study of manufacturing systems. Application of fluid, thermodynamic and electrical analogies to production systems. Credit, 3 hours.

Special Graduate Courses, IE 500, 590, 591, 592, 593. See page 226.

Mechanical Engineering

ME 102 *Engineering Problem Analysis*. Significant figures and mathematical tools useful in problem solving; unit analysis, the free-body diagram, and model studies in engineering analysis; graphing. Co-requisite: 1-MA 120. Credit, 2 hours.

113 *Engineering Graphics*. Engineering drawing, descriptive geometry and graphics; spatial visualization, sketching, simplified drafting and current practices of industry. One lecture, 6 hours laboratory. Credit, 3 hours.

311 *Mechanisms*. Relative motions of machine parts; cams, rolling contact, gearing, and flexible connectors. Prerequisites: ME 113, ES 312. One lecture, 3 hours laboratory. Credit, 2 hours.

340 *Manufacturing Design*. Design of machine elements with special emphasis on manufacturing methods. Prerequisite: ES 321. Credit, 2 hours.

361 *Engineering Mathematical Analysis*. Explanation of engineering phenomena by their differential equations. Exact and approximate solutions including Fourier Series and partial differential equations. Prerequisite: 1-MA 220. Credit, 3 hours.

382 *Thermodynamics of Mechanical Systems*. Applied thermodynamics; gas mixtures, power cycles, and reactive systems. Prerequisite: ES 381. Credit, 3 hours.

401 *Theory, Prediction and Social Effects of Invention*. Invention considered as an instrument of change in civilization; evo-

lutionary nature of inventions, cycle of growth and decline, causation and social effects; possibility, past success and art of predicting the cultural future. Prerequisites: ES 320, 381. Credit, 3 hours.

402g *Science in History*. Examination of the reciprocal relations of science and society from ancient to recent times. Prerequisite: twelve semester hours credit in science. Credit, 3 hours.

405g *Human Factors in Space Travel*. Artificial environments and environmental control. Physiological, psychological, and sociological aspects of the environment of upper atmosphere and space. Prerequisite: ES 381. Credit, 2 hours.

412g *Mechanics of Orbits and Trajectories*. Celestial mechanics, orbits and perturbations, space flight trajectories, exterior ballistics of rockets and powered flight trajectories. Prerequisite: ES 312. Credit, 3 hours.

421 *Aircraft Aerodynamics*. The atmosphere; types of air flow; lift and drag; types and characteristics of airfoils, Reynolds number, and compressibility effects; wing and auxiliary lift devices. Prerequisites: ES 371, 381. Credit, 3 hours.

422g *Aircraft Stability and Control*. Aircraft performance problems; maneuvers; theory and design of control surfaces; stability derivatives of wings and bodies applied to longitudinal, lateral and directional stability, and control. Prerequisite: ME 421. Credit, 2 hours.

431 *Air Conditioning*. Heating and cooling loads, physiological principles, psychrometry and its applications to air conditioning; cycles for heating, cooling, humidifying and dehumidifying. Prerequisite: ES 381. Credit, 3 hours.

441, 442 *Analysis and Design*. Principles of mechanical design; theory and practice as applied to various machine elements. Prerequisite: ES 422. Two lectures, 3 hours laboratory. Credit, 3 hours each semester.

443 *Aero-Space Design*. Preliminary design of aircraft and space vehicles. Prerequisites: ES 422, ME 421; CE 431. One lecture, 6 hours laboratory. Credit, 3 hours.

451g *Fluid Power*. Hydrostatics and hydrodynamics, viscous and turbulent flow; hydraulic pumps and motors, circuit design, and the application of hydraulic power. Prerequisite: ES 371. Credit, 3 hours.

452g *Gas Turbines and Jet Propulsion*. Thermodynamic and aerodynamic principles, gas turbine power plant, and the ramjet. Prerequisite: ES 371. Credit, 3 hours.

453g *Rocket Propulsion and Rocketry*. Rocket power plants, thermodynamic flow of fluids and combustion; theory and applications of propellants; liquid propellant feed systems; heat transfer, performance, and testing. Prerequisite: ES 371. Credit, 3 hours.

461 *Engineering Measurements*. Fundamental theory of static and dynamic measurements. Experiments correlate with theoretical discussions. Prerequisites: EE 301, ES 321. Two lectures, 1 laboratory lecture, 2 hours laboratory. Credit, 3 hours.

462 *Mechanical Engineering Laboratory*. Individual and group experimentation. Emphasis is placed on ability to design and investigate without close supervision. Prerequisite: ME 461. One lecture, 6 hours laboratory. Credit, 3 hours.

463 *Space Science Laboratory*. Model suspensions, experimentation of aerodynamic phenomena; experimental techniques in fluid mechanics and aerodynamics. Prerequisites: ME 421; ES 470. One lecture, 6 hours laboratory. Credit, 3 hours.

465g *Engineering Project Analysis*. Application of engineering principles to special projects. Prerequisite: Senior standing in engineering. Credit, 3 hours.

467g *Measurement Engineering*. Extension of fundamental measurement principles to more complex static and dynamic systems. Emphasis on thermoelectric, piezoelectric, and piezoresistive phenomena. Prerequisite: ES 483. Two lectures, one laboratory lecture, 2 hours laboratory. Credit, 3 hours.

471g *Solar Energy*. Principles and methods of solar energy collection, storage, and use. Prerequisites: ES 483, ME 382, ES 371. Credit, 3 hours.

483 *Internal Combustion Engines*. Application of thermodynamics, fluid mechanics, and chemistry to internal combustion engines; performance characteristics, combustion, carburetion, cooling, and controls. Prerequisite: ES 371. Credit, 3 hours.

484g *Power Systems*. Engineering and economic aspects of power generation. Prerequisites: IE 311; ME 382. Credit, 2 hours.

512 *Mechanical Vibrations*. Dynamic forces in machine elements. Problems involving several degrees of freedom. Prerequisite: ES 421. Credit, 3 hours.

522 *Theoretical Aerodynamics*. Aerodynamics of perfect and viscous fluids, laws of vortex motion, streamline bodies, and theory of airfoils in non-uniform motion; turbulence and skin friction. Prerequisite: ME 421. Credit, 3 hours.

532 *Refrigeration*. Thermodynamics analysis of low temperature refrigeration and systems other than compression. Prerequisite: ME 382. Credit, 3 hours.

544, 545 *Design*. Creative design emphasizing the analysis and design of complete machines and systems. Prerequisite: ME 442. Credit, 3 hours each semester.

546 *Systems Engineering*. Application of project engineering techniques and the synthesis of model solutions; integration of concepts studied in mathematics and the engineering sciences. Credit, 3 hours.

547 *System Control*. Theory and analysis of system controls. Prerequisite: ME 546. Credit, 3 hours.

548 *Mechanical Computers*. Use of mechanical elements in the formation of computer systems. Prerequisite: ME 546. Credit, 3 hours.

554 *Reaction Engines*. Continuation of ME 452. Credit, 3 hours.

555 *Gas Turbines*. Combustion and fuel equipment; heat exchangers; part load operation; variations of the basic cycle; aircraft gas turbines. Prerequisite: ME 452. Credit, 3 hours.

572 *Solar Energy*. Application of principles of solar energy utilization to design of both earth and space systems. Prerequisite: ME 471. Credit, 3 hours.

Special Graduate Courses, ME 500, 590, 591, 592, 593. See page 226.

Nuclear Engineering

NE 411g *Nuclear Engineering*. Nuclear and chain reactions criticality, radiation shielding, reactor systems and their control, nuclear materials, and radiation protection. Prerequisite: 1-PH 361. Credit, 3 hours.

421g *Nucleonics Laboratory*. Operation of apparatus for measuring ionizing radiations. Prerequisite: 1-PH 361. One lecture, 3 hours laboratory. Credit, 2 hours. (Same as 1-PH 463.)

431g *Nuclear Reactor Engineering*. Principles of reactor design including radiation protection, heat removal and temperature control, optimization of reactor variables, and assured safety. Prerequisite: NE 411; co-requisite: ES 483. Credit, 3 hours. (Same as 1-PH 465.)

441g *Radiation Hazards and Facilities*. Safe limits of exposure, tolerance dosage of alpha, beta, gamma and neutron radiation; design of safe radiation facilities. Prerequisite: 1-PH 464 or NE 411. Credit, 3 hours. (Same as 1-PH 467.)

451g *Reactor Design*. Engineering design of typical reactors: homogeneous, heterogeneous, stationary power, and power breeders. Co-requisite: NE 431. Credit, 3 hours. (Same as 1-PH 468.)

472g *Nuclear Engineering Laboratory*. Operation, instrumentation, control, and design of nuclear equipment. Prerequisite: NE 411. One lecture, 6 hours laboratory. Credit, 3 hours.

512 *Reactor Theory*. Neutron motion and reactor behavior; transport and diffusion theory. Prerequisite: NE 411. Credit, 3 hours. (Same as 1-PH 466.)

542 *Radiation Processing*. Radiation principles and facilities; pasteurization, sterilization, vulcanization, and chemical processing. Prerequisite: NE 441. Credit, 3 hours.

552 *Reactor Design*. Various factors of reactor design coordinated in a system analysis with a hazard evaluation. Prerequisite: NE 431. Credit, 3 hours.

561 *Materials Processing*. Processing nuclear fuels and products; storage and handling. Prerequisite: NE 431. Credit, 3 hours.

English

PROFESSORS PORTNOFF (Eng. 114A), CONLIN, MYERS, TURNER; ASSOCIATE PROFESSORS COOKE, FISHER, LAMBERTS, LEVY, OSENBERG, RATLIFF, ZIMMERMAN; ASSISTANT PROFESSORS BAROODY, BRYANT, CROSLAND, ELLIS, ERNO, FERRELL, GLICK, HENSHAW, HERMAN, HOROWITZ, JOHNSON, KEENAN, LANDINI, LYLE, MEINERS, MONTAGUE, RYAN, SHAW, TAYLOR, WELSH; INSTRUCTORS CROOKS, NEEKER, POWERS, QUIRK, RANK, SALERNO, WHEAT

English

EN 101 *First Year English*. Composition; emphasis on paragraph structure, correctness in English fundamentals, exactness and concreteness of statement; dictionary and library practice; intensive and extensive reading. Credit, 3 hours.

102 *First Year English*. Expository writing; emphasis on organizing and unifying long papers, improvement in style, expansion of vocabulary. Introduction to word study; practice in research, including the writing of a model term paper. Intensive and extensive reading. Prerequisite: EN 101. Credit, 3 hours.

103 *Introduction to Literature*. An introduction to literature through literary types, designed for students not majoring in English. Selections taken mainly from modern writers. Credit, 3 hours.

111 *English for Foreign Students*. For foreign students from non-English speaking countries who have studied English in their native countries, but who require practice in the idioms of English. Intensive reading, writing, and discussion to acquaint students with the colloquial flavor of English. Satisfies the graduation requirement of EN 101. Credit, 3 hours.

112 *English for Foreign Students*. Continuation of EN 111; reading on a broader scope and more emphasis on composition. Satisfies the graduation requirement of EN 102. Prerequisite: EN 111. Credit, 3 hours.

151, 152 *Directed Reading for English Majors and Minors*. Supervised reading with a weekly individual conference with instructor. Credit, 1 hour each semester.

- 201 *World Literature—The Classical and Medieval Periods.* Selections from the great literature of the world in translation and lectures on the cultural background of the writings. Prerequisite: EN 101. Credit, 3 hours.
- 202 *World Literature—The Renaissance and Modern Periods.* Continuation of EN 201. Selections from the great literature of the world in translation, and lectures on the cultural background of the writings. Prerequisite: EN 101. Credit, 3 hours.
- 204 *Literature of Today.* Poetry, short story, novel, and drama. Not for English majors. Not open to freshmen. Credit, 3 hours.
- 211 *Advanced Composition.* For students interested in further training in organization and expression of ideas. Primarily for non-English majors. Prerequisite: EN 102. Credit, 3 hours.
- 212 *English Prose Style.* Advanced training in various types of prose writing. Prerequisite: Grade of B in EN 102. Credit, 3 hours.
- 221 *Survey of English Literature.* The content and form of the earlier English literature, including a study of the individual and national characteristics of certain authors. Prerequisite: EN 102. Primarily for English majors and minors. Credit, 3 hours.
- 222 *Survey of English Literature.* Continuation of EN 221, based upon the later English literature. Prerequisite: EN 102. Primarily for English majors and minors. Credit, 3 hours.
- 256 *Biblical Backgrounds of Literature.* The reading of the Old and New Testaments with emphasis on types and ideas used as primary or major sources in literature. Credit, 2 hours.
- 300 *Foundations of Literary Criticism.* Modern critical theory and methods. Practice in criticism of poetry, short story, drama, and the novel. Credit, 3 hours.
- 311 *Creative Writing.* Writing laboratory. Lectures and conferences dealing with the various forms of imaginative writing. Prerequisite: EN 211 or recommendation of instructor in EN 102. Credit, 3 hours.
- 312 *Current English Usage.* Recent changes and current trends in the language, with emphasis on American English and the factual basis of grammar. Prerequisite: EN 222 or equivalent. Credit, 3 hours.
- 313 *Introduction to Semantics.* Nature of meaning and the function of language, designed to improve accuracy of communication and to provide a technique for analyzing false or misleading statements. Prerequisite: Junior standing. Credit, 2 hours.
- 341 *American Literature.* From colonial times to the Civil War, including the growth of nationalism and the rise of the New England school. Open to those specializing in other departments who have junior standing. Prerequisite: EN 102. Credit, 3 hours.
- 342 *American Literature.* From Whitman to the present. The influence of westward expansion, the growth of regionalism, the

literature of social protest. Open to those specializing in other departments who have junior standing. Prerequisite: EN 102. Credit, 3 hours.

351 *The Twentieth-Century Novel*. The novel since 1914 in England and America. Prerequisite: Three hours of literature. Credit, 3 hours.

352 *Short Story*. The development of the short story as a literary form; analysis of its technique through study of examples from the work of representative authors. Prerequisite: Three hours of literature. Credit, 3 hours.

355 *History of the Drama*. The English drama from the Middle Ages to the present, with selective examples of foreign influences. Reading of representative plays of each period. Credit, 3 hours.

411g *Advanced Creative Writing*. Continuation of EN 311. Prerequisite: EN 311 or approval of instructor. Credit, 3 hours.

412g *Professional Writing*. Lectures and conferences concerning techniques of writing for publication. Prerequisite: EN 311 or approval of instructor. Credit, 3 hours.

413g *History of the English Language*. Development of the language from the earliest times to the modern period. Prerequisites: EN 211, 221. Credit, 3 hours.

420g *Renaissance Drama*. Plays of Elizabethan, Jacobean and Caroline dramatists, excluding Shakespeare. Prerequisite: EN 221. Credit, 3 hours.

421g *Shakespeare: The Tragedies*. Critical study of the major tragedies. An introduction to Shakespearean scholarship. Prerequisite: EN 221. Credit, 3 hours.

422g *Shakespeare: The Comedies*. A rapid reading of all the comedies. Studies of the comic spirit and Shakespeare's comic genius. Prerequisite: EN 221. Credit, 3 hours.

423g *Milton*. The life of Milton, his relation to the literary and social background of his period, and textual study of his chief works. Prerequisite: EN 221. Credit, 3 hours.

424g *Chaucer*. Chaucer's language, poetry and intellectual background. Prerequisite: EN 221. Credit, 3 hours.

425g *Nineteenth Century Poetry: Romantic Period*. The poetry of Wordsworth, Coleridge, Shelley, Keats, Byron. Prerequisite: EN 222. Credit, 3 hours.

426g *Nineteenth Century Poetry: Victorian Period*. The poetry of the second half of the century. Special study of Tennyson, Browning, Arnold. Prerequisite: EN 222. Credit, 3 hours.

427g *Age of Johnson*. The chief writers, movements, and books during Johnson's career as a dominating literary figure, together with their most important relationships to predecessors and followers. Prerequisites: EN 221, 222. Credit, 3 hours.

428g *Age of Satire*. English satirists of the Restoration and early eighteenth century: Dryden, Pope, Swift, and others. Prerequisite: EN 222. Credit, 3 hours.

441g *Contemporary American Drama*. The American Drama since World War I, with special attention to experimental techniques. Prerequisite: EN 222 or equivalent. Credit, 3 hours.

442g *Contemporary British Poetry*. British poetry of the twentieth century; techniques, aims, and significance. Prerequisite: Three hours of literature. Credit, 3 hours.

443g *Contemporary American Poetry*. American poetry of the twentieth century; techniques, aims, and significance. Prerequisite: Three hours of literature. Credit, 3 hours.

444g *American Romanticism, 1830-60*. The chief American Transcendentalists and Romanticists. Prerequisite: EN 341 or 342. Credit, 3 hours.

445g *American Realism, 1860-1900*. Literary realism as expressed in the critical essay, short story, and poetry, with attention to European influences. Prerequisite: EN 341 or 342. Credit, 3 hours.

451g *Development of the Novel; 18th Century*. From the origins of prose fiction to Scott. Prerequisite: EN 221. Credit, 3 hours.

452g *Development of the Novel; 19th Century*. From Scott to Conrad. Prerequisite: EN 222. Credit, 3 hours.

453g *The American Novel to Dreiser*. The sentimental, romantic, realistic, and naturalistic novels in America. Prerequisite: EN 341 or 342. Credit, 3 hours.

454g *Modern Drama*. The chief dramatic writers of the generation preceding World War I, with special attention to experimental techniques. Prerequisite: EN 222 or equivalent. Credit, 3 hours.

455g *The Form of Verse: Theory and Practice*. The types, history, criticism, and schools of theory of metrical form. Analysis of lyric, narrative, and dramatic poetry. Original verse writing optional. Prerequisite: One semester survey of American or British literature, or equivalent. Credit, 2 hours.

456g *Classical Background of English Literature*. The myths and legends of Greece and Rome and some of the works in which they appear. Credit, 2 hours.

460g *Literature of the Southwest*. The literature, folklore and traditions of the American Southwest. Credit, 2 hours.

471g *Literature for Junior and Senior High School Students*. A study of prose and poetry which meet the interests, desires and capabilities of the high school boy and girl. Recent literature stressed. Prerequisite: EN 222. Credit, 3 hours.

480g *Methods of Teaching English*. Methods of instruction, organization, and presentation of appropriate content in English. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

491g *Backgrounds of English Literature*. Lectures and individual study in England, France, and Italy. Tour fee to be arranged. Credit, 3 hours.

507 *Old English*. The elements of Old English grammar, with selected readings. Credit, 3 hours.

508 *Beowulf*. Intensive literary and linguistic study of Beowulf. Prerequisite: EN 507. Credit, 3 hours.

510 *The Structure of English*. Analysis of the structural patterns of English from both the grammatical and linguistic points of view. Prerequisite: EN 312. Credit, 3 hours.

511 *Theory and Practice of Rhetoric*. Students will be required to demonstrate their grasp of stylistic theory by doing at least competent apprentice work in various assigned forms. Prerequisite: EN 510, or approval of department chairman. Credit, 3 hours.

520 *Renaissance Literature*. Poetry and prose of the English Renaissance, excluding drama. Prerequisite: EN 221. Credit, 3 hours.

550 *Contemporary Comparative Literature*. Current trends in American and other literatures with emphasis on their significance in contemporary thought. Prerequisite: EN 351 or approval of department chairman. Credit, 3 hours.

Special Graduate Courses, EN 500, 590, 591, 592, 593. See page 226.

Foreign Languages

PROFESSORS BOWMAN (SS 416B), WILSON; ASSOCIATE PROFESSORS ESCUDERO, MARTINEZ, VON DER HEYDT; ASSISTANT PROFESSORS BARRUTIA, GROBE, LUENOW, PALLEY, RADKE, WIRTZ; INSTRUCTOR McINTIRE

Students entering with one year of a high school foreign language should enroll in the second semester of the elementary course if they desire to continue in the same language. They may register for the first semester, but no credit will be granted for repeating the first semester.

Students entering with 2 years of a high school foreign language should enroll in the 201 course if they desire to continue in the same language. No credit will be granted if the first-year course is repeated.

Students entering with 3 or more years of a high school foreign language should enroll in Advanced Composition and/or Survey courses, but they may enroll in an Intermediate course for credit.

Foreign Languages

FL 100 *Introduction to Foreign Languages*. The significance of languages in society, including study of the history of language, family relationships existing among languages, word relationships, and meanings. Emphasis upon languages of Western Europe with some reference to Slavic and Oriental tongues. Credit, 2 hours.

421 *Directed Reading for Foreign Language Majors*. Supervised reading with a weekly individual conference with instructor. Prerequisite: Six hours in upper division courses. Credit, 2 hours.

480g *Methods of Teaching Foreign Languages*. Methods of instruction, organization, and presentation of appropriate content in Foreign Languages. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

Special Graduate Courses, FL 500. See page 226.

French

FR 101, 102 *Elementary French*. For beginning students only —MAY NOT BE TAKEN FOR CREDIT BY STUDENTS WHO HAVE COMPLETED TWO OR MORE SECONDARY SCHOOL UNITS OR THE EQUIVALENT. Credit, 4 hours each semester.

110 *Practical Phonetics for Singers*. To acquaint singers with the fundamentals of French phonetics and sound production. Correct pronunciation in reading and singing. Credit, 2 hours.

201, 202 *Intermediate French*. Additional emphasis on the development of ability to speak, read, write, and comprehend French, through grammar review and the reading of selected materials. Prerequisite: FR 102 or equivalent. Credit, 4 hours each semester.

311, 312 *French Composition and Conversation*. Designed to increase writing ability and fluency in conversation for business, travel, or social purposes, with emphasis on correct pronunciation, intonation and extension of practical vocabulary. Prerequisite: FR 202 or approval of instructor. Credit, 3 hours each semester.

321, 322 *Survey of French Literature*. The most significant works, authors, and literary movements of French literature from its beginning to the end of the 19th century. Lectures, discussions, collateral readings and reports. Prerequisite: FR 202 or approval of instructor. Credit, 3 hours each semester.

435g *French Literature of the 16th Century*. The influence of the Renaissance on the literature of France in the 16th century, as found in the works of Rabelais, Marot, DuBellay, Ronsard, and Montaigne. Prerequisite: FR 322. Credit, 3 hours.

441g *French Literature of the 17th Century*. A study of "le Grand Siècle," with emphasis on the classical writers of drama, prose, and poetry. Prerequisite: FR 322. Credit, 3 hours.

445g *French Literature of the 18th Century*. The most significant writers of the "Age of Reason," including Montesquieu, Voltaire, Diderot, and Rousseau; the contributions of Lesage, Marivaux, Prevost, and Beaumarchais to the development of the novel and drama. Prerequisite: FR 322 or approval of instructor. Credit, 3 hours.

451g *French Literature of the 19th Century*. Representative works of the principal dramatists, novelists, poets, and essay writers from early Romanticism to the end of the century. Prerequisite: FR 322. Credit, 3 hours.

461g *French Literature of the 20th Century*. The most significant novelists, dramatists, essayists, and poets of France in the 20th century. Prerequisite: FR 322. Credit, 3 hours.

523 *History of the French Drama*. The French drama from its origins to Romanticism, with special emphasis on the classical period. Credit, 3 hours.

524 *The Modern French Drama*. Representative dramatists of the 19th and 20th centuries. Credit, 3 hours.

525, 526 *History of the French Novel*. The French novel from its beginnings to the present. Credit, 3 hours each semester.

Special Graduate Courses. FR 500, 590, 591, 592, 593. See page 226.

German

GR 100 *Reading Knowledge of German*. Basic grammar to develop the ability to read the language accurately for research purposes. Stress on intensive reading in the sciences and other fields. Intended only as a research tool, cannot be taken as a substitute for GR 101. No prerequisite. Three hours per week. No credit.

101, 102 *Elementary German*. For beginning students only—MAY NOT BE TAKEN FOR CREDIT BY STUDENTS WHO HAVE COMPLETED TWO OR MORE SECONDARY SCHOOL UNITS OR THE EQUIVALENT. Credit, 4 hours each semester.

110 *Practical Phonetics for Singers*. To acquaint singers with the fundamentals and the elements of German phonetics and sound production. Correct punctuation in reading and singing. Credit, 2 hours.

201, 202 *Intermediate German*. Reading of literary texts; practice in conversation and composition; review of grammar. Prerequisite: GR 102. Credit, 4 hours each semester.

311, 312 *German Composition and Conversation*. Development of writing ability and oral expression. Material based on everyday life in Germany. Prerequisite: GR 202. Credit, 3 hours each semester.

321, 322 *Survey of German Literature.* German literature from its beginnings to the present, with special emphasis on the Classical period. Prerequisite: GR 202 or approval of instructor. Credit, 3 hours each semester.

435g *German Literature of the 16th Century.* Literary, historical, sociological and religious problems of the "Age of Luther," as found in such authors as Hans Sachs, Brant, Hutten, Fischart and Luther. Prerequisite: GR 322. Credit, 3 hours.

441g *German Literature of the 17th Century.* German literature of the Barock Period. The reforms of Opitz, the lyric period, the mysticism of Angelus Silesius and Jakob Bohme, the plays of Gryphius and the prose of Grimmelshausen. Prerequisite: GR 322. Credit, 3 hours.

445g *German Literature of the 18th Century.* The various literary trends of the 18th century, with special emphasis on Lessing, Wieland, Klopstock, Schiller, Goethe and Herder. Prerequisite: GR 322. Credit, 3 hours.

451g *German Literature of the 19th Century.* The major prose writers and dramatists. Readings, lectures, and reports. Prerequisite: GR 322. Credit, 3 hours.

461g *German Literature of the 20th Century.* Leading German writers of the 20th century, including Hauptmann, Mann, Rilke, Hofmannstahl, Kafka, and Frank. Lectures, discussions, reports. Prerequisite: GR 322 or approval of instructor. Credit, 3 hours.

523 *History of the German Drama.* German drama from its origins to Romanticism, with special emphasis on Lessing, Goethe, and Schiller. Credit, 3 hours.

524 *The Modern German Drama.* Representative dramatists of the 19th and 20th centuries. Credit, 3 hours.

525, 526 *History of the German Novel.* The German novel from Goethe to Thomas Mann. Credit, 3 hours each semester.

Special Graduate Courses. GR 500, 590, 591, 592, 593. See page 226.

Greek

GK 101, 102 *Elementary Greek.* For beginning students only—MAY NOT BE TAKEN FOR CREDIT BY STUDENTS WHO HAVE COMPLETED TWO OR MORE SECONDARY SCHOOL UNITS OR THE EQUIVALENT. Credit, 4 hours each semester.

Latin

LA 101, 102 *Elementary Latin.* For beginning students only —MAY NOT BE TAKEN FOR CREDIT BY STUDENTS WHO HAVE COMPLETED TWO OR MORE SECONDARY SCHOOL UNITS OR THE EQUIVALENT. Credit, 4 hours each semester.

201, 202 *Intermediate Latin*. Readings from the orations of Cicero; and selections from Ovid or other authors. Prerequisite: LA 102. Credit, 4 hours each semester.

Russian

RU 101, 102 *Elementary Russian*. For beginning students only—MAY NOT BE TAKEN FOR CREDIT BY STUDENTS WHO HAVE COMPLETED TWO OR MORE SECONDARY SCHOOL UNITS OR THE EQUIVALENT. Credit, 4 hours each semester.

201, 202 *Intermediate Russian*. Development of a sound reading knowledge of Russian. Systematic review of grammar. Rapid reading and oral expression. Outside reading in the student's field of interest. Prerequisite: RU 102. Credit, 4 hours each semester.

203 *Scientific Russian*. Reading of military, diplomatic, and scientific materials. Prerequisite: RU 201. Credit, 3 hours.

311, 312 *Russian Composition and Conversation*. Development of writing ability and oral expression. Prerequisite: RU 202. Credit, 3 hours each semester.

321, 322 *Survey of Russian Literature*. The most significant works, authors, and literary movements of Russian literature from its beginnings to the present. Prerequisite: RU 202. Credit, 3 hours each semester.

Spanish

SP 101, 102 *Elementary Spanish*. For beginning students only—MAY NOT BE TAKEN FOR CREDIT BY STUDENTS WHO HAVE COMPLETED TWO OR MORE SECONDARY SCHOOL UNITS OR THE EQUIVALENT. Credit, 4 hours each semester.

201, 202 *Intermediate Spanish*. Review of grammar. Vocabulary-building, reading, oral and written expression. Prerequisite: SP 102. Credit, 4 hours each semester.

211 *Commercial Spanish*. Develops ability in Spanish commercial vocabulary and business correspondence. Information regarding Spanish-American exports, imports and industry. Prerequisites: SP 101, 102. Credit, 2 hours.

311 *Spanish Conversation*. Intensive drill to develop basic conversational skills, using topics of everyday life. Prerequisite: SP 202 or approval of instructor. Credit, 3 hours.

312 *Spanish Conversation*. Emphasis on the development of fluency beyond the dialog stage, to promote facility in the discussion of ideas. Prerequisite: SP 311 or approval of instructor. Credit, 3 hours.

313, 314 *Advanced Spanish Composition*. Designed to develop skill and accuracy in self-expression in Spanish. Special emphasis on structure and form. Study of style in selections from representative authors. Prerequisite: SP 202. Credit, 3 hours each semester.

321, 322 *Survey of Spanish Literature.* Spanish literature from its beginnings to the present with some emphasis on the evolution of Spanish thought and literary ideals. Conducted in Spanish. Prerequisite: SP 202 or approval of instructor. Credit, 3 hours each semester.

417g *Spanish Phonetics.* Pronunciation and articulation of Spanish. Emphasis on patterns of Spanish articulation in the Southwest and comparisons of English articulations that influence these patterns. Prerequisite: Three semesters of any 300 level courses in Spanish. Credit, 2 hours.

427g, 428g *Spanish American Literature.* The significant literature and writers from the colonial period to the present. Prerequisite: SP 322. Credit, 3 hours each semester.

443g *Life and Works of Cervantes.* The life and works of Cervantes with emphasis upon *Don Quixote* and the *Novelas ejemplares*. Lectures, readings, and reports. Prerequisite: Twelve hours in upper division courses. Credit, 3 hours.

451g, 452g *Spanish Literature of the 19th Century.* The Romantic dramatists of this century and the most representative novelists and poets of the second half of the century. Prerequisite: SP 322. Credit, 3 hours each semester.

455g *The Regional Novel.* The chief characteristics of the Spanish regional novel as shown in representative works. Prerequisite: SP 322 or approval of instructor. Credit, 3 hours.

456g *Manuel Galvez and the Novela de la Ciudad.* The works of Manuel Galvez and the interpretation of urban life in Argentina. Prerequisite: Twelve hours in upper division courses in Spanish or graduate standing. Credit, 3 hours.

461g, 462g *Spanish Literature of the 20th Century.* The creative achievements of the Generation of 1898 and significant tendencies in the works of contemporary writers. Prerequisite: SP 322. Credit, 3 hours each semester.

472g *Spanish-American Civilization.* The people, the growth of their institutions and culture, and the aspirations of their great men. A knowledge of Spanish is not necessary. No prerequisite. Credit, 3 hours.

481g *History of the Spanish Language.* Linguistic development of the Spanish language from the epoch of Vulgar Latin to the present day. Prerequisites: SP 313, 314 or equivalent. Credit, 3 hours.

482g *Spanish Medieval Literature.* Representative works from the 11th to the 16th century. Prerequisite: SP 322. Credit, 3 hours.

485g *Spanish for Elementary Teachers.* Designed for teachers interested in introducing the teaching of Spanish in the elementary grades. Integrates the techniques of teaching with the fundamentals of Spanish. Credit, 3 hours.

486g *Spanish for Elementary Teachers*. Continuation of SP 485. Prerequisite: SP 485. Credit, 3 hours.

487g *Spanish for Elementary Teachers*. Continuation of SP 486. Prerequisite: SP 486. Credit, 3 hours.

488g *Spanish for Elementary Teachers*. Continuation of SP 487. Prerequisite: SP 487. Credit, 3 hours.

523 *History of the Spanish Drama*. The Spanish drama from its origins to Romanticism, with special emphasis on the drama of the Golden Age. Lectures, readings, and reports. Credit, 3 hours.

524 *The Modern Spanish Drama*. Representative dramatists of the 19th and 20th centuries. Lectures, readings, and reports. Credit, 3 hours.

525, 526 *History of the Spanish Novel*. The Spanish novel from its beginnings to the present. Reading of representative works of the different periods. Credit, 3 hours each semester.

529 *Mexican Literature*. Representative writers and literary movements of Mexico since 1810 to the present. Credit, 3 hours.

Special Graduate Courses. SP 590, 591, 592, 593. See page 226.

General Physical Sciences

ASSOCIATE PROFESSORS SNYDER (PS-B 353), MUNCH, YALE

General Physical Science

PL 110 *Physical Universe*. The universe as a unit; the stars; the solar system; the earth and the atom. The nature of energy and matter and relations between atoms, elements and compounds. Designed for general education. Does not meet science requirement in preprofessional curriculums. Fee, \$2.00. Credit, 4 hours.

121 *Descriptive Astronomy*. The solar system and stars from the observational and descriptive viewpoint. Credit, 2 hours.

221 *General Astronomy*. The solar system; motions of the planets; eclipses, stars, galaxies; and an introduction to navigation and astrophysics. Prerequisite: PH 101 or equivalent. Credit, 3 hours.

320 *Science for the Elementary School*. Development of an integrated science program in each grade of the elementary school. Activities include laboratory, field observation, and a three-day camping trip. Prerequisite: Eight hours in science and/or mathematics. Fee, \$3.00. Credit, 3 hours.

360 *Science and Man*. The effects upon man of his technological civilization and a consideration of recent advances in both pure and applied physical sciences. Credit, 4 hours.

410g *History of Physical Sciences.* The growth of astronomy, chemistry, and physics; the scientists who have made outstanding contributions, and the effects of these contributions on man's life. Credit, 3 hours.

440g *Outdoor Science Education.* Physical and life sciences in the world of nature. Arizona natural resources and their conservation. Techniques of conducting field trips out-of-doors. Prerequisite: Seven hours in science and/or mathematics. Credit, 3 hours.

460g *Science in the Junior High School.* Development of an integrated program for seventh and eighth grades. Prerequisites: eight hours in science and/or mathematics; PL 320 or the equivalent. Fee, \$2.00. Credit, 3 hours.

470g *General Physical Science for the Elementary School.* Recent advances in the physical sciences with emphasis on how the new concepts may be incorporated in the elementary science program. Prerequisite: Seven hours in science and/or mathematics. Fee, \$3.00. Credit, 3 hours.

480g *Methods of Teaching Physical Science.* Methods of instruction, organization, and presentation of appropriate content in Physical Science. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

522 *Workshop in Elementary School Science.* Science programs of leading elementary schools and detailed study of the State Course of Study in Science. Lectures, assigned reading, classroom demonstrations, and field studies. Open to experienced teachers, supervisors, and administrators. Two lectures, 3 hours laboratory. Credit, 3 hours.

Special Graduate Courses, PL 500, 590, 591, 592, 593. See page 226.

Geography

ASSOCIATE PROFESSORS HARING (Agric. 122), BAKER, RENNER, WERNSTEDT; ASSISTANT PROFESSOR ROSS

Geography

GE 111 *Elements of Geography.* Climate, relief, drainage, soils, plant and animal life; their inter-relationship and influence upon man. Three lectures, 3 hours laboratory. Credit, 4 hours.

112 *World Geography.* The major regions of the world with emphasis on how man has utilized the earth's resources. Credit, 4 hours.

151 *Meteorology.* Weather elements, meteorological instruments, weather maps, forecasting and their relation to activities of man. Credit, 3 hours.

211 *Elementary Cartography and Graphics.* Tools of map-making, map construction, and graphic techniques. Prerequisite: GE 111. One lecture, 3 hours laboratory. Credit, 2 hours.

212 *Geography of Landforms*. Development and interpretation of the relief features of the earth. Prerequisite: GE 111. Credit, 2 hours.

242 *Aerial Photograph Interpretation*. Geographic, physiographic, and military interpretation of aerial photographs. Application to topographic charts and to cartography. Prerequisite: GE 111. One lecture, 3 hours laboratory. Credit, 2 hours.

301 *Geography of Arizona*. Landscape features, climate, soils, minerals, water resources, plant and animal life, and industries, and their influence on man's activities. Credit, 2 hours.

302 *Geography of Anglo-America*. Physiographic provinces of the continent with their respective climates, products, and major activities of man. Credit, 3 hours.

303 *Geography of South America*. Physiographic regions, their climates, products, and human activities. Credit, 3 hours.

304 *Geography of Middle America*. The lands and peoples of the islands of the Caribbean, Central America, and Mexico. Credit, 2 hours.

311 *Conservation of Natural Resources*. The nature and distribution of natural resources and the problems and principles associated with their use. Credit, 3 hours.

321 *Geography of Europe*. Natural regions of Europe, their climates, relief features, drainage, soils, plants, and animals and their influence upon man's activities. Credit, 3 hours.

322 *Geography of Asia*. Physical and cultural geography of Asia exclusive of the Soviet Union. A geographic interpretation of southern, eastern, and southwestern Asia. Credit, 3 hours.

323 *Geography of Africa, Australia, Oceania, and Antarctica*. Climates, vegetation, surface features, resources, and peoples, and their role in the modern world. Credit, 3 hours.

324 *Geography of the Soviet Union*. People, space, resources, and power potential of the U.S.S.R. Credit, 2 hours.

331 *Economic Geography*. Production, distribution, and consumption of various types of commodities of the world and relationships to the activities of man. Credit, 3 hours.

341 *Cartography*. Topographic drafting and interpretation of aerial surveys. Introduction to cadastrals and land utilization surveys. Prerequisite: GE 211. One lecture, 3 hours laboratory. Credit, 2 hours.

351 *Climatology*. Principles of climate; attention to climatic regions and climate cycles. Prerequisites: GE 111, 151. Credit, 3 hours.

360 *Urban Geography*. Distribution, internal structure and functions of urban developments with emphasis on the locational features of social, economic and cultural phenomena. Credit, 3 hours.

411g *Principles of Physical Geography*. A study of selected areas within the major physiographic regions. Basic introduction to physiography and the physical elements of the environment. Credit, 3 hours.

412g *Principles of Oceanography*. Marine relief, topography, water masses, currents, isohalines, isotherms, biotic environment, marine geo-chemistry, marine sedimentation as factors in the geography of the oceans. Prerequisites: GE 111; CH 111 or PH 101 or equivalent. Credit, 3 hours.

413g *Geographic Literature*. Current publications in geography; authors, trends of research, and sources. Prerequisite: Approval of instructor. Credit, 2 hours.

418g *Geographic Influences on National Development*. Natural environment as it influences national growth; location, landforms, water-bodies, fuels, ores, forests, grasslands, and deserts. A background for appreciation of differences in national attitudes. Recommended for Social Studies teachers. Credit, 3 hours.

419g *Field Studies in Geography*. Systematic cataloging, mapping and analysis of geographic phenomena by means of actual field work. Written report required. Prerequisite: Approval of instructor. Credit, 3 hours.

422g *Geopolitics*. Examination of the principles of political geography and their application to the major political states of the earth. Credit, 3 hours.

424g *Topics in Geography*. Special topics in physical, economic, social, historical, and political geography. Open to students qualified to pursue independent studies. Prerequisite: Approval of instructor. Credit, 1-3 hours.

433g *Geography of Trade and Transportation*. Geographic analysis of the world's trade routes by land, sea, and air. Prerequisite: GE 111 or 131. Credit, 3 hours.

Geology

PROFESSOR MILLER (Agric. 182A); ASSISTANT
PROFESSORS ETHINGTON, MOORE

Geology

GL 111 *General Geology*. Physical and historical geology with applications to everyday life. Credit, 4 hours.

113 *Physical Geology*. Fundamental physical aspects of the Earth; its minerals and rocks, structures, landscape, and their origins. Fee, \$2.00. Three lectures, 3 hours laboratory, field trips. Credit, 4 hours.

114 *Historical Geology*. Chronologic history of the Earth and its inhabitants. Fee, \$2.00. Three lectures, 3 hours laboratory, field trips. Credit, 4 hours.

126 *Rocks and Minerals*. Elementary survey of origin, occurrence, classification, and identification of rocks and minerals. One lecture, 3 hours laboratory. Credit, 2 hours.

213 *Geomorphology*. Development and classification of landforms; a detailed analysis of the effect of geologic structure on the landforms developed during the normal cycle of erosion. Prerequisites: GL 113, 114. Two lectures, 3 hours laboratory. Credit, 3 hours.

215 *Geologic Maps*. Structural, stratigraphic, and historical interpretation of geologic maps and cross-sections. Prerequisite: GL 114. Fee, \$2.00. One lecture, 3 hours laboratory. Credit, 2 hours.

246 *Structural Geology*. Rock structures, the principles and mechanics of their formation, and their relation to surface features and mineral deposits. Prerequisite: GL 113. Fee, \$2.00. Two lectures, 3 hours laboratory, field trips. Credit, 3 hours.

311 *Engineering Geology*. Physical geology with special emphasis on structural geology, ground water, soil genesis, and relation of geology to engineering problems. Laboratory exercises include rock and mineral identification, and interpretation of geological and topographic maps. Prerequisites: CH 114; 4-CE 241. Two lectures, 3 hours laboratory. Credit, 3 hours.

319 *Field Geology*. Field techniques, including description and measurement of stratigraphic sections, solution of geologic problems, aerial mapping, and plane table surveying. Held on Saturdays in central Arizona. Prerequisite: GL 246 or approval of instructor. Fee, \$2.00. Credit, 3 hours.

321, 322 *Mineralogy*. Crystallography, crystal chemistry, and descriptive mineralogy; use of physical and chemical properties in identification of minerals. Prerequisites: GL 114; CH 115 or concurrent enrollment. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours each semester.

335, 336 *Invertebrate Paleontology*. The structure and evolutionary development of fossil invertebrates with emphasis on morphology of skeletal parts and the application of paleontology to stratigraphic problems. Prerequisite: GL 114. Fee \$2.00. Two lectures, 3 hours laboratory. Credit, 3 hours each semester.

340 *Geology of Arizona*. The geologic features and geologic history of the State and their relationship to development of natural resources. Credit, 2 hours.

352 *Sedimentation*. Origin, transportation, deposition, and methods of statistical analysis applied to problems of ancient and modern sediments. Prerequisite: GL 114. Fee, \$2.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

360 *Minerals as a Public Problem*. Economic and political problems of mineral supply and their implications in national and international affairs. Credit, 2 hours.

422 *Lithology*. Classification, description, and identification of rocks in hand specimen. Prerequisite: GL 322 or concurrent enrollment. Credit, 1 hour.

436g *Micropaleontology*. Classification, morphology, and paleoecology of microscopic organisms including Formaminifera, Ostracoda, and Conodonts. Prerequisites: GL 335, 336. Fee, \$2.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

451g *Stratigraphy*. Sources of sediments, depositional environments, and the principles involved in delimiting, correlating, and naming of stratigraphic units. Prerequisites: GL 114, 352. Credit, 3 hours.

453g *Quantitative Sedimentation*. Theory and application of various laboratory techniques in the study of sediments. Prerequisite: GL 352. Fee, \$2.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

460g *Topics in Geology*. Special topics in petrology, optical mineralogy, economic geology, petroleum geology, regional geology, and sedimentology are open to students qualified to pursue independent studies. Prerequisite: Approval of instructor. Fee, arranged. Credit, to be arranged.

461g *Principles of Economic Geology*. Occurrence, distribution, classification, structure, and mineralogy of ore deposits; study of the geologic processes and mode of formation. Prerequisite: GL 321. Field trips. Credit, 3 hours.

465g *Principles of Geophysics*. Principles of the various geophysical methods used in subsurface exploration, methods of geologic interpretation, and factors governing the selection of methods to be used. Prerequisites: PH 112; GL 114. Credit, 2 hours.

468g *Ground Water Geology*. Principles governing the occurrence, movement, quality, and recovery of underground water with special reference to Arizona. Prerequisite: GL 352. Credit, 3 hours.

472g *Sedimentary Petrography*. Lithological and mineralogical analysis of sediments and sedimentary rocks by mechanical separations, thin sections, and detrital grains. Prerequisites: GL 321, 322. Fee, \$2.00. One lecture, 3 hours laboratory. Credit, 3 hours.

Health, Physical Education, and Recreation

PROFESSORS THOMSON (MPE 126D), GILLANDERS, LAVIK, MURPHY, STEWART, WEGNER; ASSOCIATE PROFESSORS BRYANT, KLANN, PITTMAN, SMITH, STEVERSON; ASSISTANT PROFESSORS DICKINSON, GISOLO, GRAHAM, KAJIKAWA, KUSH, MARKHAM, PACKER, PLUMMER, WULK, ZUCHOWSKI; INSTRUCTORS CASTILLO, FAIRBANKS, FELKER, GRIER, HANSEN, KEMP, LAW, RALEY, TAMBURO, WINKLES

Health Education

HE 100 *Healthful Living*. Knowledge, practices, and attitudes related to healthful living. Credit, 2 hours.

360 *School-Community Health*. The basic plan of the school health program—health services, health instruction, and healthful school environment. The role of the teacher in relation to the school health program and the community health program. Credit, 3 hours.

371 *Methods and Materials in Health Education*. The methods and materials currently important to the teaching of health instruction in the schools. Prerequisite: 2-SE 411. Credit, 3 hours.

461g *School Health Problems*. An intensive study of community and school health problems designed to develop skills in the analysis and solution of selected health problems. Prerequisite: HE 360 or teaching experience. Credit, 2 hours.

470g *School-Community Health Councils*. The organization and operation of school health councils and school-community health councils. Prerequisite: HE 360 or teaching experience. Credit, 2 hours.

481g *Principles and Practices of Public Health*. The major areas of public health and the principles involved in the operation of an adequate community health program. Particular stress is directed to the public health programs of Arizona. Afternoon and evening field trips may be scheduled. Credit, 3 hours.

560 *Curriculum Construction in Health Education*. The problems of curriculum construction with respect to acquisition of materials, the establishment of basic curriculum philosophies, the application of educational principles, and the sequence of course content. Credit, 2 hours.

561 *Health Education Workshop*. To provide in-service training for teachers and administrators. Opportunities are provided to develop specific projects within the three major areas of elementary, secondary, and college health programs. Credit, 1-3 hours.

562 *Evaluation in Health Education*. Techniques and devices for evaluating the total school health program. Credit, 2 hours.

563 *Administration of School Health Programs.* Principles and techniques for coordinating and administering school health programs; personnel, legal aspects, public relations, policies, and organization. Prerequisite: HE 360 or teaching experience. Credit, 3 hours.

Special Graduate Courses. HE 500, 590, 591, 592, 593. See page 226.

Physical Education

PE 101, 102 *Freshman Physical Education.* Required of all freshmen not specializing in Physical Education. Students registered for basic ROTC or AFROTC attend one hour a week; all others attend twice a week. Credit, $\frac{1}{2}$ hour each semester.

103, 104, 105, 106 *Restricted Activities.* Limited activities for students who cannot, because of disabilities, enroll in regular physical education classes. Written recommendation of the school physician required. Twice a week. Credit, $\frac{1}{2}$ hour each semester.

110, 111 *Beginning Team Sports.* Classes in football, basketball, hockey, track and field, baseball, softball, soccer, speedball, volleyball, and other team sports. Credit may be given for varsity participation in these sports. Credit, $\frac{1}{2}$ hour each semester.

120, 121 *Beginning Individual and Dual Sports.* Instruction in golf, tennis, badminton, archery, fencing, boxing, wrestling, rifle, gymnastics, and other individual and dual sports. Credit may be given for varsity participation in these sports. Credit, $\frac{1}{2}$ hour each semester.

130, 131 *Beginning Dance.* Classes in tap, square, folk, social and modern dance and other dance activities are offered. Credit, $\frac{1}{2}$ hour each semester.

140, 141 *Beginning Aquatics.* Swimming, diving and other aquatic activities. Credit, $\frac{1}{2}$ hour each semester.

150 *Professional Activities.* Activities include: golf, tennis (men and women), wrestling (men), archery (women). Six hours a week. Credit, 3 hours.

151 *Professional Activities.* Activities include: folk-square dance; social dance (men and women), basketball, flag football, soccer, speedball (men), body mechanics, pom-pon (women). Six hours a week. Credit, 3 hours.

160 *First Aid.* Prevention of accidents, methods of examination and temporary care for victims of accident or sudden illness. Red Cross certification. Credit, 2 hours.

161 *Introduction to Physical Education.* Orientation to the field of physical education. Required of all freshmen specializing in physical education. Credit, 2 hours.

210, 211 *Intermediate Team Sports*. Continuation of PE 111. Credit, ½ hour each semester.

220, 221 *Intermediate Individual and Dual Sports*. Continuation of PE 121. Credit, ½ hour each semester.

230, 231 *Intermediate Dance*. Continuation of PE 131. Credit, ½ hour each semester.

240, 241 *Intermediate Aquatics*. Continuation of PE 141. Credit, ½ hour each semester.

250 *Professional Activities*. Activities include: gymnastics, volleyball, softball, developmental activities (men), modern dance, developmental activities (women). Six hours a week. Credit, 3 hours.

251 *Professional Activities*. Activities include: badminton, swimming, track and field (men and women). Six hours a week. Credit, 3 hours.

260 *First Aid Instructorship*. For individuals who wish to receive certification as Red Cross First Aid Instructors. Prerequisite: Must be 20 years of age and hold current advanced certificate. Credit, 1 hour.

261 *Dance Composition*. Study and analysis of theme and dramatic ideas drawn from poetry, drama, music, and other art forms for use in dance composition. Prerequisite: Approval of instructor. Three times a week. Credit, 2 hours.

262 *Dance Production*. Theory of, and experience in, the staging of dance programs, including lighting, costuming, scenery, and make-up. Three times a week. Credit, 2 hours.

280 *History and Philosophy of Dance*. Dance from ancient times to the present. Consideration of dance as an art in relation to other arts; primitive, pre-classic, and modern forms. Three times a week. Credit, 2 hours.

285 *Kinesiology*. Analytic and synthetic studies of body movements. Neuromuscular skills and body mechanics are emphasized. Prerequisite: ZO 102. Credit, 3 hours.

286 *Physiology of Exercise*. The effects of the various types of exercises upon body structure and function. Prerequisite: ZO 102. Credit, 3 hours.

310, 311, 312, 313 *Advanced Team Sports*. Continuation of PE 211. Credit, ½ hour each semester.

320, 321, 322, 323 *Advanced Individual and Dual Sports*. Continuation of PE 221. Credit, ½ hour each semester.

330, 331, 332, 333 *Advanced Dance*. Continuation of PE 231. Credit, ½ hour each semester.

340, 341, 342, 343. *Advanced Aquatics*. Continuation of PE 240, 241. Advanced skills such as Red Cross Senior Life Saving, Red Cross Water Safety Instructorship, Synchronized Swimming. Credit, ½ hour each semester.

360 *Theory and Practice of Teaching Dance.* Theory of and practice in the teaching of folk, square, and social dance. Students study, analyze, and acquire materials suitable for elementary, secondary, college and recreation use. Credit, 2 hours.

361 *Theory and Practice of Teaching Dance.* Theory of and practice in the teaching of creative rhythm and modern dance. Study, analysis and acquisition of materials suitable for elementary, secondary, college, and recreational use. Credit, 2 hours.

362 *Officiating Football, Basketball, Baseball and Track.* A study of rules and the mechanics of officiating used in football, basketball, baseball, and track. Credit, 3 hours.

363 *Techniques of Officiating.* Qualification of officials, techniques of officiating, interpretation of rules and opportunity to qualify for such D.G.W.S. ratings as are possible in the sport activities offered. Credit, 2 hours.

364 *Coaching* Theory and techniques of varsity sports. Sports include baseball, basketball, swimming, wrestling. Only two may be selected. Four hours a week. Credit, 2 hours.

365 *Coaching.* Continuation of PE 364. Sports include football, golf-tennis, gymnastics, track and field. Only two may be selected. Four hours a week. Credit, 2 hours.

366 *The Elementary Teacher and Physical Education.* The scope and values of the Physical Education Program to the prospective elementary classroom teachers. Orientation, teaching methods, program planning, equipment selection, and experience in teaching activities for grades 1-8. Two lectures, 2 hours laboratory. Credit, 3 hours.

367 *Theory and Practice of Teaching Physical Education in the Elementary Schools.* Practice in, and the analysis of, the activities suitable for elementary school programs as a basis for the development of units, sequence of units by year and grade level. For PE majors. Three hours a week. Credit, 2 hours.

368, 369 *Theory and Practice of Teaching Sports.* Class organization, teaching and coaching of team, individual, and dual sports are discussed and experienced in laboratory situations. Prerequisite: PE 251 or equivalent. Credit, 2 hours each semester.

371 *Organization and Administration of Physical Education.* Organization and administration procedures are analyzed in terms of needs of elementary and secondary students. Practices relating to program, budget, facilities, scheduling, and staff are examined. Credit, 3 hours.

430 *Boys' Club Field Experience.* The student is assigned to a cooperating Boys' Club for a period of 12 weeks, 30 hours a week. To be taken during the fall semester of the senior year. Open only to majors in this program. Credit, 8 hours.

461g *Evaluation in Physical Education.* The need and importance of evaluation in physical education activities. Skill tests, knowledge tests, attitude tests, motor capacity tests, and classification tests are studied, and opportunity for practical experience in administering the several types of tests is provided. Credit, 3 hours.

462 *Techniques of Athletic Training.* Emphasizes the correct use of personal and field equipment, support procedures and therapeutic aids. Laboratory work includes practical techniques in the clinical use of supporting apparatus, physiotherapy. Prerequisites: PE 285, 286. Credit, 2 hours.

463g *Advanced Dance Composition.* The investigation and practice of archaic, preclassic, and contemporary styles of choreography. Prerequisite: PE 261 or approval of instructor. Credit, 2 hours.

464g *Dance Accompaniment.* Analysis of the function of accompaniment for dance; experience in the use of percussion, voice, records, piano, and selected instruments in relation to their use in composition. Credit, 2 hours.

465g *Modern Practices in Physical Education.* Current practices, materials, and trends of physical education activities and their function in contemporary physical education programs are analyzed and experienced. Credit, 2 hours.

470g *Adapted Physical Education.* The organization, administration and content of adapted physical education programs including an examination of the principles of body mechanics and their application to exercise and to adapted physical education activities, experience in related screening tests, and the preventative rather than the corrective aspects of postural improvement. Prerequisites: PE 285, 286. Credit, 3 hours.

471g *Organization and Administration of Intramural Activities.* Principles and practices of the organization of intramural programs on the elementary and secondary levels. Credit, 2 hours.

560 *Curriculum Construction in Physical Education.* Application of the principles, practices, and functional philosophies of curriculum making in physical education. Prerequisite: Major in physical education or teaching experience. Credit, 2 hours.

561 *Physical Education Workshop.* In-service training for teachers, supervisors, and administrators with emphasis in such areas as physical fitness, modern dance, and the use of new teaching techniques and recently designed equipment. Problem selected is based on the professional needs of the student. Credit, 1 hour.

563 *Planning Facilities in Health, Physical Education and Recreation.* Standards and principles for coordinated planning in the construction, multiple use, and maintenance of facilities involving outdoor play areas, athletic fields, gymnasiums, swimming pools, camps, school health centers, and other special areas. Credit, 2 hours.

564 *Improving Performance in Competitive Athletics.* Factors that make for successful motor performance in skills used in individual, dual, and team sports. Ballistic movement, balance, kinesthesia, resistive exercises, spaced activity, laws of learning, physics, kinesiology, and physiology of exercise are investigated and analyzed. Credit, 3 hours.

570 *Organization and Administration of Athletics.* Practical suggestions and guides for managing the affairs of an athletic program. Athletic financing, policies, budgets, contests, schedules, travel, insurance, and current athletic trends are considered. Credit, 2 hours.

571 *Supervision of School Health and Physical Education.* An analysis of contemporary trends and practices in the supervision of health and physical education with special emphasis on supervision of teachers, in-service training, public relations and policies related to promotions. Credit, 2 hours.

580 *History and Philosophy of Physical Education.* The historical development of the philosophies of physical education and the assumptions on which current professional philosophies rest. Credit, 3 hours.

585 *Synthesis of Body Movement.* A study of basic movement common to all physical education activities combined with derivations peculiar to special forms of movement, with opportunity to investigate and experience movement in relation to space, time, dynamics, kinesthetic cognition and purpose. Credit, 3 hours.

Special Graduate Courses, PE 500, 590, 591, 592, 593. See page 226.

Recreation

RE 120 *Recreational Games.* Instruction and playing experience in table tennis, shuffleboard, bowling, paddle tennis, deck tennis, croquet. Twice a week. Credit, ½ hour.

150 *Camp Activities and Skills.* Camp counseling involving outdoor cookery, nature study, nature crafts, camp crafts, story telling, dramatics, songs and music, overnight trips, shelters, orienting, axmanship, firecraft, food preservation and cooking devices. Fee, \$5.00. One hour discussion, 3 hours laboratory. Credit, 3 hours.

260 *Introduction to Community Recreation.* Orientation to the field of organized recreation in terms of its history, philosophy, and development, and the contribution of organized recreation to the school and community. Credit, 2 hours.

261 *Social Recreation.* The development of methods and materials for leadership in social recreational activities for school, church, home, club, and other social groups. Credit, 2 hours.

262 *Program Planning and Recreational Leadership.* Principles and practices involved in planning and carrying out programs of recreation for playgrounds, community centers and youth serving

organizations. Acquisition of methods, materials and leadership skills and techniques through laboratory practice. Credit, 3 hours.

263 *Directed Field Experience in Recreation*. Supervised leadership assignments, or experience equivalent, in public or private agency, camp or institution with emphasis on a variety of leadership experiences common to such organizational programs. Credit, 2 hours.

363 *Directed Field Experience in Recreation*. Continuation of RE 263. Credit, 2 hours.

370 *Public School Camping and Program Planning*. Materials, procedures, and plans for a school camp program and the relationship of camping to other areas of education. Fee \$3.00. Credit, 3 hours.

371 *Organization and Administration of Recreation*. The study and analysis of the administrative structure and organizational policies and practices on the local, state, and national level. Analysis of methods of operation, finance, personnel standards and problems, legal aspects and study of modern trends in terms of present and projected future community needs. Credit, 3 hours.

372 *Youth Organizations*. Principles, practices and leadership experience of natural youth-serving organizations. Credit, 3 hours.

463 *Directed Field Experience in Recreation*. Continuation of RE 363. Credit, 2 hours.

470g *Camp Organization and Administration*. Organization and administration of camps with special emphasis on school camps; preparation for camp management; consideration of budget, camp site, and personnel. Fee, \$3.00. Credit, 2 hours.

570 *Modern Practices in Supervisory Techniques in Recreation*. A comparative study of modern practices in supervision, evaluation, and organizational structure of recreation programs as related to existing administrative structures. Credit, 2 hours.

Special Graduate Courses. RE 500, 590, 591, 592, 593. See page 226.

History

PROFESSORS HUBBARD (SS 225G), DANNENFELDT, KRENKEL, TILDEN;
ASSOCIATE PROFESSOR DUDLEY; ASSISTANT PROFESSORS
ADAMS, DEJONG, MARTINEZ, PAULSEN, PHILLIPS, WOOTTEN

History

HI 101, 102 *Survey of Western Civilization*. The first semester traces western civilization from its origins through the seventeenth century; the second semester continues the survey to modern times. Not open to history majors. Credit, 3 hours each semester.

103, 104 *History of the United States.* The growth of the Republic from colonial times, with the first semester covering through the Civil War period and the second continuing to the present day. Credit, 3 hours each semester.

121, 122 *Foundations of European Civilization.* Development of European ideas and institutions. First semester, ancient and medieval periods; second semester, 1300 to 1789. Required of history majors. Credit, 3 hours each semester.

223, 224 *Europe Since 1789.* Political, social, economic, and intellectual currents in Western Europe. First semester, the French Revolution to 1870; second semester, 1870 to the present. Credit, 3 hours each semester.

241, 242 *History of Latin America.* In the first semester ancient civilization, explorers and conquerors, and colonial institutions are studied. In the second semester the nationalistic development of the independent republics since 1825 is covered. Credit, 3 hours each semester.

301, 302 *Ancient Orient and the Classical World.* The first semester deals with the history and civilization of the Ancient Orient and Greece; the second semester continues classical history to the downfall of the Roman Empire. Credit, 3 hours each semester.

303, 304 *American Cultural History.* The study of culture in a broad connotation including ideas, ideals, the arts, and social and economic standards. The first semester traces the nation's colonial background and early national period. The second semester deals with the age of industrialism and modern America. Credit, 3 hours each semester.

311 *Historical Literature.* Deals comparatively with the works and ideas of leading historians. Prerequisite: At least six hours of upper division courses in history. Credit, 2 hours.

321 *The Middle Ages.* The development of Western Europe from the fall of Rome to the Renaissance with particular emphasis on the social and cultural development. Prerequisite: HI 101 or 121 or approval of instructor. Credit, 3 hours.

331 *American Colonial History.* Political, economic, social, and cultural history of the colonial era. Concentrates primarily on English with some consideration of Spanish, French, and other colonies. Credit, 3 hours.

336 *Recent American History.* The important developments in American history since 1914. Prerequisite: HI 104. Credit, 3 hours.

337 *American Frontier.* Territorial expansion and westward movement of the American people from colonial times to 1890. Prerequisites: HI 103, 104. Credit, 3 hours.

341 *History of Mexico.* The formation, culture and social life of the Mexican people since colonial times. A knowledge of Spanish is desirable but not essential. Credit, 3 hours.

351, 352 *History of England*. The political, economic and social development of the English people. First semester, from the earliest times to the 17th century; second semester, from the 17th century to the present. Credit, 3 hours each semester.

412g *Methods and Problems of Teaching History*. Methods of instruction, organization and presentation of the subject matter of history and closely allied fields. Credit, 3 hours.

423g *Renaissance and Reformation*. Antecedents and development of the Renaissance in Italy, its spread into the rest of Europe, and the subsequent changes in religious and political thought. Prerequisite: HI 101 or 121 or 122 or approval of instructor. Credit, 3 hours.

424g *The Age of Absolutism, 1648-1789*. Political, social, economic and cultural changes in Europe from the Peace of Westphalia to the eve of the French Revolution. Prerequisite: HI 102 or 122 or approval of instructor. Credit, 3 hours.

427g *Modern France*. France since 1870. Prerequisite: HI 224 or approval of instructor. Credit, 3 hours.

428g *Modern Germany*. The development and expansion of Germany from 1848 to the present. Emphasis on political, social, and intellectual trends and problems. Prerequisite: HI 102 or 224 or approval of instructor. Credit, 3 hours.

430g *History of the Southwest*. Development of the southwestern states, people, and economic life, with emphasis on Arizona. Prerequisites: HI 103, 104 or approval of instructor. Credit, 3 hours.

431g, 432g *American Biography*. Considers the noted Americans who made important contributions to United States history. The first semester deals with the period prior to 1860; the second semester with the period since 1860. Prerequisites: First semester, HI 103 or approval of instructor; second semester, HI 104 or approval of instructor. Credit, 3 hours each semester.

433g *American Diplomatic History*. The diplomatic history of the United States from independence to the rise of America as a world power. Prerequisites: HI 103, 104 or approval of instructor. Credit, 3 hours.

434g *Constitutional History of the United States*. The origin and development of the Constitution of the United States with special emphasis on how it has been interpreted by the courts. Prerequisites: HI 103, 104 or approval of instructor. Credit, 3 hours.

437g *Civil War and Reconstruction*. Analysis of the causes and development of the war, political, constitutional and social issues of reconstruction and their effects on post-war America. Prerequisite: HI 103 or 104 or approval of instructor. Credit, 3 hours.

438g *Populism and Progressivism*. Political trends in the United States, 1877-1918. Prerequisite: HI 104 or approval of instructor. Credit, 3 hours.

439g *Economic History of the United States.* An analysis of economic growth in the United States. Prerequisites: HI 103, 104 or 3-EC 201 or approval of instructor. Credit, 3 hours.

442g *History of Brazil.* The political, economic, social and intellectual aspects of the Brazilian people since colonial times. Credit, 3 hours.

449g *Intellectual and Cultural History of Latin America.* Emphasis given to main currents of thought, the outstanding thinkers and their impact on nineteenth and twentieth century Latin America. Attention will also be given to the cultural and institutional basis of Latin American life. Credit, 3 hours.

451g *The British Empire and the Commonwealth.* The growth and development of the British Empire, with emphasis on those factors contributing to the transition to the Commonwealth of Nations. Prerequisite: HI 102 or 122 or 352 or approval of instructor. Credit, 3 hours.

452g *Tudor and Stuart England.* The political, social, economic, and cultural developments which contributed to the forming of the modern world. Prerequisite: HI 101 or 122 or 352 or approval of instructor. Credit, 3 hours.

453g *Modern Britain.* Analysis of the factors contributing to Britain's position as the world's leading power in the 19th century and its decline from that position in the 20th century. Prerequisite: HI 102 or 122 or 352 or approval of the instructor. Credit, 3 hours.

454g *British Constitutional History.* The historical development of the constitutional system of Great Britain from the Middle Ages to the present with particular emphasis on the growth of democracy. Prerequisites: HI 101, 102 or 121, 122 or 351, 352 or approval of instructor. Credit, 3 hours.

461g *Development of Russian Institutions.* The development of Russian political, economic, social, religious and intellectual institutions and traditions from the 9th century to the Revolution of 1917. Prerequisite: HI 102 or 122 or approval of instructor. Credit, 3 hours.

462g *The Soviet Union.* The development of the Soviet system since the Revolution of 1917, with emphasis on its Russian, European, Asian, and global significance. Prerequisite: HI 102 or 224 or approval of instructor. Credit, 3 hours.

471g, 472g *The Far East.* History and culture of China and Japan, including the areas of peripheral influence. First semester, to the mid-nineteenth century; second semester, to the present emphasizing the impact of the West on the Far East. Credit, 3 hours each semester.

481g *History of the Middle East.* Historical development of the area inhabited by the Arab, Turkish, Israeli, and Persian people,

emphasizing the cultures and the world strategic significance of the area. Prerequisite: HI 102 or 104 or 122 or approval of instructor. Credit, 2 hours.

512 *European Historiography*. Studies in the methods and theories of the writers of Ancient and European History. Credit, 3 hours.

513 *American Historiography*. Studies in the methods and theories of the writers of United States history. Credit, 3 hours.

Special Graduate Courses, HI 500, 590, 591, 592, 593. See page 226.

Home Economics

PROFESSOR RANNELLS (HEC 100); ASSOCIATE PROFESSORS BRESINA, ELLSWORTH, GAGE, KAGY, WRIGHT; ASSISTANT PROFESSORS HOOVER, STREUFERT, TIMMONS, WOOLDRIDGE

Home Economics

HO 112 *Personal Adjustment for Family Living*. Consideration of the individual's adjustment to present and future personal and family relations. Designed for majors and non-majors. Open to men and women. Credit, 2 hours.

122 *Clothing Selection*. The selection of clothing with consideration of material, cost, style, design, the individual, and the occasion. Primarily for non-majors. Credit, 2 hours.

123 *Clothing Construction*. Basic processes applied to the making of clothing becoming to the individual. Study of and use of commercial patterns. Development of skills in basic fitting techniques. Open to both majors and non-majors who have not had previous training or on approval of instructor. Six hours a week. Credit, 3 hours.

124 *Wardrobe Planning and Construction*. Selection and care of clothing with consideration of the total family clothing problem. Judgment in using and improving ready-made garments. Experience in the construction of a garment using speed methods. Six hours a week. Credit, 4 hours.

131 *Home Nursing*. Information on health for the family, care of the sick, the mother through pregnancy and childbirth, and infant care. Credit, 1 hour.

141 *Elementary Nutrition*. Principles of nutrition, diet, food in its relation to health. Open to men and women. Credit, 2 hours.

142 *Food Principles and Preparation*. Scientific principles and nutritive facts related to preparing and serving of food. Designed for majors and non-majors. Fee, \$5.00. One lecture, four hours laboratory. Credit, 3 hours.

222 *Textiles*. Textile fibers, their construction, finish, sources, characteristics, identification, and uses. Credit, 2 hours.

223 *Home Selection and Furnishing.* Housing; selection, combination, and arrangement of furniture; color schemes; choice of wall finishes, floor coverings, draperies, and accessories. Credit, 3 hours.

232 *Child Development.* Physical, emotional, social, and intellectual development of children from birth to five years. Observation in the nursery school. Open to men and women. One hour observation, 3 hours discussion. Credit, 3 hours.

233 *Household Equipment.* The selection, construction, use, care, and repair of all types of household equipment. Credit, 3 hours.

234 *Management of Personal and Family Resources.* Management in terms of goals for the individual and the family. Importance of choices in regard to the wise use of time, money, energy, abilities, skills and material goods on the basis of family relations and the optimum development of the individual. Credit, 2 hours.

321 *Clothing: Pattern Designing.* Fundamental principles in designing, cutting, and fitting individualized garments. Flat patterns used. Prerequisites: HO 122 and 123 or 124. Fee, \$2.00. Six hours a week. Credit, 3 hours.

322 *Art Related to the Home.* The application of the principles of art to daily living with experience in selecting and creating objects for the home and personal use. Credit, 2 hours.

331 *Family Relationships.* Understanding of family life and current problems including preparation for marriage. Open to men and women. Credit, 3 hours.

332 *Management of Work in the Home.* The work of the home from the standpoint of the management of the work load; the technology of home processes and the techniques of work simplification. Prerequisite: HO 234. Three hours a week. Credit, 2 hours.

334 *Consumer Problems and Family Finance.* The economic problems of the individual and family, with the consideration of wise use of income, the selection and use of consumer goods on different levels, analysis of standards for buying, including comparative costs, and the influence of advertising, retail stores, and government agencies. Credit, 3 hours.

341 *Quantity Cookery.* Standard methods of food preparation in quantity; operation of institutional equipment, menu planning for institutions. Experience in quantity food service. Prerequisite: HO 142. Fee, \$2.00. One lecture, 6 hours laboratory. Credit, 3 hours.

342 *Food Demonstration.* Purposes and techniques of food demonstrations. Practical experience before audiences. Prerequisite: HO 142. Fee, \$5.00. Four hours a week. Credit, 3 hours.

343 *Meal Management*. Nutritional and social aspects of planning, preparing and serving of meals for families. Emphasis on time, energy and equipment management; food arrangements; food costs; and table appointments. Prerequisite: HO 142. Fee, \$5.00. Six hours a week. Credit, 3 hours.

422g *Clothing: Draping and Dress Design*. Working with fabric on a dress form expressing original ideas in dress design; emphasis upon the understanding of the principles involved in fitting and pattern construction. Prerequisites: HO 122, 123 or 124. Fee, \$3.00. Six hours a week. Credit, 3 hours.

423g *Clothing: Tailoring*. Construction of coat or suit; tailoring techniques, alteration of patterns, and fitting emphasized. Prerequisites: HO 124, 321. Six hours a week. Credit, 3 hours.

424g *Applied Home Furnishing*. Theory and experience in home furnishing projects such as construction of curtains, draperies, and slip covers, as well as refinishing of furniture. Prerequisites: HO 124, 223. Credit, 2 hours.

427g *Children's Clothing*. Selection of appropriate fabric; self-help, comfort and artistic features. Credit, 3 hours.

428g *Clothing and Textile Appraisal*. The determining factors in the selection and buying of family clothing and of fabrics used in the home. Prerequisite: HO 222. Credit, 2 hours.

431 *Nursery School Education*. Apprentice teaching in the university laboratory preschool. Discussion and application of methods for guiding children in routines and free play situation. Prerequisite: HO 232 or 2-EE 313 or 1 course in psychology. Credit, 3 hours.

432g *Problems of Normal Preschool Children*. Problems occurring most frequently in early childhood and their significance. Guidance methods. Survey of recent literature. Prerequisite: HO 232 or 2-EE 313 or 1 course in psychology. Credit, 2 hours.

434g *Organization and Administration of Preschools*. Curriculum planning and evaluation of existing and proposed programs in relation to recommended standards and needs of the community. Prerequisite: HO 431 or approval of instructor. Credit, 3 hours.

435g *Family Living*. The inter-personal relationships of family members as a factor in their growth and development. Prerequisites: HO 232 or 2-EE 313 and HO 331. Credit, 3 hours.

436g *The Meaning of Play*. Each student will observe, analyze and interpret play activities in relation to the development of the child. Prerequisite: HO 232 or 2-EE 313 or approval of instructor. One lecture, 2 hours laboratory. Credit, 2 hours.

437 *Home Management House*. A laboratory experience designed to facilitate the application of the principles of management to the activities of the home and to provide for the integra-

tion of learnings from the related areas of home economics. Residence—advanced reservations required. Board and room at regular University rates. Prerequisites: HO 232, 234, 332, 343. Credit, 3 hours.

441g *Advanced Nutrition*. Special problems in diet and nutrition. Prerequisites: HO 141; CH 101. Credit, 3 hours.

442g *Experimental Foods*. Application of experimental methods to preparation of food; reports and reading of food research. Prerequisites: HO 142 and science approved by instructor. Fee, \$5.00. Six hours a week. Credit, 3 hours.

443g *Child Nutrition*. Special emphasis upon the nutritional needs from prenatal development through adolescence. The study of food requirements, feeding practices, and indices of good nutritional status. Prerequisites: HO 141, 232, or approval of instructor. Fee, \$2.00. Two lectures, 2 hours laboratory. Credit, 3 hours.

444g *Diet Therapy*. Methods of adapting, modifying, and applying normal nutrition principles to abnormalities of metabolism. Prerequisites: HO 343, 441. Fee, \$2.00. Two lectures, 2 hours laboratory. Credit, 3 hours.

445g *Institutional Food Service*. The organization, administration and management of food service in hospitals and institutions. Prerequisite: HO 341. Credit, 3 hours.

446g *Institution Food Purchasing*. Food purchasing for institutions; understanding of cost factors, food laws, quality standards, and basic manufacturing processes. Prerequisite: HO 341 or approval of instructor. Credit, 3 hours.

447g *Gourmet Foods*. The art and appreciation of international epicurean foods accompanied by preparation and appropriate service. Prerequisite: HO 142 or approval of instructor. Fee, \$5.00. Three hours a week. Credit, 2 hours.

452g *The Teaching of Clothing and Textiles*. For teachers of clothing selection, construction, and care. Use of equipment, motivation and standards of work, individual illustrative material, evaluation. Students bring sewing equipment, including pieces of fabric. Prerequisite: Undergraduate class in methods of teaching homemaking. Credit, 2 hours.

454g *The Teaching of Food and Nutrition*. For homemaking teachers in elementary and secondary schools. Emphasis on family-centered focus within the limitations of the 50-minute class period. Prerequisite: Undergraduate class in methods of teaching homemaking. Credit, 2 hours.

456g *Teaching of Family Living and Child Guidance*. For teachers of homemaking in elementary and secondary schools. Includes a study of philosophy, content, teaching activities, use of community resources, and evaluation. Opportunity to participate in planning and conducting a play school typical of a high school teaching situation. Credit, 3 hours.

480g *Methods of Teaching Home Economics.* Methods of instruction, organization, and presentation of appropriate content in Home Economics. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

521 *Recent Developments in Textiles.* The recent developments in the textile field as they affect the consumer. Prerequisite: HO 222. Credit, 2 hours.

522 *Pattern Design.* Distinction in design through the use of the flat pattern. Prerequisite: HO 321. Fee, \$2.00. Credit, 3 hours.

531 *Advanced Child Development.* Facts and concepts for interpreting and understanding personality and social development of the young child in the family. Methods, techniques, and patterns. Prerequisite: HO 232 or 2-EE 313 or PY 281 or approval of instructor. Credit, 3 hours.

541 *Recent Developments in Nutrition.* Recent research in nutrition with view of finding practical applications. Prerequisite: HO 141. Credit, 2 hours.

551 *Supervision of Home Economics Education.* For off-campus teachers of homemaking cooperating in the student-teaching program of the University and others qualified. An evaluation of programs of other states. A program suited to the needs of Arizona is developed. Prerequisite: Approval of instructor. Credit, 2 hours.

552 *Evaluation in Home Economics Education.* Newer concepts concerning evaluation and testing instruments and techniques in elementary and secondary schools. Prerequisite: Undergraduate course in methods of teaching homemaking. Credit, 3 hours.

553 *Recent Trends in the Teaching of Homemaking.* Survey of content and procedures for teaching the various areas of homemaking in elementary and secondary schools. Primarily for persons preparing to re-enter teaching. Prerequisite: Undergraduate major in Home Economics and a course in methods of teaching homemaking. Credit, 2 hours.

Special Graduate Courses, HO 500, 590, 591, 592, 593. See page 226.

Humanities

PROFESSOR SCHILLING (SS 415A) ASSOCIATE PROFESSORS
BUKER, LAMM; INSTRUCTOR HOWELLS

Humanities

HU 101, 102 *Ideas and Values in the Humanities.* The interrelation of art, literature, music, and philosophy in the modern world. Credit given for General Education only when both HU 101 and 102 are taken. Credit, 4 hours each semester.

201, 202 *The Humanities in the Western World.* An integrated course designed to develop a discriminating appreciation of art, music, literature, philosophy, and religion. The heritage of the past is presented in relation to life today. Credit given for attending selected plays, exhibitions, concerts. Prerequisites: Thirty hours; EN 101, 102. Credit for General Education given only when both HU 201, 202, are taken. Credit, 4 hours each semester.

301, 302 *The Humanities in Modern America.* An integrated course in American art, music, literature, and philosophy, with emphasis upon present developments. Participation in current university and community offerings in the subject fields is a supplementary activity. Prerequisites: EN 101, 102. One lecture and two discussion periods a week. Both HU 301, 302 must be taken to receive credit in General Education. Credit, 3 hours each semester. See page 79 for list of courses that may be used for Option II and Option III in the Humanities.

Industrial Education

PROFESSOR BURDETTE (EC 801); ASSOCIATE PROFESSORS LITRELL, KIGIN; ASSISTANT PROFESSORS BURK, CAVALIERE, GOODWIN, KAUFMAN, KEITH, PAXTON, PEABODY, PRUST; INSTRUCTORS BOARD, EDWARDS

Aeronautics

TA 180 *Aircraft Structures.* Design and construction of wood structures, fabric and finishing. Fee, \$4.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

181 *Composite Aircraft Structures.* Structure design, control system, landing gear, and engine mountings. Fee, \$2.00. One lecture, 3 hours laboratory. Credit, 2 hours.

182 *Metal Aircraft Structures.* Construction and design, including layout, template and flat plate development. Special heat treating and corrosion prevention. Fee, \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

183 *Aircraft Maintenance.* Repair and alteration of modern aircraft including installation and general servicing of hydraulics and electrical equipment. Rigging, weight and balance computations, periodic inspections, recording, cost estimating. Fee, \$2.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

185 *Private Pilot Certificate.* Flight School Primary. Flight training to meet CAA requirements. Satisfactory completion of CAA tests required for certification. Credit arranged; limit three hours.

287 *Aircraft Power Plants*. Modern air and liquid cooled engines, power, accessory and supercharger sections; specifications and tolerances, horsepower curves, MEP, BMEP, BHP; inspection methods, materials and processes. Fee, \$5.00. Two lectures, 8 hours laboratory. Credit, 5 hours.

288 *Aircraft Power Plant Maintenance*. Alteration, operation, periodic inspection, service, diagnosis and engine installation; theory, design and maintenance characteristics of controllable, constant speed, hydromatic, electric and reversible propellers. Fee, \$2.00. One lecture, 3 hours laboratory. Credit, 2 hours.

289 *Aircraft Power Plant Accessories*. Fuel systems, carburetion, fuels, injection systems, magnetos, generators, starters, and superchargers. Fee, \$3.00. Two lectures, 4 hours laboratory. Credit, 3 hours

384 *Airport Planning*. Community airway and air traffic control; airport types, requirements, planning and construction; lighting, building and hangar design. Credit, 2 hours.

385 *Commercial Pilot Certificate*. Flight training to meet CAA requirements. Satisfactory completion of CAA tests required for certification. Prerequisite: TA 185. Credit, 2-8 hours.

388 *Propulsion*. Principles, thrust, performance, combustion systems, metallurgy, axial and centrifugal flow compressors, gas turbines, turbo-prop engines. Fee, \$4.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

486 *Flight Engineering*. Relationships of altitude, power output, and performance; engine power curves, take-off and climb charts, cruising charts and flight logs. Two lectures, 3 hours laboratory. Credit, 3 hours.

487 *Aircraft Design*. Basic constructional concepts; stressed skin aircraft, correlation of design, requirements with manufacturing practice. Credit, 3 hours.

488 *Airline Operations*. Administrative problems and airport management; unit organizations, personnel problems, interline agreements, promotion and publicity. Credit, 2 hours.

Technical Design

TD 111 *Technical Drawing*. Orthographic projection, section and auxiliary views, fasteners, axonometric projection, perspective. Six hours laboratory. Fee, \$2.00. Credit, 2 hours.

112 *Descriptive Geometry*. History and geometry of Technical Drawing. Prerequisite: TD 111. Fee, \$2.00. Six hours laboratory. Credit, 2 hours.

121 *Production Language*. Technical terms and symbols, industrial standards and tolerances, sketching and reading working drawings. Prerequisite: TD 111, or equivalent. Fee, \$2.00. One lecture, 3 hours laboratory. Credit, 2 hours.

200 *Machine Drafting*. Working drawings for machines, jigs and fixtures, punches and dies. Prerequisite: TD 121. Fee, \$2.00. Six hours laboratory. Credit, 2 hours.

302 *Technical Drawing*. Application emphasized in all fields of industrial drafting. Prerequisites: TD 121, 1-MA 118. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

303 *Descriptive Geometry*. Contoured surfaces, intersections and developments; layout drawing, cut and fill problems. Prerequisites: TD 112, MA 118. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

305 *Precision Design*. Layout and dimensioning for production. Use of catalogs, standards, specifications. Prerequisites: TD 200, 1-MA 118, ME 251. Fee, \$2.00. One lecture, 3 hours laboratory. Credit, 2 hours.

330 *Electro-Mechanical Design*. Actuating mechanisms, electronic hardware, components, packaging. Prerequisites: TD 302, or equivalent, TE 213. Fee, \$2.00. One lecture, 3 hours laboratory. Credit, 2 hours.

340 *Fluids*. Containers, fluid drives, hydraulic, pneumatic controls; code design. Prerequisites: TD 302, PH 111, MA 118, or equivalent. Fee, \$3.00. Three lectures. Credit, 3 hours.

350 *Design Laboratory*. Stress strain determination and analysis, modern measurements, kit design, lubrication and velocity experiments. Prerequisites: TD 305, PH 111, ME 102. Fee, \$3.00. One lecture, 5 hours laboratory. Credit, 3 hours.

402 *Structural Detailing*. A.I.S.C. riveted and welded fabrication design. Prerequisites: ES 211, TD 121, MA 118. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

406 *Mechanical Design*. Mechanisms, kinematics, linkage, cams, and gears. Prerequisites: TD 305, 350, ES 211, 1-PH 111. Fee, \$3.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

407 *Mechanical Design*. Strength design of machine parts. Prerequisite: TD 406. Fee, \$3.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

408 *Nomographics*. Use and creation of graphs for design problems and publication. Prerequisites: TD 302, ME 102. One lecture, 3 hours laboratory. Credit, 2 hours.

Electronics

TE 200 *Electricity and Electronics*. Theory and applications of d-c and a-c circuits. Prerequisites: IA 109; 1-MA 118. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

210 *Radio Code*. International Morse Code; Required: Ten words per minute. Commercial procedures. Fee, \$2.00. One lecture, 3 hours laboratory. Credit, 2 hours.

213 *Vacuum Tubes*. Principles, construction, and operation. Prerequisites: TE 200; 1-MA 120. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

310 *Direct Current Circuits*. Power circuits and measurements. Prerequisite: TE 200. Fee, \$2.00. Two lectures, 3 hours laboratory or problem session. Credit, 3 hours.

311 *Alternating Current Circuits*. A-c power circuits and measurements. Prerequisite: TE 310. Fee, \$2.00. Two lectures, 3 hours laboratory or problem session. Credit, 3 hours.

315 *Electronics*. Electronic circuits and applications. Prerequisite: TE 213. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

316 *Electronics*. Continuation of TE 315. Prerequisite: TE 315. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

317 *Electronic Measurements*. Equipment and techniques used in laboratory and industry. Prerequisite: TE 213. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

318 *Aircraft Radio*. Theory and operation of equipment. Requirements for 3rd class operator's license included. Prerequisite: TE 200 or IA 220. Credit, 3 hours.

319 *Industrial and House Wiring*. Installation of lighting and power circuits, underwriters regulations, cable and conduit lay out, and cost estimation. Prerequisite: IA 220 or TE 200. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

320 *Acoustics*. Industrial sound and noise problems. Prerequisite: TE 315. Credit, 2 hours.

330 *Transistors*. Principles of semiconductors, diodes and transistors. Prerequisite: TE 213. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

410 *Electronics in Industry*. Theory and applications in the industrial field. Prerequisite: TE 316. Credit, 2 hours.

412 *Microwaves*. Circuits with emphasis on typical television, telemeter and radar applications. Prerequisite: TE 316. Three lectures. Credit, 3 hours.

414 *Television*. Emphasizes monochrome and color receivers. Prerequisite: TE 316. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

415g *Video Circuits*. Continuation of TE 414 with emphasis on control room and transmission equipment. Prerequisite: TE 414. Two lectures, laboratory arranged. Credit, 2, 3 or 4 hours.

417 *Circuit Analysis*. Fundamental network theorems. Prerequisite: TE 311. Credit, 3 hours.

418g *Communication Circuits*. Control room and transmission equipment; includes preparation for first class operator's license. Prerequisite: TE 316 or equivalent. Two lectures, laboratory arranged. Credit, 2, 3 or 4 hours.

419g *Communication Systems*. Continuation of TE 418. Prerequisite: TE 418. Two lectures, laboratory arranged. Credit, 2, 3 or 4 hours.

420g *Circuit Analysis*. Complex network theorems. Prerequisite: TE 417. Credit, 3 hours.

Mechanics

TM 161 *Machine Shop*. Measurement, layout, benchwork, drill press and lathe operations. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

162 *Machine Shop*. Engine, lathe operations and practical metallurgical problems. Prerequisite: TM 161. Two lectures, 3 hours laboratory. Credit, 3 hours.

164 *Sheet Metal*. Layout, cutting, soldering, joining; manufacture and applications. Prerequisite: TD 111. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

169 *Oxy-Acetylene Welding*. Materials, setup, safety; types of welds, positions and cutting. Fee, \$8.00. One lecture, 5 hours laboratory. Credit, 3 hours.

173 *Automotive Electrical Equipment*. Principles, specifications, circuits, and adjustment of components. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

274 *Basic Automotives*. Engines, power transmission, brakes, and chassis assemblies; design, tolerance measurements, corrective procedures. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

364 *Sheet Metal*. Pattern development and machine emphasis; industrial applications, and estimating. Prerequisite: TM 164. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

369 *Electric Arc Welding*. Making lap, ridge, flat, vertical, horizontal, overhead and T-welds; metallurgy and rods. Prerequisite: TM 169. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

371 *Auto Body Repair*. Welding, re-shaping, and refinishing. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

376 *Diesel Engines*. Compression and fuel ratios; fuel injection methods, pressure lubrication, heat problems, fuels; operation and maintenance. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

377 *Automotive Machine Work*. Engine rebuilding, boring, honing, and fitting. Prerequisite: TM 274. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

461g *Machine Shop*. Milling machines and shapers; design, cutters, holding devices and typical operations. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

462g *Machine Shop*. Complex milling, shaping, grinding problems and operations. Prerequisite: TM 461. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

467 *Jigs and Fixtures*. Design, construction and experimentation for quantity production. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

469g *Welding Problems*. Specialized techniques in oxy-acetylene welding-cutting and electric arc welding; heliarc inert gas welding. Fee, \$8.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

478g *Auto Testing and Tuning*. Instruments, methods: electrical and carburetion systems emphasized. Prerequisites: TM 173, 274. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

Industrial Arts

IA 104 *Drafting and Design*. Design principles and problems; architectural drafting. Prerequisite: TD 111. Fee, \$3.00. Six hours laboratory. Credit, 2 hours.

109 *Calculations*. Slide rule and technical problems. Credit, 2 hours.

121 *Woods*. Wood technology, construction and history. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

135 *Basic Graphic Arts*. Type composition, presswork, book binding, screen processes, duplicating. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

156 *Upholstery*. Frame design and constructions, filler materials, fabrics. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

161 *Materials Laboratory*. Plastics, leather, lapidary; industrial emphasis. Fee, \$6.00. One lecture, 3 hours laboratory. Credit, 2 hours.

170 *Automobile Theory and Function*. Consumer approach to acquaint the average owner with limitations, correct operation and maintenance. Fee, \$3.00. One lecture, 3 hours laboratory. Credit, 2 hours.

220 *Electricity*. Principles of a-c, d-c, and machines. Prerequisite: 1-MA 116 or 117. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

235 *Machine Composition*. Introduction to Linotype mechanisms and machine principles. Operation and care of machines. Fee, \$3.00. One lecture, 5 hours laboratory. Credit, 3 hours.

256 *Upholstery*. Design emphasis, power sewing and materials studies. Prerequisite: IA 156. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

261 *General Metals*. Properties, tools and machines, welding, casting, heat treating. Fee, \$6.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

322 *Machine Woods*. Power tool operation, industrial woods application. Prerequisite: IA 121. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

323 *Shop Maintenance*. School and industrial maintenance organization and operations. Fee, \$3.00. One lecture, 3 hours laboratory. Credit, 2 hours.

327 *Finishing Materials and Techniques*. Materials origin, composition and application for woods and metals. Prerequisite: IA 322. Fee, \$4.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

335 *Graphic Arts*. Layout and design, photo offset lithography, photo screen processes, production techniques. Prerequisite: IA 135. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

342 *Selection and Organization of Subject Matter*. Selective learning units through job analysis; course development. Credit, 3 hours.

356 *Industrial Upholstery*. Commercial procedures in design, construction and assembly. Prerequisite: IA 256. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

401g *Drafting Procedures*. Methods, evaluation drafting problem sequences, and equipment. Fee, \$3.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

421g *Production Woods*. Product and process design, jigs and fixtures, quality control, assembly, finishing. Prerequisite: IA 322. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

422g *Planning and Equipment*. Planning industrial arts laboratories; equipment selection, auxiliary facilities. Credit, 3 hours.

427g *Finishing Problems*. Industrial wood and metal finishing techniques; product testing. Prerequisites: IA 322, 327. Fee, \$6.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

435 *Offset Lithography (Camerawork)*. Survey of lithography, offset camera work. Layout, stripping, opaquing. Fee, \$9.00. One lecture, 5 hours laboratory. Credit, 3 hours.

436 *Offset Lithography (Presswork)*. Planography and operation of the offset press: Etches gums, and solvents. Prerequisite: IA 435. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

444g *Modern Industries*. Aspects of management, labor, plant and product; for interpretation of industry in secondary school industrial arts programs. Credit, 3 hours.

446g *Instructional Materials*. Selection, method, preparation and construction. Credit, 3 hours.

461g *The General Shop*. Principles, methods of organization and equipping; practicum. Fee, \$4.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

465g *General Metals*. Continues properties, sheet-metal, casting, welding; emphasizes machine, spinning and metal finishes. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

480g *Teaching Industrial Subjects*. Teaching techniques, organization, and evaluation of teaching efficiency. Prerequisite: 2-SE 311. Credit, 3 hours.

494 *Techniques of Construction*. From prints to completion; FHA standards. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

513 *Electricity and Radio for Teachers*. Programs, courses, syllabi and laboratory projects. Credit, 3 hours.

515 *Electrical Laboratory Design*. Requirement studies of high school laboratories for electricity and radio. Credit, 3 hours.

540 *Evaluation in Industrial Subjects*. Evaluative factors such as attitude, behavioral factors, skills, technical and related information; instrument construction. Credit, 3 hours.

542 *Philosophy of Practical Arts*. Current concepts, anticipated policies, practices and objectives. 3 credits.

544 *History of Industrial Education*. Factors motivating evolution of modern programs; implication for future; trends. Credit, 3 hours.

548 *Supervision and Administration of Industrial Education*. Improving instruction, fund and material control, student personnel problems, curricular patterns. Credit, 3 hours.

549 *Current Literature and Research*. Research techniques; analysis of literature; investigations and reporting. Credit, 3 hours.

Special Graduate Courses. IA 590, 591, 592, 593. See page 226.

Mass Communications

PROFESSOR ALISKY (SS 232); ASSISTANT PROFESSORS
JOHNSON, MATULA; INSTRUCTOR LANCE

Journalism

JO 110 *Mass Communications*. The communications industry, including the press, radio, and television; basic concepts of news, news values, and reporting of news; fundamentals of journalism; laboratory practice in news-gathering and news-writing. Prerequisite: EN 101. Two lectures, 2 hours laboratory. Credit, 3 hours.

211 *Reporting*. Study and practice in the coverage and writing of news; structure of the news story and development of news values; laboratory practice; experience as reporter on the *State Press*. Prerequisite: JO 110. One lecture, 4 hours laboratory. Credit, 3 hours.

212 *Advanced Reporting*. Continuation of JO 211. Main types and sources of news; interviewing and re-writing; laboratory and *State Press* experience. Prerequisite: JO 211. One lecture, 4 hours laboratory. Credit, 3 hours.

300 *The Cinema in Mass Communications*. The motion picture as a mass medium. Credit, 3 hours.

301 *Advertising Principles*. Advertising as a communications tool in marketing and business management. Consideration of creative methods, survey of media, measurement of effectiveness, and coordination with other aspects of the sales and promotional program. Prerequisite: 3-MK 351 or JO 110. Credit, 3 hours. (Same as 3-AD 301.)

311 *News Photography*. Instruction with field and laboratory practice in camera and darkroom techniques for newspaper and magazine photographic work. Prerequisite: JO 110 or approval of instructor. Fee, \$10.00. One lecture, 3 hours activity. Credit, 2 hours.

312 *Communications Law*. Legal aspects of the rights and responsibilities of the press, radio, and television; regulations, restrictions, and "the people's right to know"; basic features of the law of libel, privilege, contempts, copyrights, access to information; background of court reporting. Prerequisite: JO 212. Credit, 3 hours.

313 *Copyreading and Editing*. Practical work in copyreading and headline writing; use of the newspaper stylebook; principles of typography and of makeup. Laboratory practice. Prerequisite: JO 212. Credit, 3 hours.

314 *History of Communications*. American journalism from its English and colonial origins to the present day; development of radio and television, and the progression of the various media toward an industry of mass communications. Prerequisite: JO 212. Credit, 3 hours.

315 *Radio-Television News*. Techniques and practices of editing and preparing local and wire news copy for radio and television news broadcasts; laboratory practice in preparation of same for actual broadcasting. Prerequisite: JO 212. Credit, 3 hours.

320 *Staff Activity*. Experience and responsibility of editing and making up a complete newspaper as a member of its masthead staff. The University newspaper, the *State Press*, is used as the laboratory or work-project for this class. Prerequisite: JO 313. Credit, 2 hours.

330 *International Communications*. Press and broadcasting of Latin America and selected European and Asian nations. Foreign correspondents. Worldwide news agencies. Voice of America and international broadcasting. Problems in worldwide flow of information. Prerequisite: JO 110. Credit, 3 hours.

340 *Magazine and Industrial Journalism*. General magazine and house organ publishing, writing, and editing. Prerequisite: JO 110. Credit, 3 hours.

401 *Public Relations*. Publicity methods and public relations; representation of business firms and institutions to the public. Includes training on what constitutes news-worthy material and how to communicate it through newspapers, magazines, radio-television stations, and other media. Prerequisite: 3-GB 233 or JO 211. Credit, 2 hours.

411g *Special Assignment*. Selection and performance of a major project or projects on an individual basis. Prerequisites: JO 312, 320, 412. Credit, 2 to 5 hours.

412g *Editorial Interpretation*. The press as an influence upon public opinion. The byline story, editorial, and work of the columnists, in analyzing and interpreting current events. Prerequisite: JO 212. Credit, 2 hours.

413g *Advising High School Publications*. Designed for high school journalism advisers. Problems of annual and newspaper staffs discussed. Credit, 2 hours.

421 *News Problems and Policies*. Seminar in journalism with emphasis upon major difficulties encountered and editorial decisions required in the writing, handling and publishing of news. Prerequisite: JO 312 or 412. Credit, 2 hours.

Radio-Television

RT 200 *Fundamentals of Radio-Television*. The organization of broadcast stations, facilities and terminology of broadcasting. Prerequisite: JO 110. Credit, 3 hours.

232 *Radio-Television Announcing*. Techniques of radio and television announcing. Prerequisites: JO 110; SE 120 or 200. Radio-television majors only. Credit, 3 hours.

321 *Radio-Television Drama*. The production of both radio drama and television drama, with emphasis on acting techniques appropriate to each form. Prerequisite: DR 112. Credit, 3 hours. (Same as DR 321.)

332 *Radio Programming and Production*. Principles of production and fundamentals of programming market radio stations, as well as modern networks. Application of the principles through work on KASN and Radio-TV Bureau programs. Prerequisite: RT 230. Two hours class, 2 hours laboratory. Credit, 3 hours.

336 *Television Production.* Skills of planning, staging, and presentation, with practical experience as cameraman, floor manager, mike operator. Prerequisite: RT 232. Fee, \$5.00. Two lectures, 2 hours laboratory. Credit, 3 hours.

371 *Radio and Television Advertising.* Techniques and problems of radio and television as advertising media, including program selection and planning, preparation of continuity and coordination with other forms of advertising. Prerequisite: 3-AD 301. Credit, 3 hours. (Same as 3-AD 371.)

431 *Television Writing.* Principles and techniques of writing for television with emphasis on television drama. Credit, 3 hours.

433, 434 *Radio-Television Station Operation.* Radio and television programming and production. Specific assignments in the operation of college radio-television stations. Prerequisite: RT 332 or 336. Credit, 2 hours each semester.

472 *Radio-Television Station Management.* Background in the organization, procedures, and policies of radio-television stations. Financial and creative basis of station operation. Consideration of personnel and production problems, relationship with advertising agencies, networks and sponsors. Prerequisites: 3-AD 301 and SE 332 or 431. Credit, 3 hours. (Same as 3-AD 472.)

Mathematics

PROFESSORS LOWENSTEIN (PS B233), FREUND, GREEN, NERING, SCOTT, WEXLER; ASSOCIATE PROFESSORS CARR, LYON, MILLER, PORTMANN, ROBERTS, SAVAGE, WUNCH; ASSISTANT PROFESSORS COHN, LISKOVEC, LIVERMORE, PECK, SANDERS, SMITH; INSTRUCTORS DYERSON, LAKE, MYERS, RICHARDSON SEABURY, THOMPSON

Mathematics

MA 116 *Intermediate Algebra.* The real number system, algebraic operations, polynomials, special products, factoring, functions and graphs, exponents, equations and their solutions. Meets three to five days a week, depending on student's qualifications in algebra. Credit, 3 hours.

117 *College Algebra.* Progressions, permutations and combinations, probability, mathematical induction, determinants, and theory of equations. Prerequisite: MA 116 or equivalent. Credit, 3 hours.

118 *Trigonometry.* The six trigonometric functions and their graphs, radian measure, identities and equations, inverse trigonometric functions, logarithms, solution of triangles. Prerequisite: MA 117. Credit, 3 hours.

119 *Algebra and Trigonometry*. Primarily for students who plan to continue with MA 120, 121, 212 and who need a review of College Algebra and Trigonometry. Credit will not be allowed for both MA 119 and MA 117 or MA 118. Credit, 4 hours.

120, 121 *Analytic Geometry and Calculus*. Prerequisite: College Algebra and Trigonometry (or equivalent) with grade of C or better. Credit, 4 hours each semester.

205 *Mathematics for General Education*. The development of mathematics with emphasis on the influence of mathematics on other branches of culture. Fundamental aims, methods, and results are considered rather than development of techniques. Credit, 4 hours.

212 *Analytic Geometry and Calculus*. Continuation of MA 120, 121. Prerequisite: MA 121. Credit, 4 hours.

220 *Differential Equations*. Methods of solution of differential equations of science and engineering, including series solutions. Prerequisite: MA 212. Credit, 3 hours.

226 *Introduction of Modern Statistics*. The basic concepts and methods of statistics, including descriptive statistics, significance tests, estimation, sampling, and correlation. Not open to majors in mathematics or the physical sciences. Prerequisite: MA 116. Credit, 3 hours.

362 *Advanced Calculus for Engineers*. Vector field theory; partial differential equations. Prerequisite: MA 220. Not open to mathematics majors. Credit, 3 hours.

363 *Advanced Calculus for Engineers*. Complex variable theory; probability theory. Prerequisite: MA 220. Not open to mathematics majors. Credit, 3 hours.

365 *Introduction to Numerical Analysis*. Finite differences; interpolation; numerical differentiation, integration, and summation; transcendental equations. Prerequisite: MA 212. Credit, 3 hours.

385 *Arithmetic in the Elementary School*. A teacher's view of arithmetic as a system of related concepts, principles, and processes; instruction in the subject matter of arithmetic; materials and methods used to teach arithmetic with meaning. Prerequisite: Junior standing. Credit, 3 hours.

404g *Projective Geometry*. Projective geometry and its relationship to Euclidean and other geometries. Prerequisite: MA 212. Credit, 3 hours.

407g *College Geometry*. Advanced plane geometry. Prerequisite: MA 212. Credit, 3 hours.

408g *Differential Geometry*. Curves and surfaces; curvature; invariants; geodesics. Prerequisite: MA 220. Credit, 3 hours.

426g, 427g *Mathematical Statistics*. Empirical and theoretical distributions, regression and correlation, sampling distributions, estimation and tests of hypotheses, analysis of variance. Prerequisite: MA 212. Credit, 3 hours each semester.

429g *Probability*. Combinatorial analysis, probability distributions and density functions, moments, limit theorems. Prerequisite: MA 212. Credit, 3 hours.

437g *Statistical Methods for Engineering and Physical Sciences*. The theory and methods of experimental statistics including tests of hypotheses, analysis of variance, factorial experimentation. MA 426 and 437 may not both be counted for credit. Prerequisite: MA 212. Credit, 3 hours.

438g *Design of Experiments*. The principles of experimental design; special designs; analysis of covariance. Prerequisite: MA 427 or 437. Credit, 3 hours.

442g *Vector Spaces and Matrix Theory*. Linear vector spaces and transformations; algebra of matrices; linear equations; eigenvalue and eigenvector theory; quadratic and Hermitian forms. Prerequisite: MA 212. Credit, 3 hours.

443g *Introduction to Abstract Algebra*. Fundamental properties of groups, rings, and fields; homomorphism theorems for groups and rings; integral domains and quotient fields. Prerequisite: MA 442 or approval of instructor. Credit, 3 hours.

445g *Theory of Numbers*. Prime numbers; the unique factorization theorem; congruences; Diophantine equations; primitive roots; the quadratic reciprocity theorem. Prerequisite: MA 212 or approval of instructor. Credit, 3 hours.

446g *Theory of Equations*. Complex numbers; theorems and methods relating to the solutions of polynomial equations; numerical approximations; determinants and the solution of systems of linear equations. Prerequisite: MA 212. Credit, 3 hours.

460g *Foundations of Applied Mathematics: Real Analysis*. Functions of several variables; Jacobians and implicit function theorem; multiple integrals and change of variable; sequences of functions; power series; Fourier integrals and series. Prerequisite: MA 220. Credit, 3 hours.

461g *Foundations of Applied Mathematics: Complex Analysis*. Analytic functions; complex integration; Taylor and Laurent series; residue theorem; conformal mapping and harmonic functions. Prerequisite: MA 460 or equivalent. Credit, 3 hours.

462g *Introduction to Partial Differential Equations*. Second order partial differential equations with emphasis on Laplace, wave, and diffusion equations; solutions by the methods of: characteristics, separation of variables, Green's function, and integral transforms. Prerequisite: MA 460. Credit, 3 hours.

463g *Transform Theory and Operational Methods*. Fourier, Laplace, Hankel, and Mellin transforms; applications to boundary value problems; generalized functions and modern operational mathematics. Prerequisite: MA 461. Credit, 3 hours.

465g *Numerical Analysis*. Numerical solution of ordinary differential equations, integral equations, and partial differential equations; matrices and determinants applied to the numerical solution of simultaneous linear equations; harmonic analysis; method of least squares and Chebyshev polynomials. Prerequisites: MA 220, 365. Credit, 3 hours.

470g, 471g *Foundations of Analysis*. Real and complex numbers; point-set topology in Euclidean-space; limits and continuity; differentiation; Riemann-Stieltjes integration; functions of several variables; Jacobians; line and surface integrals. Prerequisite: MA 220. Credit, 3 hours each semester.

480g *Mathematics in the Upper Elementary Grades*. For teachers of mathematics in grades 6-8; subject matter taught in these grades, with appropriate materials and methods of instruction. Prerequisites: Major or minor in mathematics and MA 385 or approval of instructor. Credit, 3 hours.

484g *Mathematics for the Secondary School Teacher*. Selected topics relating to mathematical structure in algebra and geometry. Prerequisite: Approval of instructor. Credit, 3 hours.

485g *History of Mathematics*. The origin and development of mathematical ideas beginning with geometry and algebra and continuing through selected topics in modern mathematics. Prerequisite: Approval of instructor. Credit, 3 hours.

512, 513 *Topology*. The basic concepts of set theory, cardinal and ordinal numbers, and the well-ordering theorem; general topological spaces, including function theory in abstract spaces and topological algebraic structures. Prerequisite: MA 471. Credit, 3 hours each semester.

522 *Theory of Statistics: Probability*. Probability distributions; expected values; moments; generating functions; limit theorems. Prerequisite: MA 427 or equivalent. Credit, 3 hours.

523 *Theory of Statistics: Inference*. Sampling and sampling distributions; theories of estimation and tests of hypotheses. Prerequisite: MA 522. Credit, 3 hours.

524 *Theory of Statistics: Least Squares*. General linear hypothesis; regression; analysis of variance. Prerequisites: MA 442 and 523. Credit, 3 hours.

527 *Advanced Inference*. Point and interval estimation; the Neyman-Pearson theory; game theory; decision theory. Prerequisite: MA 524. Credit, 3 hours.

539 *Statistical Laboratory*. The computing methods of statistics. The student is expected to participate in consultation problems with members of the statistical laboratory staff. Prerequisite: Approval of instructor. Credit, 1-3 hours.

543, 544 *Modern Algebra*. Groups, modules, rings, and fields; Galois theory; linear algebras; representation theory. Prerequisite: MA 443. Credit, 3 hours each semester.

547 *Group Theory*. Groups with operators; composition series; soluble groups; Abelian groups; Sylow's theorems. Prerequisite: MA 443. Credit, 3 hours.

550, 551 *Methods of Mathematical Physics*. Topics selected from matrices, orthogonal functions, integral equations, calculus of variations, eigenvalue problems, perturbation methods, boundary value problems. Prerequisite: MA 461 or equivalent. Credit, 3 hours each semester.

554 *Calculus of Variations*. Necessary and sufficient conditions of Euler, Weierstrass, Legendre, and Jacobi; direct methods and Dirichlet principle; Ritz and Galerkin methods of approximate solutions; applications to eigenvalue problems and partial differential equations. Prerequisite: MA 460 or 470. Credit, 3 hours.

565 *Advanced Numerical Analysis*. Modern numerical analysis techniques; relaxation methods; variational methods; methods for non-linear equations. Prerequisite: MA 465. Credit, 3 hours.

570, 571 *Functions of a Real Variable*. Point-set theory and metric spaces; Lebesgue integration; abstract measure theory; L_p spaces and linear functionals; differentiation. Prerequisite: MA 471. Credit, 3 hours each semester.

572, 573 *Functions of a Complex Variable*. Analytic functions; complex integration; Taylor and Laurent series; residue theorem; partial fractions and infinite product representation of functions; Riemann mapping theorem; analytic continuation; harmonic functions; Dirichlet problem; Green's function; conformal mapping. Prerequisite: MA 461 or 471. Credit, 3 hours each semester.

574, 575 *Theory of Ordinary Differential Equations*. Systems; existence proofs; singularities; asymptotic behavior of solutions; boundedness of solutions; eigenvalues and eigenfunctions; Rayleigh-Ritz methods; perturbation theory. Prerequisite: MA 461 or 572. Credit, 3 hours each semester.

576, 577 *Theory of Partial Differential Equations*. Existence and uniqueness theorems; boundary value and initial value problems; characteristics; Green's function; maximum principle; variational and operational methods; Sturm-Liouville theory. Prerequisite: MA 461 or 572. Credit, 3 hours each semester.

580, 581 *Mathematics for In-service Teachers*. Subject matter in mathematics required for accelerated programs in secondary curricula. Prerequisite: Approval of instructor. Credit, 3 hours each semester.

584 *Survey of Modern Mathematics for In-service Teachers.* Theory of sets, real number system, transfinite numbers, and other selected topics. Course designed for teachers of secondary school mathematics. Prerequisite: Approval of instructor. Credit, 3 hours.

586 *Probability and Statistics for In-service Teachers.* Probability theory based on the theory of sets and the modern concepts of statistical inference; problems related to the teaching of statistics in high school. Prerequisite: Approval of instructor. Credit, 3 hours.

587 *Abstract Algebra for In-service Teachers.* The postulational approach to algebra; elementary mathematical systems, including groups and fields. Prerequisite: Approval of instructor. Credit, 3 hours.

588 *Modern Geometry for In-service Teachers.* Survey of topics of Euclidean, projective, and non-Euclidean geometries. Prerequisite: Approval of instructor. Credit, 3 hours.

Special Graduate Courses, MA 590, 591, 592, 593. See page 226.

Military Science

PROFESSOR FERRELL (MPE 200); ASSISTANT PROFESSORS CAMUNEZ, HANSON, JONES, LUXEMBURGER, SMITH, SULLIVAN; INSTRUCTORS LOWES, MIKULEKY, McPEEK

Military Science

In conjunction with MS 101, a student must enroll in an academic course as prescribed by the Department of Military Science. A list of approved academic courses may be obtained at the time of registration.

MS 101 *Basic Military Science.* Leadership laboratory, one hour weekly. Credit, 0.5 hours.

102 *Basic Military Science.* Leadership laboratory; US Army and national security; organization of the Army; individual weapons. Two hours lecture, one leadership laboratory a week. Credit, 1.5 hours.

201, 202 *Basic Military Science.* Leadership laboratory; American military history; map reading and aerial photography; basic tactics. Prerequisites: MS 101, 102. Two hours lecture and one leadership laboratory a week. Credit, 1.5 hours each semester.

301 *Advanced Military Science.* Leadership laboratory; military teaching methods; organization, function and missions of the Arms and Services. Prerequisite: Basic Course or equivalent. Four lectures, one leadership laboratory a week. Credit, 3.0 hours.

302 *Advanced Military Science*. Leadership laboratory; small unit tactics and communications. Prerequisite: Basic Course or equivalent. Credit, 3.0 hours.

311 *Advanced Military Science*. Leadership laboratory; operations; logistics. Prerequisites: MS 301, 302. Four lectures, one leadership laboratory a week. Credit, 3.0 hours.

312 *Advanced Military Science*. Leadership laboratory; military administration; military law; service orientation. Prerequisites: MS 301, 302. Four lectures, one leadership laboratory a week. Credit, 3.0 hours.

Music

PROFESSORS RIDER (Arts 203), BULLOCK, M. A. DRESSKELL, FLETCHER, HARELSON, SCOLAR; ASSOCIATE PROFESSORS ANTOINE, AUTENRIETH, BARKLEY, N. DRESSKELL, HINES, KEATING, QUAID, RICKEL; ASSISTANT PROFESSORS BOWERS, BRITTON, CHAUSOW, LOMBARDI, NELSON, SMITH, STALZER

Music

MU 100 *Fundamentals of Music Notation*. To provide non-music majors with sufficient symbol literacy to begin work in the field of musical learning. No credit for music majors. Credit, 2 hours.

105 *Music in Living*. The function of music in social, political, and cultural developments past and present. The relationship of music to various aspects of life and the other arts. For students not majoring in music. Credit, 2 hours.

107 *Introduction to Music*. The correlation of music with literature, science, and art. A non-technical course in the humanities primarily created for non-music majors. Credit, 2 hours.

124, 126, 224, 226, 324 *Integrated Theory*. Basic theory needed for musicians to develop musical understandings, and skills in written harmony. To be taken concurrently with Integrated Theory Techniques. Three times a week. Credit, 2 hours each semester.

125, 127, 225, 227, 325 *Integrated Theory Techniques*. Sight singing, dictation, ear training, and keyboard work. To be taken concurrently with Integrated Theory. Twice a week. Credit, 1 hour each semester.

211 *Music for Classroom Teachers*. Basic musical preparation for all Education majors. Previous musical training not necessary. Credit, 2 hours.

311 *Music Methods for Lower Elementary Grades*. Development of the classroom music program for kindergarten through 4th grade. Prerequisite: MU 211 or equivalent. Credit, 3 hours.

312 *Music Methods for Upper Elementary Grades.* Development of the classroom music program for 5th through 8th grade. Prerequisite: MU 211 or equivalent. Credit, 3 hours.

320 *Counterpoint.* Strict counterpoint in all species in two, three, and four or more parts. Creative writing on original cantata-fermi. Prerequisite: MU 226. Credit, 2 hours.

321 *Counterpoint.* Continuation of MU 320. Combined forms; double and triple with free parts. Original compositions in the style for organ or piano. Trios for piano and strings, woodwinds, or string quartet. Prerequisite: MU 320. Credit, 2 hours.

341, 342, 343, 344 *History and Literature of Music.* History and literature of music, designed to give perspective in judgments, based upon essential information and understanding as well as covering sources of information. Three times a week. Credit, 2 hours each semester.

355 *Survey of American Music.* The growth and development of America's music. A humanities course for non-music majors. Credit, 2 hours.

356 *Survey of the Musical Theater.* An examination of music's place in the theater, viewed in terms of its historical importance and relative function. A humanities course for non-music majors. Credit, 2 hours.

423g *Composition.* Creative writing in the smaller forms including harmonic textures and use of contrapuntal devices. Credit, 2 hours.

424g *Composition.* Continuation of MU 423. Concentrated creative writing for voice and instrumental works. To include solo and ensemble compositions. Prerequisite: MU 423. Credit, 2 hours.

427 *Form and Analysis.* Harmonic and structural analysis of musical forms. The study of simpler forms to and including the Sonata Allegro form. Prerequisite: MU 226. Credit, 2 hours.

428g *Form and Analysis.* Continuation of MU 427. Includes the larger forms, such as symphonic and tone poems with free adaptations and combinations of all forms. Prerequisite: MU 427. Credit, 2 hours.

429g, 430g *Canon and Fugue.* Polophonic studies in form and technique. Prerequisite: Approval of instructor. Credit, 2 hours each semester.

431g *Choral Arranging.* Arrangements for three, four, and more parts mixed choirs and glees; accompaniments; special effects. Emphasis upon choral requirements of school and radio performance. Prerequisite: MU 226. Credit, 2 hours.

433g *Instrumentation.* Theoretical and practical study of scoring for wind instruments in various combinations, ranging from small ensembles to the full band. Prerequisite: MU 226. Credit, 2 hours.

434g *Instrumentation*. Continuation of MU 433. Adds problems of scoring for the string section, and progresses to full scoring for symphony orchestra and symphonic band. Prerequisite: MU 433. Credit, 2 hours.

445g, 446g *Twentieth Century Music*. An approach, through recorded music and discussion, to the works of composers of the Twentieth century. Prerequisite: MU 226 or approval of instructor. Three times a week. Credit, 2 hours.

449, 450 *Music in Worship*. Historical survey and analysis of Plainsong, Anglican chant, Gregorian chant, Canticles, Traditional liturgies, and Forms of service. The transition from psalmody into hymnody. The liturgical year in various faiths. Credit, 3 hours each semester.

451 *Repertoire*. The literature available for performance in all performing media. Prerequisite: MP 212. May be repeated for credit. Credit, 2 hours.

455g, 456g *Musicology*. Systematic, historical, and comparative musicology. Musical bibliography is stressed. Prerequisites: One foreign language; MU 226. Credit, 3 hours each semester.

461g *Education Methods: Band and Orchestra*. Wind, string, and percussion methods and materials used in the development of junior and senior high school bands and orchestras. Prerequisite: Twenty semester hours of music. Credit, 2 hours.

462g *Elementary School Music Materials*. Books, music, primary instruments, phonograph records, and films for primary, intermediate and upper grades. Credit, 1 hour.

463g *Problems in Teaching Elementary School Music*. Singing, playing, rhythms, and listening experiences for children. For elementary teachers; also for specialist teachers of music who wish to help classroom teachers to participate in teaching music to their groups. In certain cases, kindergarten-primary teachers in service may use this course in partial fulfillment of certification requirements. Prerequisite: Teaching experience. Credit, 2 hours.

464g *Listening Activities in the Elementary School*. Phonograph recordings, films, and radio programs suitable for use with experience units in the elementary grades. For classroom teachers and music teachers. Credit, 2 hours.

465 *Public School Music Survey*. For music majors in the B.A. in Education curriculum. Surveys the entire field of music education on the national, state, and local scale. Includes philosophy, curriculum, materials, and teaching methods. Credit, 3 hours.

466g *Listening Activities in the High School*. Designed to aid the teacher to develop the ability to train pupils in how to listen for emotional content and formal structure. Recordings, films, and other media are used to indicate the correlation of music with other forms of art. Credit, 2 hours.

480g *Methods of Teaching Music.* Methods of instruction, organization, and presentation of appropriate content in music. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

481g *Performance Pedagogy and Materials.* Principles and methods of performance techniques. Sectionally organized for each performance field. Prerequisite: Four years of study in one performance area or equivalent. Credit, 2 hours.

482g *Theory of Rhythm.* An integration of musical organization through physiological and psychological principles based upon rhythmic perception. Prerequisites: MU 428, 445; MP 339 or 340. Credit, 2 hours.

523 *Advanced Composition.* Creative writing in the larger forms for chorus, orchestra, and band. Prerequisite: MU 424. Credit, 2 hours.

524 *Advanced Composition.* Continuation of MU 523. Concentrated writing in the larger forms, vocal and instrumental, making use of modern harmonic devices. Prerequisite: MU 523. Credit, 2 hours.

525, 526 *Pedagogy of Theory.* Practices and principles of teaching music theory. Emphasis directed towards setting up the most desirable and practical offerings possible. Comparative studies of existing practices throughout the United States. Prerequisite: MU 321 or equivalent. Five times a week. Credit, 3 hours.

527, 528 *Evolution of Musical Theory.* Harmonic theory from Pythagoras to the present. Prerequisite: MU 321. Credit, 3 hours each semester.

529, 530 *Notation of Polyphonic Music.* First semester, keyboard and lute tablatures, and white mensural notation; second semester, black mensural notation. Credit, 3 hours each semester.

535 *Bach.* The life and works of Johann Sebastian Bach. Credit, 3 hours.

536 *Palestrina.* The life and works of Giovanni Pierluigi Palestrina. Credit, 3 hours.

537 *Mozart.* The life and works of Wolfgang Amadeus Mozart. Credit, 3 hours.

(M.A. candidates may choose one of these three (535, 536, 537) to fulfill requirements for degree.)

540 *Performance Practices of Early Keyboard Music.* The manners of performance of earlier times, including rhythmic expression, ornamentation and technique. A study of the appropriate keyboard instruments, forms, and tunings. Credit, 3 hours.

541 *The Art Song.* French, German, Italian, and English literature. Diction, interpretation and artistic significance. Credit, 3 hours.

542 *History of the Sonata*. Development of the sonata form from the 16th century to the present. Credit, 3 hours.

564 *The Marching Band—Pageantry*. The marching band; performances at athletic events; various formations, mechanics of stunts. Prerequisite: Approval of instructor. Credit, 2 hours.

567 *Organization and Administration of High School Bands and Orchestras*. Organization problems, procedures and materials. Credit, 2 hours.

Special Graduate Courses, MU 500, 590, 591, 592, 593. See page 226.

Music Performance

MP 109 *Elements of Conducting*. Essentials of conducting techniques used by both instrumental and vocal teachers in elementary and secondary school musical organizations. Twice a week. Credit, 1 hour.

111, 112, 211, 212 *Applied Music—Private Instruction*. Private instruction in piano, organ, voice, violin, viola, violoncello, contrabass, flute, oboe, clarinet, bassoon, saxophone, trumpet (cornet), French horn, baritone, trombone, tuba, and percussion. Prerequisites: Courses taken in numerical order to complete repertory and technical requirements or proficiency equivalent. Two lessons a week. Credit, 2 hours each semester.

121, 122, 221, 222 *Applied Music—Private Instruction*. Private instruction in piano, organ, voice, violin, viola, violoncello, contrabass, flute, oboe, clarinet, bassoon, saxophone, trumpet (cornet), French horn, baritone, trombone, tuba, and percussion. Prerequisites: Courses taken in numerical order to complete repertory and technical requirements or proficiency equivalent. One lesson a week. Credit, 1 hour each semester.

125, 126, 225, 226 *Basic Piano*. Instruction in Applied Music to be taken only by music majors who qualify in placement examinations. Two lessons a week. Credit, 1 hour each semester.

131, 132, 231, 232 *Class Piano*. A four-semester sequence of courses designed for those lacking piano experience and those who need piano as a classroom tool. Emphasis on keyboard technique, sight reading, simple accompaniments and improvisation. Two hours a week. Credit, 1 hour each semester.

133, 134 *Class Voice*. The systematic development of the principles of good singing. For non-music majors and as substitute for credits in Applied Music minor of music majors. Credit, 1 hour each semester.

145 *Symphony Orchestra*. Open to all students who can qualify on the basis of auditions with the director. Over a four-year period, the student is introduced to the great masterpieces of symphony orchestra literature. Four times a week. May be repeated for credit. Credit, 1 hour.

151 *Choral Union*. Open to all students in the University and to interested singers in the community. Time devoted to preparation and performance of the larger choral works. Rehearsals are held one evening per week. May be repeated for credit. Credit, 1 hour.

152 *Concert Choir*. A picked group chosen by audition. May be repeated for credit. Credit, 1 hour.

155 *Men's Glee Club*. Experience in rehearsal and performance of music for male voices. Public performances. Prerequisite: Approval of the conductor. Open to male students of any of the colleges. May be repeated for credit. Credit, 1 hour.

161 *Symphonic and Marching Band*. Open to all students who can qualify on the basis of auditions with the Director. In addition to the staging of formations and drills for football games and other events, the student is introduced to the great masterpieces of symphonic band literature over a period of four years. Five times a week. May be repeated for credit. Credit, 1 hour.

171 *Opera Workshop*. Rehearsal and performance of operatic works. Study of practical production problems in the musical theatre. Several public productions yearly. Prerequisite: Approval of instructor. Open to students of any of the colleges. May be repeated for credit. Credit, 1 hour.

181 *Chamber Music Ensembles*. String, brass, woodwind, percussion, keyboard, vocal and mixed ensembles. Prerequisite: Approval of instructor. Twice a week. May be repeated for credit. Credit, 1 hour.

235, 236 *Educational Methods for Strings*. Practical class in gaining the string knowledge necessary for instrumental teachers in public schools. Meets daily. Credit, 1 hour each semester.

237, 238 *Educational Methods for Brass and Percussion*. Practical class in gaining the brass and percussion knowledge necessary for instrumental teachers in public schools. Meets daily. Credit, 1 hour each semester.

311, 312, 411, 412 *Applied Music—Private Instruction*. Private instruction in piano, organ, voice, violin, viola, violoncello, contrabass, flute, oboe, clarinet, bassoon, saxophone, trumpet (cornet), French horn, baritone, trombone, tuba, and percussion. Prerequisites: Courses taken in numerical order to complete repertory and technical requirements or proficiency equivalent. Two lessons a week. Credit, 2 hours each semester.

321, 322, 421, 422 *Applied Music—Private Instruction*. Private instruction in piano, organ, voice, violin, viola, violoncello, contrabass, flute, oboe, clarinet, bassoon, saxophone, trumpet (cornet), French horn, baritone, trombone, tuba, and percussion. Prerequi-

sites: Courses taken in numerical order to complete repertory and technical requirements or proficiency equivalent. One lesson a week. Credit, 1 hour each semester.

337, 338 *Educational Methods for Woodwinds and Percussion.* Practical class in gaining the woodwind and percussion knowledge necessary for instrumental teachers in public schools. Meets daily. Credit, 1 hour each semester.

339 *Choral Conducting.* Elements of choral technique and interpretation. Required of music education vocal students. Prerequisite: MP 109. Three times a week. Credit, 2 hours.

340 *Instrumental Conducting.* Fundamentals of score reading, and interpretation of instrumental music. Required of all music education instrumental major students. Prerequisite: MP 109. Three times a week. Credit, 2 hours.

351, 352 *Service Playing.* Music for liturgical and non-liturgical church services. Development of such techniques as transportation, modulation, and improvisation. Credit, 3 hours each semester.

385, 386, 485, 486 *Applied Music—Major Performer.* A sequential program of private instruction for the Bachelor of Music candidate only. Prerequisite: MP 312. Credit, 4 hours each semester.

511, 512, 513, 514 *Applied Music—Private Instruction.* For the student who has had the equivalent of four years training in his major performing field, voice or instruments. Prerequisite: MP 412 or equivalent. Two lessons a week. Credit, 2 hours each semester.

521, 522, 523, 524 *Applied Music—Private Instruction.* For the student who has had the equivalent of four years training in his major or minor performing field. Prerequisite: MP 412 or 422 or approval of Department Chairman. One lesson a week. Credit, 1 hour each semester.

539 *Advanced Conducting.* The study and practice of advanced baton technique for band and orchestra. Score reading, mechanics of conducting, individual criticisms of style. Prerequisite: Major in Music or Music Education. Credit, 2 hours.

585, 586 *Applied Music—Major Performer.* Private instruction for performance majors only. Prerequisite: MP 486. Credit, 4 hours each semester.

595, 596 *Solo Performance.* Candidates for the Master of Music in Applied Music must give two recitals; one full solo recital and one as recommended by the faculty. The second recital may take the form of a major operatic role, performance with orchestra, ensemble, lecture recital, or other. Credit, 1 hour each semester.

Nursing

ASSOCIATE PROFESSORS HANNER (ANX XVI 2), BRANSTETTER, WALKER; ASSISTANT PROFESSORS BIGLER, DAWSON, JOHNSON, LOIR, McLEOD, MUNCH, STUMPF; INSTRUCTORS NACZKI, STEFFL, STELLHORN, WEED

Nursing

NU 101 *Introduction to Nursing*. Designed to assist the beginning student to gain a knowledge of the backgrounds of nursing and a basic understanding of the purposes and functions of the nursing profession and its relationship to other health professions and community agencies. One lecture, 1 hour discussion. Credit, 2 hours.

211 *Human Relationships in Nursing*. Designed to provide opportunity for development of beginning understanding and skills fundamental to good interpersonal relations in hospital and home situations. Prerequisites: Major in nursing and NU 101. Two hours discussion and conference, 3 hours laboratory. Credit, 3 hours.

212 *Human Relationships in Nursing*. Continuation of NU 211. Two hours conference every two weeks, 3 hours laboratory on alternate weeks. Credit, 1 hour.

221 *Psychiatric Nursing*. Current psychiatric concepts and the nursing care of selected patients with psychiatric conditions. Prerequisites: Major in nursing, PY 100, HO 232, and NU 211, and/or approval of instructor. Fee, \$10.00. Four hours lecture, 8 hours supervised practice. Credit, 6 hours.

302 *Nursing Science*. The basic concepts inherent in nursing as derived from the behavioral, social, physical and biological sciences with the opportunity for the application of principles in the laboratory and clinical nursing area. To be taken concurrently with NU 331. Prerequisites: PY 100; SO 101; science requirements in the nursing curriculum. Two hours lecture, 3 hours laboratory. Credit, 3 hours.

303 *Nursing Science*. Continuation of NU 302. Prerequisite: NU 302 or approval of instructor. One hour lecture, 3 hours laboratory. Credit, 2 hours.

306 *Modern Professional Nursing*. New concepts and trends in professional practice and nursing education. Prerequisite: Enrollment in graduate nurse program. Credit, 3 hours.

307, 308 *Psycho Dynamics of Nursing*. Considers concepts basic to interpersonal relations in nursing. Designed to aid in development of understanding of relationships of the nurse to patients and co-workers. Limited to students enrolled in registered nurse program. Prerequisite: PY 100 and 281 or HO 232 and approval of instructor. Two hours discussion, 2 hours clinical experience. Credit, 2 hours each semester.

331, 332 *Maternal and Child Nursing.* The role of the nurse as related to the individual needs and health problems of the mother and child during pregnancy, parturition, puerperium, childhood and adolescence. Prerequisite: NU 211, and science requirements of the nursing curriculum, and approval of instructor. To be taken concurrently with NU 302, 303. Fee, \$15.00. Four hours lecture, 18 hours supervised practice and conference. Credit, 9 hours each semester.

350 *Leadership Skills in Nursing.* An introduction to the functions and responsibilities of the leader of the nursing team; techniques of management and teaching in the clinical units. A consideration of the leadership role of the professional nurse directing her activity toward comprehensive patient care. Designed as a workshop for graduate nurses. Credit, 1 hour.

360 *Recent Advances in Nursing.* Advanced study in various specialized fields in nursing. May be repeated for credit. Credit, 1-5 hours.

407 *Nursing Continuum.* Critical analysis is made of philosophies and methods of professional nursing practice. Nursing problems in select clinical areas are studied to determine the scientific basis (physical, biological, social) of nursing care. Prerequisite: Senior status in the nursing program. Eight hours of clinical experience, 4 hours lecture and discussion. Credit, 4 hours.

441, 442 *Medical and Surgical Nursing.* The basic and advanced concepts, knowledges, and skills of nursing in the care of patients with medical and surgical conditions emphasizing nursing science principles. A critical analysis is made of the philosophies and methods of professional nursing practice. Prerequisite: NU 332 or approval of instructor. Fee, \$10.00. Four hours lecture, 16 hours supervised practice and conference. Credit, 8 hours each semester.

451 *Public Health Science.* Basic principles of Public Health administration, vital statistics, epidemiology, environmental sanitation, and health education. Coordinated with and concurrent to Public Health Nursing clinical experience. Prerequisites: Senior status in the nursing major; approval of instructor. Credit, 3 hours.

452 *Public Health Nursing.* Relates principles and practice of Public Health Nursing. Particular consideration of the health needs of the individual and his family in the home, the school, at work, and in the community. Prerequisites: Senior status in the nursing major; approval of instructor. Fee, \$10.00. Twelve hours of clinical experience and conferences. Credit, 3 hours.

453 *Public Health Nursing.* Continuation of NU 452. Prerequisites: NU 451 and approval of instructor. Fee, \$10.00. Two hours lecture, 12 hours of clinical experience and conferences. Credit, 5 hours.

Physics

PROFESSORS WAGER (PS-B133), GOSSICK, MEISTER; ASSOCIATE
PROFESSORS KEVANE, KYRALA, RAWLS; ASSISTANT
PROFESSORS DOWLING, SCHROEDER; INSTRUCTORS
FITZGERALD, IMPSON

Physics

PH 101 *Introduction to Physics*. The fundamental principles of physics, presented with a minimum of mathematics, to give the student an understanding of the concepts of physics as applied to everyday life. Fee, \$4.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

111 *General Physics*. The fundamental principles of mechanics, heat, and sound with an emphasis on applications to professional scientific fields. Prerequisites: MA 116 or 117; MA 118. Fee, \$5.00. Three lectures, 1 recitation, 2 hours laboratory. Credit, 4 hours.

112 *General Physics*. The fundamental principles of electricity, magnetism, and light. Prerequisite: PH 111. Fee, \$5.00. Three lectures, 1 recitation, 2 hours laboratory. Credit, 4 hours.

222 *Physical Mechanics*. The motion of a particle and systems of particles in one, two, and three dimensions: including a discussion of gravitation and of moving coordinate systems. Prerequisites: PH 112; MA 121 or equivalent. Credit, 4 hours.

223 *Physical Mechanics*. Continuation of PH 222 including kinematics of rigid body motion, and an introduction to Lagrangian and Hamiltonian mechanics and to the special theory of relativity in classical mechanics. Prerequisites: PH 222; MA 212. Credit, 3 hours.

241 *Intermediate Heat and Thermodynamics*. Principles of heat energy with an introduction to thermodynamics. Prerequisites: MA 212 and PH 112 or equivalent. Credit, 3 hours.

251 *Sound and Optics*. Basic principles of sound and optics including a general discussion of wave motion and physical and geometrical optics. Prerequisites: 4-ME 102; MA 121. Credit, 3 hours.

301 *Basic Principles of Modern Physics*. Those portions of mechanics, electricity and magnetism, and optics necessary to the understanding of atomic and nuclear phenomena. Designed for teachers. Credit, 3 hours.

322 *Wave Motion and Sound*. Mechanics of vibration on strings, membranes, and fluids. Prerequisites: PH 222; MA 220. Credit, 3 hours.

331, 332 *Principles of Electricity and Magnetism*. Electrostatics, magnetostatics, direct current theory, alternating current theory,

propagation of electromagnetic waves and related topics. Prerequisites: PH 223 and MA 220 or equivalent. Credit, 3 hours each semester.

361 *Modern Physics*. Fundamental principles of spectroscopy, x-rays, nuclear theory, cosmic rays and photoelectricity. Prerequisites: 4-EE 202 and MA 220 or equivalent. Credit, 3 hours.

433g *Electron Physics*. Principles and theories of electron motion in free space, solids and plasmas, electron emission and the principles of circuit theory. Prerequisite: PH 332. Credit, 3 hours.

442g *Kinetic Theory of Gases*. The classical theories of Maxwell-Boltzmann with an introduction to the theories of Fermi-Dirac and Bose-Einstein. Prerequisites: MA 220 and PH 241 or equivalent. Credit, 3 hours.

451g *Optics*. Physical and geometrical optics based on the Maxwell equations and including interference, diffraction, crystal and metal optics. Prerequisites: MA 220; PH 332. Credit, 3 hours.

460g *Atomic Physics*. Recent advances in atomic physics. Designed for teachers. Prerequisite: PH 301 or one year of college physics. Credit, 3 hours.

461g *Atomic Physics*. Extra-nuclear phenomena from an advanced viewpoint. Prerequisites: PH 332; MA 220 or equivalent. Credit, 3 hours.

462g *Nuclear Physics*. Intra-nuclear phenomena from an advanced viewpoint. Prerequisite: PH 461 or equivalent. Credit, 3 hours.

463g *Nucleonic Laboratory*. Experimental techniques of nuclear physics. Designed for teachers and students not majoring in physics. Prerequisite: PH 112. Fee, \$6.00. One lecture, 3 hours laboratory. Credit, 2 hours.

464g *Nuclear Physics*. Fundamentals of nuclear physics. Designed for teachers and students not majoring in physics. Prerequisites: PH 112, 460 or equivalent. Credit, 3 hours.

471g *Quantum Mechanics and Atomic Spectra*. The Schrodinger wave equation and perturbation theory; treatment of the hydrogen atom, potential well problems, and elementary atomic and molecular spectroscopy. Prerequisite: PH 332. Credit, 3 hours.

490g *Advanced Physical Measurements*. Prerequisites: PH 112 or equivalent, and approval of instructor.

- Mechanics and Heat. Fee, \$5.00. Three hours laboratory. Credit, 1 hour.
- Electricity and Magnetism. Fee, \$10.00. Six hours laboratory. Credit, 2 hours.
- Optics and Light. Fee, \$5.00. Three hours laboratory. Credit, 1 hour.

—Atomic Physics. Fee, \$5.00. Three hours laboratory. Credit, 1 hour.

—Nuclear Physics. Fee, \$5.00. Three hours laboratory. Credit, 1 hour.

514 *Survey of Modern Physics*. A survey of background material of physics followed by a thorough treatment of recent additions in the field. Designed particularly for secondary school teachers who wish to augment the background required in their earlier training. Prerequisite: Approval of instructor. Credit, 2 hours.

515 *Techniques in Teaching Physics*. Experience in problem solving; preparation of demonstrations, experiments, and projects; organization of laboratories. Designed primarily for secondary school physics teachers. Prerequisite: Approval of instructor. Credit, 2 hours.

516, 517 *Physics for In-service Teachers*. Concepts and principles of physics. Prerequisite: Approval of instructor. Credit, 3 hours each semester.

521, 522 *Mechanics*. Topics chosen from the following: variational principles and Lagrange's equations, rigid body motion, Hamilton's equations, canonical transformations, Hamilton-Jacobi theory and small oscillation theory as applied to problems in mechanics, electricity and magnetism, and modern physics. Prerequisite: Approval of instructor. Credit, 3 hours each semester.

523 *Theory of Relativity*. Special and general theories of relativity. Prerequisites: PH 522, 532 or approval of instructor. Credit, 3 hours.

531, 532 *Electromagnetic Theory*. Electrostatics, magnetostatics, Maxwell's equations, the stress tensor, plane and spherical waves, and multiple radiation; Hamiltonian formulation of the field equations and Cerenkov radiation. Credit, 3 hours each semester.

541 *Advanced Thermodynamics*. Problems in thermodynamics including phase changes and phase equilibrium, liquidification of gases and liquid helium, superconductivity and fluctuation. Prerequisites: PH 442, 471. Credit, 3 hours.

542 *Statistical Mechanics*. Review of quantum mechanics. Statistical interpretation of thermodynamics and partition functions. Ideal gases, magnetism and specific heats. Prerequisite: PH 541. Credit, 3 hours.

551 *Advanced Optics*. Electromagnetic potentials and polarization, rigorous diffraction theory, interference and diffraction with partially coherent light, fiber optics, and the application of Fourier transforms to problems in optics. Prerequisite: PH 451. Credit, 3 hours.

561, 562 *Advanced Nuclear Physics*. Nuclear structure, size, statistics, forces, models and beta disintegration. Prerequisite: Approval of instructor. Credit, 3 hours each semester.

563 *Atomic Spectra and Structure.* Atomic spectra from the viewpoint of quantum mechanics, including selection rules, intensities, the Stark and Zeeman effects, and hyperfine structure. Prerequisite: PH 577. Credit, 3 hours.

564, 565 *Molecular Spectra and Structure.* Molecular spectra from the viewpoint of quantum mechanics including the analysis of electronic, vibrational and rotational spectra of polyatomic molecules and the use of group theory to simplify the calculations. Prerequisite: PH 471. Credit, 3 hours each semester.

576, 577 *Quantum Mechanics.* The Schroedinger wave equation, eigenfunctions and eigenvalues, collision theory, approximation methods with applications to atoms, molecules, solids, radiation, and related topics. Prerequisite: Approval of instructor. Credit, 3 hours each semester.

578, 579 *Advanced Quantum Mechanics.* Relativistic quantum mechanics and quantum field theory. Prerequisite: PH 577. Credit, 3 hours each semester.

580 *Current Topics in Solid State Physics.* Credit, 1 hour.

581 *Solid State Physics.* Topics chosen from crystallography, free electron theory, band theory, etc. Prerequisite: Approval of instructor. Credit, 3 hours.

582 *Solid State Physics.* Continuation of PH 581, with the topics chosen from Brillouin zones, solid types and properties, semiconductors, solid rectifier and transistor physics, etc. Prerequisite: Approval of instructor. Credit, 3 hours.

Special Graduate Courses, PH 500, 590, 591, 592, 593. See page 226.

Political Science

PROFESSORS RICE (SS 224D), DURHAM, UHL; ASSOCIATE
PROFESSORS HINK, MASON; ASSISTANT PROFESSORS
HERRICK, LEONARD, VICHULES

Political Science

PS 101 *Modern Politics and Government.* The role and principles of government in the world today. Origins, structure, and practices of government. Credit, 3 hours.

102 *American Government.* American national, state, and local government. Constitutionalism, principles, federal-state-local relations, organization, functions. Credit, 3 hours.

212 *State and Local Government.* The politics and administration of state, county, and town and city government in the United States. Consideration of organizational problems. Services offered the public by these governments. Special attention to Arizona government. Acceptable for teacher certification in lieu of PS 311. Credit, 3 hours.

213 *Municipal Government.* The politics and administration of city and town government in the United States. Problems, forms, and services of city governments. Credit, 3 hours.

310 *Federal Constitution and Government.* The Constitution and government of the United States at the national level. Meets the federal government requirement for teacher certification. Credit, 2 hours.

311 *Arizona Constitution and Government.* The Constitution and government of the State of Arizona. Meets the Arizona government requirement for teacher certification. Credit, 1 hour.

313 *Problems of American National Government.* A study of the powers, functions, and agents of American political institutions. Credit, 3 hours.

321 *The Legislative Process.* Consideration of the lawmaking process followed in selected legislative bodies. Composition of membership, organization, powers. Impact of internal and external forces on legislation. Prerequisite: One course in political science. Credit, 3 hours.

322 *Political Parties and Pressure Groups.* Development of the American two-party system. Role of parties in relationship to public opinion, pressure groups, and public officials. Party organization and activities. Prerequisite: One course in political science. Credit, 3 hours.

331 *Western Political Thought.* Western political philosophers and their theories from Plato and Aristotle to the eighteenth century. Credit, 3 hours.

341 *Public Administration.* Comparison of administration in private business and government. Organizational principles and administrative techniques used in national, state, and local governments in the United States. Powers of public administrators and their control. Prerequisite: One course in political science. Credit, 3 hours.

351 *International Politics.* The development of the modern system of nation-states. Analysis of power politics. Role of international law. Prerequisite: One course in political science. Credit, 3 hours.

352 *Modern European Diplomacy.* The principal European diplomatic developments and international affairs from 1648 to the present. Prerequisite: One course in political science. Credit, 3 hours.

354 *American Foreign Policy.* The United States in world affairs. Analysis of American foreign policy since World War I. The techniques involved in formulating American foreign policies. Prerequisite: One course in political science. Credit, 3 hours.

361 *Public Law.* Nature, purposes, and sanctions of law as an agency of social control. Sources of law; private law and public

law; common law and civil law. Role of the courts and nature of the judicial process. Prerequisite: One course in political science. Credit, 3 hours.

371 *Modern Democracies*. A comparative treatment of the governmental institutions and practices of England, France, and Italy, with special reference to the United States. Less attention to such governments as those of the Scandinavian countries, Japan, and West Germany. Prerequisite: One course in political science. Credit, 3 hours.

372 *Modern Totalitarian States*. Comparison of the objectives and techniques of governmental leadership in the Soviet Union, Communist China, Spain, and other modern dictatorships. Attention to the recent dictatorships of Nazi Germany and Fascist Italy. Prerequisite: One course in political science. Credit, 3 hours.

414g *Arizona Government*. Contemporary problems in Arizona state and local governments. Individual and group studies and reports. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

421g *Political Opinion and Propaganda*. Analysis of informal and organized influences and pressures upon our political institutions. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

422g *Problems in Political Parties and Elections*. Problems in the American party system, supplemented by student field work. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

423g *Political Behavior*. Discussion of recent research into political participation, voting and nonvoting, leadership and followership, group voter behavior, political decision-making. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

431g *Recent Political Thought*. Political ideas and philosophies from the eighteenth century to the present. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

432g *American Political Thought*. Political theories and movements from the colonial period to the present. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

441g *Public Personnel Management*. History of civil service; comparison of the older civil concept with the recent concept of the merit system. Problems of recruitment, examination preparation, pay scales, promotion, employee motivation, discipline. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

442g *Municipal Management*. Analysis of management practices in cities and towns in the United States. Attention given to formal and informal organization structure and management practices, with a definite examination of management tools. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

443g *Governmental Budgeting and Finance Administration*. Analysis of the legal and social nature of governmental budgets. Budgetary procedures and administrative methods of financial control through the devices of allotments, allocations, accounting, auditing, and reporting. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

451g *International Organizations*. Collective security as a means of maintaining world peace. Aims and accomplishments of the League of Nations, the United Nations, and other world organizations. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

452g *Latin America and the United States*. Analysis of the diplomatic relations among the Latin American states. Development of U.S. foreign policy toward Latin America. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

453g *Foreign Policy of the Soviet Union*. The nature and objectives of Soviet foreign policy, permanent factors in geographic and ideological strategy, coexistence and expansion, the role of underdeveloped areas, the East-West conflict and post-Stalin era. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

461g *Constitutional Law*. Development of the United States Constitution as reflected in decisions of the Supreme Court. Prerequisite: Twelve hours in political science. Credit, 3 hours.

463g *International Law*. The law of the nations as developed by custom and agreement and as exhibited in decisions of international and national tribunals. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

473g *Latin American Politics*. The development and problems of national Latin American governments and international relations with special emphasis on Mexico. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

474g *Great Britain and the Commonwealth of Nations*. Comparison of governmental institutions of Great Britain and nations formerly under British rule. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

475g *Governments of Asia*. The governments and politics of independent and colonial nations in South and East Asia and

in the Middle East; comparisons with each other and European nations. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

476g *Government of the Soviet Union*. A descriptive and comparative analysis of Soviet government and institutions. Appraisal of the Soviet economic system and incentives, and of the machinery for control of the people. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

510 *Internship in Government*. Required of all Master of Public Administration candidates without previous experience in government service. An internship to be served in an agency of federal, state, or local government. Credit, 3 hours.

542 *Governmental Organization*. Analysis of organization theories and their application to administrative organizations at the national, state, and municipal levels of government. Credit, 3 hours.

561 *Administrative Law*. Nature, sources, and scope of administrative law; government agencies and personnel; internal remedies and judicial control of administrative action. Credit, 3 hours.

Special Graduate Courses, PS 500, 590, 591, 592, 593. See page 226.

Psychology and Philosophy

PROFESSORS JOST (SS 321G), BALL, GOLDIAMOND, GURNEE, SMITH, STAATS; ASSOCIATE PROFESSORS ARNER, BARDRICK, COPPOCK, HAIGH, MICHAEL, TYLER, WALDMAN; ASSISTANT PROFESSORS GIESCHEN, POLLIE, VOTICHENKO;

Philosophy

PI 101 *Introduction to Philosophy*. Great thought in Western culture, ancient, and modern times: Plato and Aristotle to Hume and Kant, James and Dewey. Credit, 3 hours.

211 *Social and Moral Philosophy*. Chief problems and traditional theories of moral and social philosophy. Credit, 3 hours.

222 *Ancient and Medieval Philosophy*. Readings in the Pre-Socratic Philosophies, Socrates and Plato, Aristotle; the Epicureans and Stoics, Aquinas and the Scholastics. Prerequisite: PI 101. Credit, 3 hours.

223 *Modern Philosophy*. Readings from Descartes, Hume, Berkeley, Hegel, Kant, Russell, Whitehead and others, Philosophers of the Twentieth Century. Prerequisite: PI 101. Credit, 3 hours.

231 *Logic*. The methods and principles used in distinguishing correct from incorrect reasoning, both deductive and inductive,

including an examination of common fallacies, syllogistic reasoning, truth tables, Mill's methods, and scientific method. Credit, 3 hours.

301 *Philosophies of the Western World*. The Great Thought of the West, ancient and modern, including Ethics, Metaphysics, Religion, Epistemology, and the Philosophy of History. Credit, 3 hours.

304 *Theory of Knowledge*. The logical structure and experiential basis of human knowledge; the origin, structure, methods and validity of knowledge. Prerequisite: PI 101 or 301. Credit, 3 hours.

306 *Philosophy of Science*. The ideas basic to modern science and their impact on our culture, on the progress of science, on morality, and on education. A clarification of scientific description, explanation, prediction, theory formation, casualty, probability, and determination. Credit, 3 hours.

309 *Metaphysics*. Selected metaphysical problems and issues, including the reality of universals, the nature of mind, free-will and determinism. Prerequisite: PI 101 or 301. Credit, 3 hours.

312 *Social Philosophy*. Important contributions to social thinking, with special emphasis on the ideological conflicts of modern times. Prerequisite: PI 101 or approval of instructor. Credit, 3 hours.

314 *Philosophy of History*. The theories of St. Augustine, Hegel, Marx, Spengler, Toynbee, Berdyaev, Collingwood. Progress in history, historical inevitability, the role of the great man, the rational and irrational in history. Prerequisite: PI 101 or 301 or approval of instructor. Credit, 3 hours.

325 *American Philosophy*. A critical and historical examination of American thought from the seventeenth century to the present; Puritanism, the Enlightenment, Transcendentalism, Pragmatism, and the New Realism. Credit, 3 hours.

327 *Recent Empirical and Analytic Philosophy*. Nineteenth and twentieth century Empiricism, Positivism, Pragmatism, and Linguistic Analysis; the writings of Mill, Mach, Comte, James, Moore, Russell, Carnap, and Wittgenstein. Prerequisite: PI 101 or 301 or approval of the instructor. Credit, 3 hours.

328 *Recent Idealistic and Existentialist Philosophies*. An historical and critical examination of nineteenth and twentieth century Idealism, Voluntarism, and Existentialism. Such thinkers as Hegel, Nietzsche, Bergson, Jaspers, and Sartre are considered. Credit, 3 hours.

332 *Symbolic Logic*. Calculus of propositions, classes, and relations. Applications to foundations of mathematics. Prerequisite: PI 231 or approval of instructor. Credit, 3 hours.

340 *Philosophy of Human Nature.* The views of Plato, Augustine, Locke, Nietzsche, and others; the structure of the mind, the mind-body relation; the nature of self, and the philosophical implications of more recent psychological thought. Prerequisite: PI 101 or 301 or approval of instructor. Credit, 3 hours.

341 *Philosophy of Religion.* The nature of religion, various conceptions of God, good and evil, revelation and mysticism. Great philosophers, theologians and psychologists including James, Tillich, Niebuhr, Schweitzer, Jung, Gandhi and Marcel are considered. Prerequisite: PI 101. Credit, 3 hours.

405g *Philosophy of Literature.* Philosophical examination of signs, expressions, symbols, figurative usage, and structure in literature. Reference to Hardy, Kafka, Joyce, Gide, Proust, Sartre and others. The principles of critical judgment with reference to Ransome, Tate, Burke, Blackmur, Cocteau. Prerequisite: Nine hours in philosophy or 9 hours in literature. Credit, 3 hours.

415g *Advanced Ethics.* Selected problems of normative and analytic ethics. Prerequisite: PI 211 or approval of instructor. Credit, 3 hours.

433g *Symbolic Logic.* Axiomatic development of logic, properties of deductive systems, modal and many-valued logics, applications to philosophic problems. Prerequisite: PI 332 or approval of instructor. Credit, 3 hours.

436g *Philosophy of Mathematics.* Logicism, Intuitionism, Formalism, axiomatic procedure, the nature of proof and definition in mathematics, and the relation between mathematics and the empirical sciences. Prerequisite: Nine hours in philosophy or 9 hours in mathematics. Credit, 3 hours.

Psychology

PY 100 *Elementary Psychology.* Emotions, motives, thinking observing, learning, and intelligence, and their role in the development and adjustment of the individual. Credit, 3 hours.

112 *General Psychology.* Scientific psychology and the principles of behavior. Readings in general psychology with emphasis on scientific and experimental studies. Lecture, demonstrations, and class experiments. Two lectures, 2 hours laboratory. Credit, 3 hours.

170 *Mental Health.* Principles and practices of mental health derived from clinical and experimental research. Methods of coping with personality problems. Credit, 2 hours.

180 *Applied Psychology.* The applications of psychological principles and researches in several fields of human endeavor. Prerequisite: PY 100. Credit, 3 hours.

240 *Human Growth and Development*. The physical, mental, emotional, and social growth and development throughout the life span. Lectures supplemented by field trips and laboratory experiences. Prerequisites: SO 101; PY 100. Credit, 3 hours.

280 *Business Psychology*. The problems of human behavior in the business setting; the contributions of psychology to the understanding and solution of these problems. Prerequisite: PY 100. Credit, 3 hours.

315 *Psychology of Personality*. Definition and description of personality in terms of differing methodological approaches. Study of biological and sociocultural determinants of personality. Prerequisite: Nine hours in psychology. Credit, 3 hours.

320 *General Behavior Theory: Conditioning*. Drive and reinforcement factors in conditioning. Classical conditioning of visceral and motor responses. Prerequisite: PY 112. Two lectures, 2 hours laboratory. Credit, 3 hours.

321 *General Behavior Theory: Complex Human Learning*. Extension of experimentally established behavior principles to complex human learning. Prerequisite: PY 112 or approval of instructor. Two lectures, 2 hours laboratory. Credit, 3 hours.

322 *General Behavior Theory: Experimental Analysis of Behavior*. The methods and concepts of free operant research with lower animals and humans. Training in automatic scheduling and recording equipment. Prerequisite: PY 112. Two lectures, 2 hours laboratory. Credit, 3 hours.

323 *General Behavior Theory: Perceptual Processes*. Introduction to signal detection, perception, and communication involving vision, audition (including speech), and other senses, with application to display and training procedures. Prerequisite: PY 322. Two lectures, 2 hours laboratory. Credit, 3 hours.

330 *Statistical Methods*. Application of statistics to behavioral and social sciences. Prerequisite: MA 116. Credit, 3 hours.

341 *Child Psychology*. Child behavior analyzed in terms of psychological principles. Evaluation of data from laboratory and clinic approaches. Prerequisite: PY 100. Credit, 3 hours.

342 *Psychology of Adolescence*. Methods and findings of recent studies of the development, growth and problems of the adolescent, with implications for education. Prerequisite: PY 240 or 341. Credit, 2 hours.

350 *Social Psychology*. The behavior of man in his social relations. Problems of crowd behavior, social control, propaganda, suggestion, imitation, competition, cooperation, and leadership. Prerequisites: PY 100; SO 101 or 301. Credit, 3 hours.

366 *Psychopathology*. Study of behavior problems, causes, dynamics and treatment. Prerequisite: PY 100. Credit, 3 hours.

380 *Techniques of Selection in Industry.* Psychological methods of determining the qualifications of a worker for a job. Emphasis on the methods used to improve the usefulness of tests, interviews, and application blanks in personnel work. Prerequisite: PY 100. Credit, 3 hours.

414 *History of Psychology.* Major problems and trends of modern psychology traced from their beginnings to the present including the development of the modern scientific approach. Prerequisite: Twelve hours in psychology. Credit, 3 hours.

424g *General Behavior Theory: Physiological Psychology.* Analysis of physiological variables in the control of behavior, and behavioral influences upon physiology. Physiological relations to learning, motivation and emotions, and sensation. Prerequisites: Two courses from PY 320-322 sequence, and either ZO 102, 360, 460, or equivalent. Two lectures, 2 hours laboratory. Credit, 3 hours.

425g *General Behavior Theory: Comparative Psychology.* Species specific behavior. A study of the generality of behavioral laws throughout the animal kingdom. Emphasis upon comparison between human and infra-human behavior. Prerequisites: PY 320 or 322 and ZO 100 or equivalent. Two lectures, 2 hours laboratory. Credit, 3 hours.

430g *Intermediate Statistics.* Experimental designs involving simple and complex analysis of variance. Prerequisite: PY 330. Two lectures, 3 hours laboratory. Credit, 3 hours.

431g *Introduction to Measurement.* Introduction to the logic, procedures, and problems of psychological measurement. The nature of variables, functional relations, scaling, curve fitting, reliability and validity as used in psychological research. Prerequisite: PY 430 or equivalent. Two lectures, 2 hours laboratory. Credit, 3 hours.

440g *Directed Experience With Children.* Special studies adapted to the needs of the student including experience with play therapy when the student has sufficient background to participate in this program. Prerequisite: Approval of instructor. Credit, 3 hours.

450g *Advanced Social Psychology: Communication.* Creation and manipulation of signs and symbols. Studies of social impact of communication, content and media. Prerequisite: PY 350. Credit, 3 hours. (Same as SO 465g.)

470, 471 *Introduction to Clinical Psychology.* The role of the clinical psychologist in contemporary society. Study of the clinician-patient relationship and of the clinical point of view through analysis of case material. Prerequisite: 9 hours in psychology. Credit, 3 hours each semester.

510, 511 *General Psychology.* A sequence designed to provide the background in principles, data, research procedures, and

theoretical orientations of the science of psychology necessary for further graduate work in psychology. Required of all graduate students. Credit, 6 hours each semester.

512 *Systematic Psychology*. The development of a consistent approach to psychology; a survey of Behaviorism, Phenomenology, Gestalt and other systems in modern psychology. Theory construction and experiment and the relation of psychology to the social and physical sciences, and of logic and mathematics in psychology. Prerequisite: PY 511. Credit, 3 hours.

522, 523 *Methods in Experimental Psychology*. The basic laboratory procedures and equipment used in areas of laboratory psychology. Students will be assigned to each of the departmental laboratories in turn. Prerequisites: At least 3 courses in the PY 320-425 sequence or their equivalent; PY 510, 511 or concurrently; or approval of instructor. Credit, 3 hours each semester.

525 *Language Processes*. Theoretical and experimental analysis of language behavior. Prerequisite: PY 523 or approval of instructor. Credit, 3 hours.

526 *Advanced Learning*. Advanced formulations and procedures in learning and conditioning. Prerequisite: PY 523 or approval of instructor. Credit, 3 hours.

527 *Application of Experimental Psychology*. The application of laboratory discoveries and principles to the controlled alteration of behavior in applied settings such as educational, industrial, social, and mental institutions. Prerequisite: PY 523 or approval of instructor. Credit, 3 hours.

528 *Sensory Processes*. Signal detection and communication involving vision, audition (including speech), and other senses. Prerequisite: PY 523. Credit, 3 hours.

535 *Psychophysics*. Current developments in psychophysical methodology and theory, with application to monitoring, signal detection, sensory measurement, and mental tests. Prerequisites: PY 431, 523 or equivalents. Two hours lecture, 2 hours laboratory. Credit, 3 hours.

540 *Developmental Psychology*. Basic principles, data and methods in the study of human development. Prerequisite: PY 511 or concurrently. Credit, 3 hours.

550 *Advanced Social Psychology: The Group and the Individual*. Advanced study of the relationships between individuals and social groups. Credit, 3 hours. (Same as SO 567.)

558 *Group Dynamics*. Consideration of the psychological theories and methods of study in various forms of collective behavior including group leadership, group effectiveness, communication within groups, and relations between groups and individual members. Prerequisite: PY 350 or 3-MG 311. Credit, 2 hours.

560, 561 *Diagnostic Methods*. A survey of diagnostic instruments; including intelligence, objective and projective tests. A study of the inference process in understanding test data. Two hours lecture, 2 hours laboratory. Credit, 3 hours each semester.

562 *Projective Testing*. Administration, scoring and interpretation of the Rorschach. Prerequisite: PY 561. Credit, 3 hours.

563 *Projective Testing*. Administration and interpretation of projective tests, with special emphasis on the TAT. Prerequisite: PY 561. Credit, 3 hours.

565 *The Clinical Interaction*. The patient-clinician relations fundamental to the diagnostic and therapeutic functions of the psychologist. Credit, 3 hours.

566 *Individual Psychotherapy*. Theories and techniques of psychotherapy. Prerequisite: Proseminar or approval of instructor. Credit, 3 hours.

568 *Play Therapy*. Methods and theories of play therapy with parallel supervised laboratory, experiences in play therapy. Conferences with parents and teachers. Prerequisite: Approval of instructor. Credit, 3 hours.

570 *Theories of Personality*. The theories of personality which are of current significance in psychology. Credit, 3 hours.

571 *Advanced Psychopathology*. Study of the major neurotic and psychotic symptoms and syndromes. Prerequisite: PY 366. Credit, 3 hours.

574, 575 *Clinical Practicum*. Supervised experience in a clinic, school, or institution, to supplement and apply skills developed during classwork, seminars, laboratories, and individual instruction. Includes diagnostics, evaluation, individual and group psychotherapy case conferences with varied populations, depending upon needs of student and settings. Credit, 4 hours each semester.

580 *Behavioral Engineering*. The control of behavior patterns of the human operator through explicit environmental controls. Prerequisites: PY 322, 323 or equivalents. Credit, 3 hours.

Special Graduate Courses, PY 500, 590, 591, 592, 593. See page 226.

Sociology and Anthropology

PROFESSORS PERRIL, STEWART; ASSOCIATE PROFESSORS
RUPPE (SS 107E), FITZGERALD, JEFFERY, LINDSTROM, MAN-
HEIM; ASSISTANT PROFESSORS HARWARD, STAATS;
INSTRUCTOR KUNKEL

Anthropology

AN 111 *Elementary Anthropology*. Primitive society, religion, material culture, the origin and antiquity of man and civilization, modern races, the linguistic phases of culture, and the principles of anthropology. Credit, 3 hours.

221 *Indians of the Southwest.* Culture of living Indian tribes—Navajo, Hopi, Pima, Papago, etc. Social problems of the Southwestern Indians. Credit, 3 hours.

231 *Archaeological Field Methods.* The excavation of archaeological sites and the recording and interpretation of data. Includes field experience in this locality. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

312 *Peoples of the World.* An ethnographic survey of the peoples and cultures of Africa, Eurasia, and Oceania. Prerequisite: AN 111 or approval of instructor. Credit, 3 hours.

313 *Primitive Society.* The development and varieties of human societies; a survey of primitive social institutions; the role of property in primitive society; the problem of control and authority in society. Prerequisite: AN 111 or SO 101. Credit, 3 hours.

314 *Primitive Religion.* The origins, elements, forms, and symbolism of religion; a comparative survey of primitive religious beliefs and ceremonies; the place of religion in the total culture. Prerequisite: AN 111 or approval of instructor. Credit, 3 hours.

322 *Peoples of Africa.* The races and cultures of the peoples of Africa, past and present, with special emphasis on the Negroid peoples. Prerequisite: AN 111 or approval of instructor. Credit, 3 hours.

323 *Peoples of Asia.* The races and cultures of Asia, including the more complex cultures of India, China, Japan, and related areas. Prerequisite: AN 111 or approval of instructor. Credit, 3 hours.

324 *Peoples of Oceania.* The races and cultures of the Pacific Ocean area. Prerequisite: AN 111 or approval of instructor. Credit, 3 hours.

331 *Prehistory.* The development of Man and human types. A survey of Old World cultures from the Old Stone Age through the Iron Age. Credit, 3 hours.

332 *Southwestern Archaeology.* The development of prehistoric cultures in the Southwest; early man and the Hohokam, Mogollon, Basket Maker and Pueblo cultures. Prerequisite: AN 111 or approval of instructor. Credit, 3 hours.

341 *Physical Anthropology.* Fossil men, race classification and distribution, racial history and race problems, man's place in the animal kingdom, human heredity, and osteology. Prerequisite: AN 111 or approval of instructor. Credit, 3 hours.

351 *Culture and Personality.* The way a culture determines personalities; accepted and deviant behavior; cultural values; comparisons of widely differing cultures. Prerequisite: Approval of instructor. Credit, 3 hours.

364 *Museum Techniques*. Laboratory techniques in restoration of artifacts. Museum display practices to present anthropological material. Prerequisite: AN 111 or approval of instructor. Credit, 2 hours.

365 *Laboratory Methods in Archaeology*. Techniques of artifact analysis. Basic archaeological research techniques, methods of report writing. Prerequisite: AN 111 or approval of instructor. May be repeated for credit. Credit, 2 hours.

375 *Method and Theory of Archaeology*. History of the development of archaeology and the theoretical basis of the discipline. The rationale and methods of reconstruction of past human behavior from archaeological data. Prerequisite: AN 111 or approval of instructor. Credit, 3 hours.

411g *Social Anthropology*. Social organization, social institutions, and cultural diffusion; acculturation, culture and personality, the community study, selected primitive cultures. Prerequisite: SO 101 or 301 or AN 111. Credit, 3 hours.

412g *American Minority Peoples*. Problems of racial, national and religious minorities in the United States. Prejudice, acculturation and assimilation. Prerequisite: SO 101 or 301 or AN 111. Credit, 3 hours.

421g *The North American Indian*. Archaeology, ethnology, and linguistic relationship of the Indians of North America. Current social and economic problems of the Indians. Prerequisite: AN 111 or approval of instructor. Credit, 3 hours.

422g *Archaeology of North America*. The origin, spread, and development of the prehistoric Indians of North America up to the historic tribes. Does not include the Southwest. Prerequisite: AN 111 or approval of instructor. Credit, 3 hours.

423g *Indians of Middle America*. Indian civilizations of Mexico and Central America. The Aztec, Maya and their predecessors. Tribes and folk cultures of the Indians who inhabit these areas at present. Prerequisite: AN 111 or approval of instructor. Credit, 3 hours.

424g *Indians of South America*. South American Indian cultures, including the prehistoric cultures of the Inca of Peru and other Andean peoples. Present-day folk cultures of South American Indians. Prerequisite: AN 111 or approval of instructor. Credit, 3 hours.

431g *History and Theory of Anthropology*. The historical development of theories and concepts in anthropology. Evolutionism, diffusionism, and functionalism. Psychological and historical theories in anthropology. A pro-seminar required of all graduate students and seniors majoring in anthropology. Prerequisite: AN 111 or approval of instructor. Credit, 3 hours.

441g *Acculturation and Applied Anthropology*. The dynamic processes of culture contact. The impact of Western civilization upon native societies; anthropological problems in colonial and native administration; applied anthropology in the modern world. Prerequisite: AN 111 or SO 101. Credit, 3 hours.

445g *Contemporary Indian Affairs*. Present problems of American Indians resulting from acculturation, minority status, and legislative action. Immediate problems such as health, education, social welfare, legislation, tribal leadership, and other areas will be dealt with in detail. Prerequisite: Approval of instructor. Credit, 3 hours.

Sociology

SO 101 *Introductory Sociology*. The fundamentals of sociology, organization of human groups and society, and the processes of interaction and social change. Credit, 3 hours.

231 *The Community*. The consideration of how a community is organized and how it develops. Special emphasis is upon the inter-relationship of the many organizations and agencies, their functions, and their influence on the individuals involved. Prerequisite: SO 101. Credit, 3 hours.

271 *Introduction to Social Work*. The forces which facilitate or hinder the meeting of human needs, the social services developed to help, and the role of the professional worker. Credit, 3 hours.

301 *Principles of Sociology*. Intensive and critical analysis of the concepts of sociology. Not open to students who have credit for SO 101. Credit, 3 hours.

331 *Rural Sociology*. Rural peoples, their organization, institutions, and social change. Comparisons made on local, regional, and national levels. Prerequisite: SO 101 or 301. Credit, 3 hours.

332 *The Modern City*. The growth, characteristics, and problems of the modern city. Prerequisite: SO 101 or 301. Credit, 3 hours.

333 *Population Problems*. Theories of population growth; births, death, migration; population policies. Prerequisite: SO 101 or 301. Credit, 3 hours.

341 *Modern Social Problems*. Current problems of race relations, poverty and unemployment, mental disease, mental deficiency, etc. Credit, 3 hours.

345 *Society and Juvenile Delinquency*. Delinquency viewed as a product of the society; the societal factors of apprehension, treatment, and prevention. Prerequisite: SO 101 or 301. Credit, 3 hours.

351 *Industrial Sociology*. Social and cultural analysis of industry. Attention given to occupational roles, status, and social participation of workers. Prerequisite: SO 101 or 301. Credit, 3 hours.

352 *Social Change*. Patterns of social change, resistance to change, and change-producing agencies and processes. Prerequisite: SO 101 or 301. Credit, 3 hours.

355 *Courtship and Marriage*. A functional approach to marriage; courtship, engagement, marital adjustment. Credit, 3 hours.

378 *Social Security*. The problem of economic security in modern times, the ways it may be met, and the present social security system. Credit, 3 hours.

404g *Sociological Theory*. The major issues and theoretical approaches of sociology, past and present. Prerequisite: SO 101 or 301. Credit, 3 hours.

432g *Human Ecology*. The patterns and laws of societies' adjustments to the physical environment; the distribution of communities and institutions. Prerequisite: SO 101 or 301. Credit, 3 hours.

433g *Demography*. The science of population analysis; problems in measurement of the size, composition and changes in population. Prerequisite: SO 101 or 301. Credit, 3 hours.

446g *Principles of Criminology*. Causation of crime; juvenile delinquency; classes of crime; criminal as a social type. Prerequisite: SO 101 or 301. Credit, 3 hours.

447g *Penology*. Theories of punishment; methods of dealing with convicts; police, courts, prisons, probation, and parole. Prerequisites: SO 101 or 301; 446. Credit, 3 hours.

448g *Gerontology*. The social processes in aging and their relationship to the physical changes. Prerequisite: SO 101 or 301. Credit, 3 hours.

453g *Social Class and Stratification*. Social classes and the function of these groupings in a cultural organization. Prerequisite: SO 101 or 301. Credit, 3 hours.

454g *Family Education*. The development of marriage and family education; current emphasis and present trends. A treatment of both the content involved and the various kinds of educational programs in this field. Prerequisite: SO 101 or 301. Credit, 3 hours.

455g *The Family*. The family considered from the institutional viewpoint, its historical development, and its adaptation to a changing culture; the family system in many cultures. Prerequisite: SO 101 or 301. Credit, 3 hours.

462g *Social Control*. The significance of social control in society, and the various methods used by individuals and groups to control others. Prerequisite: SO 101 or 301. Credit, 3 hours.

463g *Small Group Interaction*. Theoretical and applied aspects of social interaction, with particular emphasis on the processes involved in small groups. Prerequisite: SO 101 or 301. Credit, 3 hours.

465g *Advanced Social Psychology: Communication*. Creation and manipulation of signs and symbols. Studies of social impact of communication, content and media. Prerequisite: PY 350. Credit, 3 hours. (Same as PY 450g.)

470g *Community Resources*. Existing social agencies; the needs they meet and how they meet them. Especially designed for teachers, nurses, police, and related professions. Prerequisite: Approval of instructor. Credit, 3 hours.

477g *History of Social Welfare*. The historical development of social welfare and its relation to the social forces of the time. Credit, 3 hours.

478g *Social Welfare Services*. Field trips and limited experience in a social agency. Prerequisites: SO 271, 378 and 477 or approval of instructor. Two hours classroom discussion, 4 hours limited participation in the program of a local agency. Credit, 3 hours.

490g *Social Research*. Techniques of social research, including questionnaires, interviewing, sampling, and data analysis. Prerequisite: One course in statistics. Credit, 3 hours.

505 *History of Sociological Thought*. An intensive analysis of the history of sociological thought. Prerequisite: SO 404 or equivalent. Credit, 3 hours.

506 *Contemporary Sociological Theory*. A detailed study of current sociological theories. Prerequisite: SO 404 or equivalent. Credit, 3 hours.

532 *Studies in Ecology and Demography*. Critical review of current literature in ecology and demography; group and individual projects. Credit, 3 hours.

546 *Criminology and Criminal Law*. The history of criminal law and punishment as a means of social control; the use of indeterminate sentences, probation, and parole; the legal foundations of the juvenile court; the law of arrest, search, and seizure; and the role of psychiatry in criminal law. Credit, 3 hours.

555 *Studies of the Family*. A critical analysis of current developments in the study of marriage and the family. Credit, 3 hours.

567 *Advanced Social Psychology: The Group and the Individual*. Advanced study of the relationships between individuals and social groups. Credit, 3 hours. (Same as PY 550.)

Special Graduate Courses, SO 500, 590, 591, 592, 593. See page 226.

Speech and Drama

PROFESSOR BYERS; ASSOCIATE PROFESSORS ALBRIGHT
(Anx. IX), STITES; ASSISTANT PROFESSORS DAVIS,
LAVIN, SANDLIN, WILLSON, YEATER

Drama

DR 111 *Introduction to Drama*. The various types of drama with reference to their theatric representation. Credit, 3 hours.

112 *Acting*. Reading in theory; laboratory projects. Credit, 3 hours.

113 *Make-up*. The techniques of theatrical make-up; laboratory projects. Fee, \$5.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

213 *Stage Scenery*. Theory and practice of designing stage decor; laboratory projects in connection with settings for the Drama Workshop productions. Two lectures, 6 hours laboratory. Credit, 4 hours.

311 *Creative Dramatics*. Methods of making a play from a lesson or story, helping children to improvise their own roles; selection of literature and subject matter suitable for play making. Laboratory work with school children during latter part of course. Credit, 3 hours.

313 *Play Production*. Problems connected with staging of plays in elementary and secondary schools. Prerequisites: SE 100 or 120; DR 111. Credit, 3 hours.

314 *Advanced Acting*. A history of the art of acting. Group participation in scenes from plays to illustrate the various styles of acting. Prerequisite: DR 112. Credit, 3 hours.

315 *Directing*. The principles of play direction; laboratory projects. Prerequisite: DR 213. Credit, 3 hours.

320 *History of the Theater*. A study of twenty plays to illustrate the art of theatric representation at successive stages in the evolution of the physical playhouse of the Western World. Credit, 3 hours.

321 *Radio-Television Drama*. The production of both radio drama and television drama, with emphasis on acting techniques appropriate to each form. Prerequisite: DR 112. Credit, 3 hours. (Same as RT 321.)

415g *Directing*. Aesthetic and technical theories of play direction, with laboratory projects in stylized and period plays. Prerequisite: DR 315. Credit, 3 hours.

Speech

SE 100 *Elements of Speech*. Adjustment to the speech situation; obtaining and organizing material. The conversational mode; articulation, pronunciation, and tone; bodily movement. Credit, 2 hours.

120 *Speech Fundamentals*. An introduction to the physical and functional bases of speech production. Required of Speech majors and minors. Credit, 2 hours.

211 *Public Speaking*. Organization and delivery of various types of speeches. Emphasis on types which occur most often in everyday life. Prerequisite: SE 100 or 120 or approval of instructor. Credit, 2 hours.

214 *Intercollegiate Debate*. Preparation for and participation in intercollegiate debates. Prerequisite: Approval of instructor. Credit, 2 hours.

221 *Voice and Diction*. Designed to develop and improve the speaking voice. Background discussion and individual and group exercises and drills. Prerequisite: SE 100 or 120. Credit, 2 hours.

241 *Oral Interpretation*. Techniques of the reading aloud of prose, poetry, and drama. Prerequisite: SE 100 or 120. Credit, 3 hours.

300 *Principles and Methods of Discussion*. The development of attitudes and skills for effective participation and leadership in discussion. Practice in symposiums, panels, and conferences. Prerequisite: Approval of instructor. Credit, 2 hours.

312 *Principles of Argumentation*. Construction and delivery of various types of argumentative speeches. Essential to students engaging in intercollegiate debate. Prerequisite: SE 100 or 120. Credit, 2 hours.

313 *Speech Composition*. Practice in the organization and compositional development of speeches. Prerequisite: SE 100 or 120. Credit, 2 hours.

315 *Intercollegiate Debate*. Continuation of SE 214. Prerequisite: SE 214. Credit, 2 hours.

316 *Intercollegiate Debate*. Continuation of SE 315. Prerequisite: SE 315. Credit, 2 hours.

341 *Advanced Oral Interpretation*. More technical study of the art of reading aloud effectively from prose, poetry, and drama. Prerequisite: SE 241. Credit, 3 hours.

411g *Business and Professional Speech*. The application of rhetorical principles to specific business and professional speaking situations. Practice in using the forms of persuasion, conference speaking techniques, and group participation methods. Credit, 3 hours.

420g *Speech Correction for the Classroom Teacher.* The role of the teacher in understanding and aiding speech and hearing development in normal and speech-defective children with emphasis upon the recognition and prevention of disorders. May not be counted toward the major in speech and drama. Credit, 3 hours. (Same as 2-SP 420g.)

421g *Speech Correction.* Cause and correction of disorders of speech. Prerequisite: Twelve hours in Language and Literature courses. Credit, 3 hours.

422g *Speech Pathology.* The nature and treatment of major disorders of speech with emphasis upon aphasia, cerebral palsy, cleft palate, and stuttering. Prerequisite: SE 421 or approval of instructor. Credit, 3 hours.

423g *Clinical Practice in Speech Correction.* Case treatment of speech disorders in the University Speech Clinic. Prerequisite: SE 421. May be repeated for credit. Credit, 1-3 hours.

424g *Phonetics.* Study of phonetics, including phonetic symbols, the production, the general characteristics and the application of the sounds of American speech to the acquisition and teaching of good pronunciation. Prerequisite: Twelve hours in Language and Literature courses. Credit, 2 hours.

425g *Audiology.* The normal process of hearing and the nature, causes, and rehabilitation of hearing disabilities. Credit, 3 hours.

426g *Audiometry.* Theory and practice of testing hearing acuity, and of evaluating and interpreting test results. Credit, 3 hours.

427g *Clinical Practice in Audiology and Audiometry.* Theories of lip-reading and auditory training; practical experience in testing and rehabilitating the hearing handicapped. Prerequisite: SE 425. May be repeated for credit. Credit, 1-3 hours.

450g *Contemporary Public Address.* Leading contemporary public speakers and their influence on social and political life. Credit, 3 hours.

Zoology

PROFESSORS BENDER, STAHNKE; ASSOCIATE PROFESSORS
HANSON, (LSC 84), BEAL, CLOTHIER, COLE, GIBBS, LANDERS,
WATT; ASSISTANT PROFESSORS BERTKE,
DAMMAN J., PATTERSON

Biology

BI 100 *The Living World.* A survey of the major biological principles as illustrated by the areas of behavior, biogeography, ecology, evolution, hygiene, morphology, physiology, reproduction and development, and taxonomy. Does not meet science requirement in pre-professional curriculum. Fee, \$2.00. Credit, 4 hours.

120 *Field Biology*. Observation, identification, and natural history of plants and animals of aquatic and terrestrial habitats. Open only to B.A. Ed. freshmen or sophomores or non-biology majors. Prerequisite: BI 100 or equivalent. Fee, \$3.00. One lecture, 3 hours field or laboratory. One week-end field trip. Credit, 2 hours.

210 *Special Techniques in Biology*. Approval of instructor and chairman of the department required. Fee, \$3.00. May be repeated for credit. Credit, 1 hour.

218 *The History of Medicine*. From Babylonian times through present day medicine. For pre-medical and pre-dental students. Credit, 1 hour.

300 *The Biogenetics of Man*. Modern theories of heredity and evolution, their historical background, their importance and influence in human affairs. Not offered for credit to majors in the Division of Life Sciences. Credit, 4 hours.

340 *Genetics and Eugenics*. Principles and facts of heredity developed from plants and animals. Principles of race improvement. Prerequisites: BI 100 or BO 100, and ZO 100 or equivalent. Credit, 3 hours.

341 *Genetics Laboratory*. Optional with BI 340. Prerequisite: BI 340 or concurrent registration. Fee, \$5.00. Credit, 1 hour.

426g *Limnology*. The dynamics of inland waters, stressing the interrelations of climatic, geological, topographical, physical, and chemical factors with special reference to aquatic life. Prerequisites: BO 100, CH 111, ZO 100. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

430g *Organic Evolution*. Principles and theories of evolution. Prerequisites: Twelve hours of biology including BI 340 and a course in systematics. Credit, 3 hours.

480g *Methods of Teaching Biology*. Methods of instruction, organization, and presentation of appropriate content in biology. Prerequisites: 2-SE 311 or concurrent registration and 20 hours in the biological sciences. Credit, 3 hours.

490g *Biostatistics*. The application of the methods of statistics to biological problems. Prerequisite: MA 226 or approval of instructor. Credit, 3 hours.

510 *Techniques in Teaching Biology*. Includes microtechniques, photography, dissection, and the collection and preparation of biological materials for laboratory and demonstration purposes. Designed primarily for secondary school teachers. BO 100; ZO 100 and MI 201 recommended. Fee, \$5.00. Six hours laboratory. Credit, 2 hours.

511 *Recent Advances in the Biological Sciences*. A review of basic biology in the light of recent advances. Prerequisite: Approval of instructor and Division Head. May be repeated for credit. Credit, 1 hour.

512 *Recent Advances in the Biological Sciences*. Continuation of BI 511. Prerequisite: Approval of instructor and Division Head. May be repeated for credit. Credit, 1 hour.

515 *Biogeography*. Principles of plant and animal distribution. Prerequisite: Approval of instructor. Credit, 2 hours.

518 *The Development of Biological Concepts*. A biographical and conceptual study of the history of the biological sciences. Prerequisite: Twenty-four hours of biological sciences. Credit, 2 hours.

520 *The Biology of the Desert*. The factors affecting plant and animal life in the desert regions and adaptations of the organisms to these factors. Field trips will be taken to various desert areas. Prerequisite: Ten hours of biology and/or approval of instructor. Fee, \$5.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

Special Graduate Courses, BI 500, 590, 591, 592, 593. See page 226.

Entomology

ET 102 *Agricultural Entomology*. The recognition, economic importance, life history, habits and control of harmful and beneficial insects of importance to agriculture, particularly of the Southwest. Properties, formulations, and recommended uses of commercially important insecticides will be considered. Prerequisite: BI 100 or ZO 100 or equivalent. Fee, \$5.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

200 *General Entomology*. Form, activities, and classification of insects. Prerequisite: ZO 100 or equivalent. Fee, \$5.00. Three lectures, 4 hours laboratory. Credit, 4 hours.

320 *Field Entomology*. Study and collection of insects in their natural habitats, with emphasis on ecology, life histories, and field recognition. Prerequisite: ET 200 or approval of instructor. Fee, \$5.00. Nine hours laboratory. Credit, 3 hours.

404g *Apiculture*. A study of bees and their ways, including methods of management. Students work with bee hives and honey, performing most of the operations essential to good bee-keeping and honey production. Prerequisite: ET 200. Fee, \$5.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

420g *Toxicology of Insecticides*. The mode of action of insecticides, the relationship of chemical structure to toxicity, and the physiological explanation of the chemical poisoning of insects. Prerequisites: ET 200 or equivalent and organic chemistry. Credit, 2 hours.

450g *Insect Morphology*. Morphology of typical insects including both external and internal structure. Prerequisites: ET 200 and ZO 350 or equivalent. Fee, \$5.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

460g *Insect Physiology*. A survey of life processes of insects. Prerequisites: ET 200 and CH 231. Fee, \$5.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

470g *Systematic Entomology*. The classification of insects; taxonomic categories and procedures; bibliographical methods; nomenclature; museum practices. Prerequisite: ET 200. Fee, \$2.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

496g *Entomological Techniques*. A practical consideration of important techniques not adequately treated in other courses, particularly: scientific illustration, use of the literature, mounting, preserving, and preparing insects for study, record keeping, elementary mathematical treatment of data, interpretation of graphs, charts and maps. Prerequisite: ET 200. Fee, \$2.00. One lecture, 3 hours laboratory. Credit, 2 hours.

502 *Entomology for Teachers*. Methods of collection, recognition and preparation of insects for classroom use. The care and handling of living as well as pinned specimens will be considered. Emphasis will be placed on Arizona insects and their biology. Prerequisite: At least 10 hours in biology and/or approval of instructor. Fee, \$5.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

570 *Insect Identification*. Detailed consideration of classification and literature of a selected order of insects with practice in identification of adult and immature forms. Prerequisites: ET 200 and 470. Fee, \$2.00. Nine hours laboratory. Credit, 3 hours.

Zoology

ZO 100 *General Zoology*. The fundamental principles of zoology as applied to the study of the main groups of invertebrate and vertebrate animals. Fee, \$5.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

102 *Human Anatomy—Physiology*. Consideration of the structure and dynamics of the human mechanism. Prerequisites: High school biology and chemistry; or PL 110 and BI 100 or equivalent. Not open to biology or medical technology majors, pre-medical or pre-dental students. Fee, \$2.00. Credit, 4 hours.

150 *Invertebrate Zoology*. The characteristics, life cycles, habits, economic importance, and evolution of the major groups of invertebrate animals. Prerequisite: ZO 100 or approval of instructor. Fee, \$5.00. Two lectures, 4 hours laboratory. One week-end field trip. Credit, 3 hours.

201 *Human Anatomy-Physiology*. Consideration of the structure and dynamics of the human mechanism. Credit, 2 hours.

202 *Human Anatomy-Physiology*. Continuation of ZO 201. Credit, 2 hours.

203 *Human Anatomy-Physiology Laboratory*. To be taken concurrently with ZO 201. Fee, \$3.00. Three hours laboratory. Credit, 1 hour.

204 *Human Anatomy-Physiology Laboratory*. To be taken concurrently with ZO 202. Fee, \$3.00. Three hours laboratory. Credit, 1 hour.

240 *Heredity and Development*. The application of genetic, embryological, and physiological principles to human development. Not open to biology or medical technology majors, pre-medical or pre-dental students. Prerequisites: CH 101, 102; ZO 201. Credit, 2 hours.

270 *Principles of Animal Systematics*. Methods and principles of systematic zoology. Prerequisite: ZO 100. Credit, 2 hours.

271 *Chordate Anatomy*. Fundamental principles of the structure, development, and homology of the chordate. Prerequisite: ZO 100. Fee, \$8.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

273 *Ichthyology*. Life histories, habitats, and habits of fish. Prerequisites: BI 100 or ZO 100 and approval of instructor. Fee, \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

274 *Ornithology*. A study of birds; particularly habits, behavior, and economic importance of Arizona species. Recognition of species by size, form, color, song, and habit. Prerequisite: BI 100 or equivalent. Fee, \$3.00. One lecture, 3 hours laboratory. One week-end field trip. Credit, 2 hours.

275 *Mammalogy*. A study of the classification, structure, habits, ecology, and distribution of mammals, with emphasis on North American forms. Prerequisite: BI 100 or ZO 100. Fee, \$4.00. One lecture, 3 hours laboratory. One week-end field trip. Credit, 2 hours.

276 *Reptiles and Amphibians*. An overview of the large taxonomic categories of reptiles and amphibians of the world. Emphasis on life histories, habitats, and habits. Prerequisites: BI 100 or ZO 100 and approval of instructor. Fee, \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

340 *Animal Microtechnique*. Zoological microtechnique, including the preparation for microscopic examination of animal structures, tissues, cells and whole mounts. Prerequisite: ZO 100. Fee, \$8.00. Six hours laboratory. Credit, 2 hours.

350 *Morphology of the Arthropoda*. A comparative study of the external and internal morphology of the major arthropod groups with a consideration of their possible phylogenetic relationships. Prerequisite: ZO 100. Fee, \$5.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

360 *General Physiology*. The functions of the animal body with emphasis on fundamental physiological processes. Prerequisites: ZO 100; CH 111 or equivalent. Fee, \$5.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

425g *Animal Ecology*. Interrelations of animals and their environments. Prerequisites: BO 100; ZO 100. Fee, \$4.00. Three lectures, 4 hours laboratory or field trips. One week-end field trip. Credit, 4 hours.

440g *Animal Cytology*. Structure, differentiation, and functions of cells. Prerequisite: ZO 100. Fee, \$4.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

441g *Poisonous Animals of Arizona*. Form, activities, and identification of venomous animals of Arizona and others thought venomous. Prerequisite: ZO 100 or equivalent. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

455g *General Parasitology*. Pathogenic protozoa, worms, and arthropod parasites. Prerequisite: ZO 100 or equivalent. Fee, \$5.00. Three lectures, 4 hours laboratory. Credit, 4 hours.

460g *Human Mechanisms*. The functions of the human body with emphasis on the muscular, circulatory, metabolic, and coordination mechanisms. Prerequisites: CH 111; ZO 100 or equivalent. Fee, \$5.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

462g *Comparative Invertebrate Physiology*. Comparative analysis of the general physiological processes of the invertebrate animal groups. Prerequisites: One course in physiology; 1 year of chemistry. Physics and organic chemistry recommended. Fee, \$7.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

470g *Animal Histology*. The microscopic study of animal tissues and their identification. Prerequisites: ZO 100 and 271; ZO 472 recommended. Fee, \$5.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

472g *Embryology*. Animal development from egg to the period of extra-uterine or extra-ovular existence, including invertebrates but with the most emphasis on vertebrates. Prerequisites: ZO 100 and ZO 271 or approval of instructor. Fee, \$6.00. Three lectures, 4 hours laboratory. Credit, 4 hours.

474g *Natural History of the Higher Vertebrates*. The natural history of birds and mammals, emphasizing southwestern species. Not open to students having had ZO 274 and 275. Prerequisite: BI 100 or ZO 100. Fee, \$5.00. Credit, 4 hours.

475g *Wildlife Biology*. Principles and basic techniques. Prerequisites: ZO 274 and 275 or approval of instructor. Fee, \$4.00. Two lectures, 3 hours laboratory or field trip. Credit, 3 hours.

550 *Invertebrate Zoology*. Prerequisites: Twelve hours of biology and approval of instructor. Fee, \$6.00. One lecture, 6 hours laboratory. One week-end field trip. Credit, 3 hours.

553 *General Protozoology*. Identification, classification, life cycles, physiology, and economic importance of the free-living and parasitic protozoa, and host-parasite relationships. Fee, \$7.00. Three lectures, 4 hours laboratory. Credit, 4 hours.

555 *Parasitology*. Historical and analytical approach to the treatment of selected areas in the body of knowledge relating to parasites and parasitism. Prerequisites: MI 202; ZO 455. Credit, 3 hours.

560 *Experimental Mammalian Physiology*. Directed experiments to develop skill in the use of physiological equipment and in the handling of animals followed by an independent study project. Prerequisite: Approval of instructor. Fee, \$6.00. Six hours laboratory. Credit, 2 hours.

561 *Comparative Vertebrate Physiology*. Comparative analysis of the general physiological processes of the vertebrate animal groups. Prerequisites: One course in physiology; 1 year of chemistry. Physics and organic chemistry recommended. Fee, \$7.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

Special Graduate Courses, ZO 500, 590, 591, 592, 593. See page 226.

Statistics

Summary of Registration 1958-59

On Campus Students—Regular Session

	Freshmen	Sophomores	Juniors	Seniors	Special	Graduates	Total
Men	2426	1270	1294	1175	172	1534	7871
Women	1356	616	563	436	118	742	3831
Total	3782	1886	1857	1611	290	2276	11702

Extension Division

Residence Center Students—Regular Session

Men	895
Women	1283
Total	2178

Correspondence

Men	192
Women	222
Total	414

Summer Session 1958

Men	2368
Women	1688
Total	4056

Total Registration in College

Men	11326
Women	7024
Total	18350

Training Schools

Boys	130
Girls	123
Total	253

GRAND TOTAL18603

Summary of Registration 1959-60

On Campus Students—Regular Session

	Freshmen	Sophomores	Juniors	Seniors	Special	Graduates	Total
Men	1823	1198	1331	1276	504	1887	8019
Women	1212	670	601	486	365	943	4277
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	3035	1868	1932	1762	869	2830	12296

Extension Division

Residence Center Students—Regular Session

Men	788
Women	1119
	<hr/>
Total	1907

Correspondence

Men	183
Women	226
	<hr/>
Total	409

Summer Session 1959

Men	2783
Women	1916
	<hr/>
Total	4699

Total Registration in College

Men	11773
Women	7538
	<hr/>
Total	19311

Training Schools

Boys	129
Girls	123
	<hr/>
Total	252

GRAND TOTAL19563

Summary of Graduates 1958-59

Total Graduates Through May 27, 1958	15716
One, Two, and Three Year Diplomas:	
(Discontinued Commencement 1936)	3522
Earned Degrees:	
Bachelors	
Bachelor of Arts	577
Bachelor of Science	3221
Bachelor of Arts in Education	6443
Total	10241
Masters	
Master of Arts	12
Master of Arts in Education	1915
Master of Science	3
Total	1930
Doctors	
Doctor of Education	9
Total	9
Total Through May, 1958	12180
Honorary Degrees:	
Master of Arts in Education	2
Doctor of Laws	8
Doctor of Literature	1
Doctor of Science	3
Total	14
Total Degrees Granted Through May 27, 1958	12194
Earned Degrees Granted May 26, 1959	
Bachelors	
Bachelor of Arts	122
Bachelor of Science	461
Bachelor of Arts in Education.....	462
Bachelor of Science in Engineering	56
Total	1101
Masters	
Master of Arts	13
Master of Arts in Education	204
Master of Science	21
Master of Science in Engineering	4
Total	242
Doctors	
Doctor of Education	6
Total	6
Education Specialist	2
Total May, 1959	1351

Honorary Degrees	
Doctor of Laws	1
Total Degrees Granted May 26, 1959	1352
Earned Degrees:	
Bachelors	
Bachelor of Arts	699
Bachelor of Science.....	3682
Bachelor of Arts in Education	6905
Bachelor of Science in Engineering	56
Total	11342
Masters	
Master of Arts	25
Master of Arts in Education	2119
Master of Science	24
Master of Science in Engineering	4
Total	2172
Doctors	
Doctor of Education	15
Total	15
Education Specialist	2
Total	2
Total Through May, 1959	13531
Honorary Degrees:	
Master of Arts in Education	2
Doctor of Laws	9
Doctor of Literature	1
Doctor of Science	3
Total	15
Total Degrees Granted Through May 26, 1959	13546

Summary of Graduates 1959-60

Total Graduates Through May 26, 1959	17053
One, Two, and Three Year Diplomas:	
(Discontinued Commencement 1936)	3522
Earned Degrees:	
Bachelors	
Bachelor of Arts	699
Bachelor of Sciences	3682
Bachelor of Arts in Education	6905
Bachelor of Science in Engineering	56
Total	11342

Masters	
Master of Arts	25
Master of Arts in Education	2119
Master of Science	24
Master of Science in Engineering	4
Total	2172
Doctors	
Doctor of Education.....	15
Total	15
Education Specialist	2
Total	2
Total Through May, 1959	13531
Honorary Degrees:	
Master of Arts in Education	2
Doctor of Laws	9
Doctor of Literature	1
Doctor of Science	3
Total	16
Total Degrees Granted Through May 26, 1959	13546
Earned Degrees Granted May 31, 1960	
Bachelors	
Bachelor of Arts	148
Bachelor of Science	504
Bachelor of Architecture	1
Bachelor of Arts in Education	472
Bachelor of Science in Engineering	80
Bachelor of Science in Nursing	6
Total	1211
Masters	
Master of Arts	50
Master of Arts in Education	214
Master of Science	36
Master of Public Administration	1
Master of Science in Engineering	6
Total	307
Doctors	
Doctor of Education	6
Total	6
Education Specialist	2
Total May, 1960	1526
Honorary Degrees	
Doctor of Laws	1
Total Degrees Granted May 31, 1960	1527

Earned Degrees

Bachelors

Bachelor of Arts.....	847
Bachelor of Science.....	4186
Bachelor of Architecture.....	1
Bachelor of Arts in Education	7377
Bachelor of Science in Engineering.....	136
Bachelor of Science in Nursing.....	6
Total	<u>12553</u>

Masters

Master of Arts.....	75
Master of Arts in Education.....	2333
Master of Science.....	60
Master of Public Administration.....	1
Master of Science in Engineering.....	10
Total	<u>2479</u>

Doctors

Doctor of Education.....	21
Total	<u>21</u>

Education Specialist.....	<u>4</u>
---------------------------	----------

Total	<u>4</u>
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Total Through May, 1960.....15057

Honorary Degrees:

Master of Arts in Education.....	2
Doctor of Laws.....	10
Doctor of Literature.....	1
Doctor of Science.....	3
Total	<u>16</u>

Total Degrees Granted Through May 31, 1960.....15073

Gifts and Bequests

Arizona State University, as an educational institution, qualifies under existing United States law as the object of tax deductible gifts and contributions. Gifts or bequests may be made directly to Arizona State University. It is suggested that those desiring to do so consult their attorney. A form for use in making such a gift or bequest should approximate that shown below:

I,
(Name)

of
(Address)

do hereby give, devise, and bequeath to the Board of Regents of the Universities and State College of Arizona, for use by the Arizona State University, the sum of.....

.....dollars. This is to be known as the

.....Fund, and is

to be used as indicated below:.....

.....
.....

The law respects the right of all donors to specify the purpose for which gifts and bequests may be used. It is also legal, possible and appropriate to the needs of the University to make gifts for the unrestricted use of the institution. Such bequests enable the University to meet the changing needs that arise from year to year. The law allows gift deductions up to 30 per cent of individual taxable income, provided that at least one-third of total gifts go to schools or other educational institutions. Arizona State University, of course, qualifies for this additional proportion.

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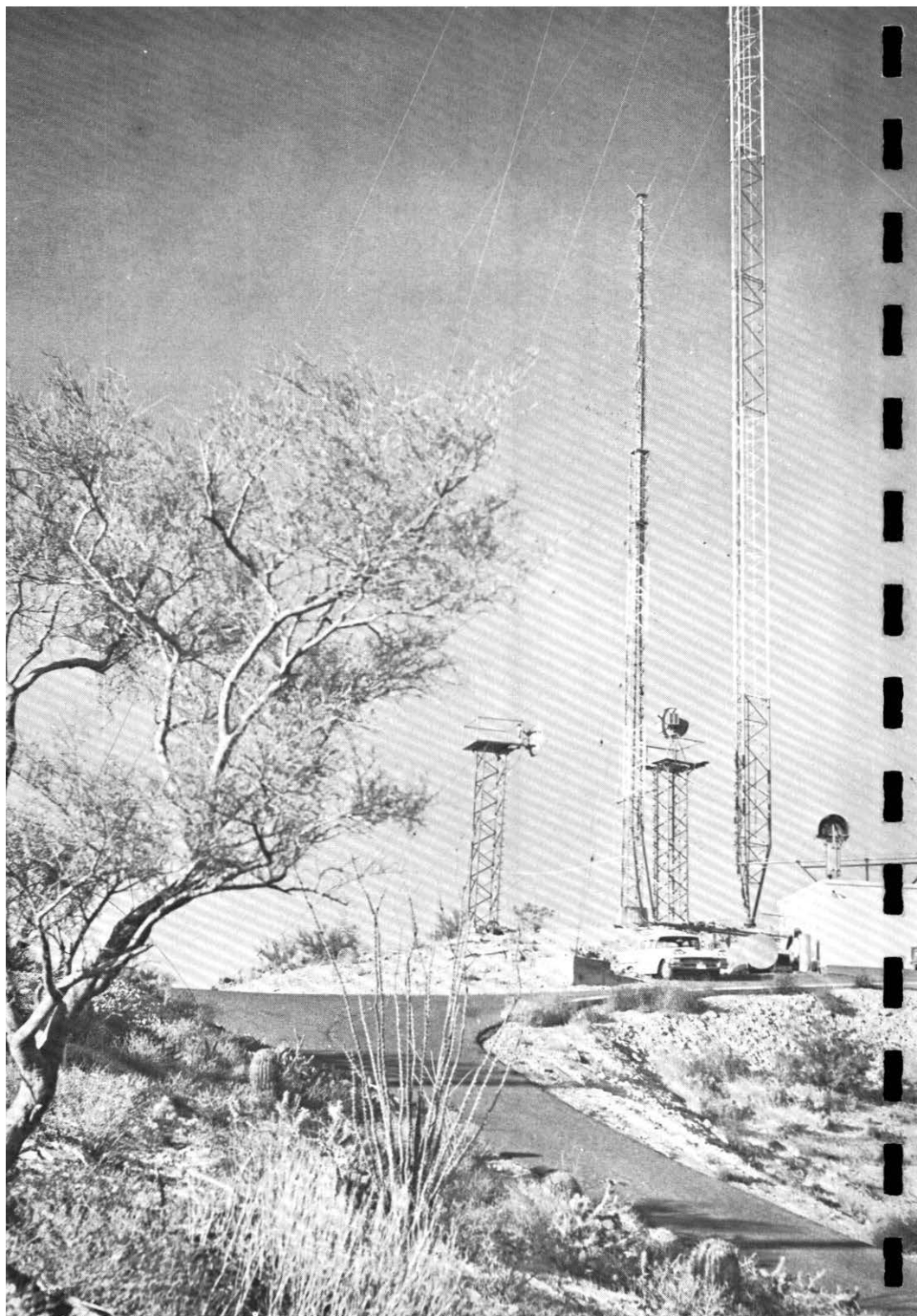
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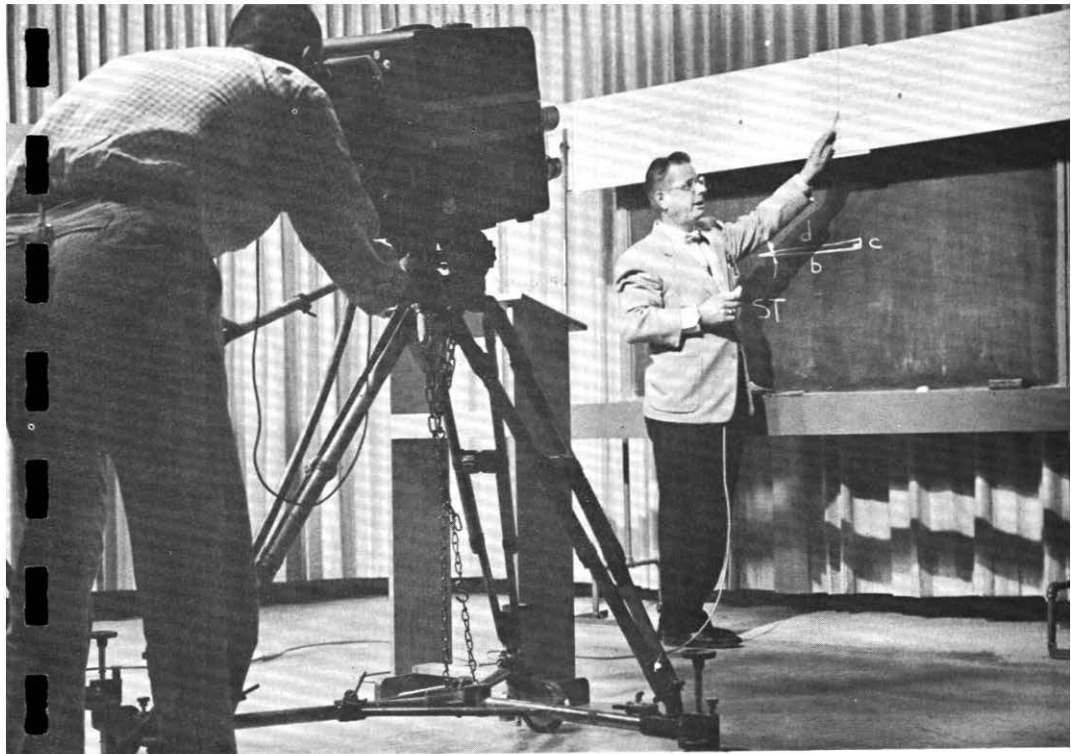
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Home economics education is centered in the beautifully landscaped Home Economics Building on College Avenue.

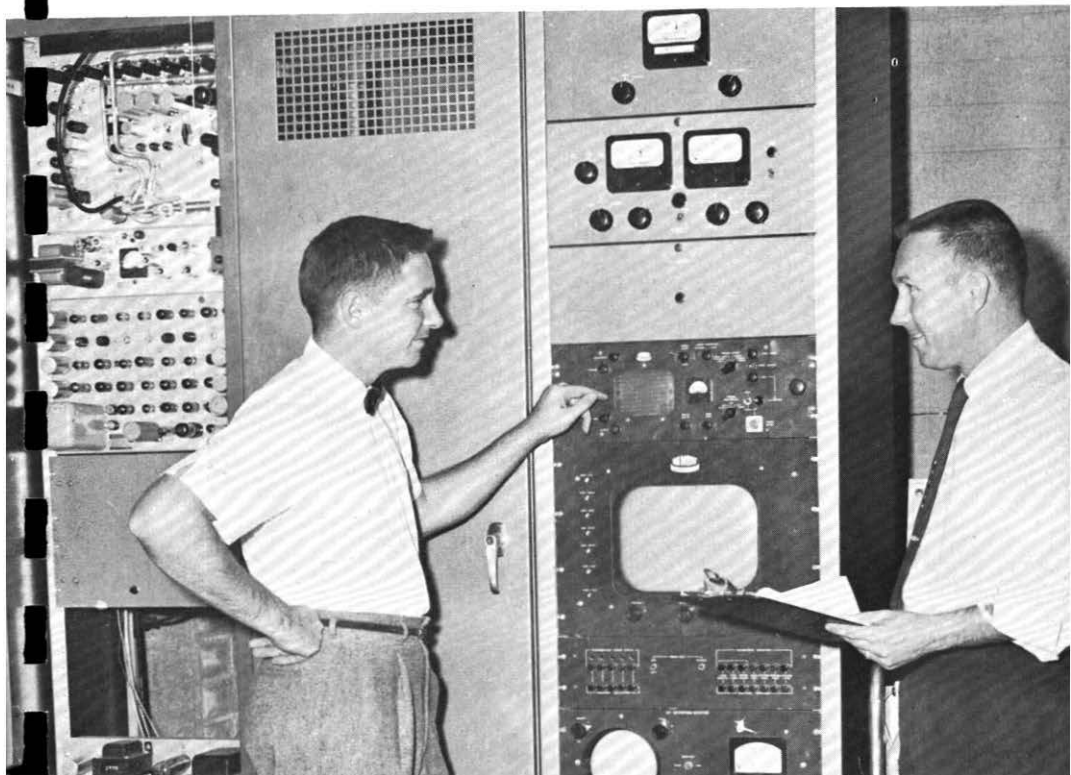


A symbol of service to those off the campus is the array of transmitting towers for KAET, the University's educational television station. The transmitter is located high on South Mountain, 21 miles southwest of the campus.



Televised classes for credit are offered by the University's television station, KAET.

Courses in electronics include practical experience with complex laboratory equipment.





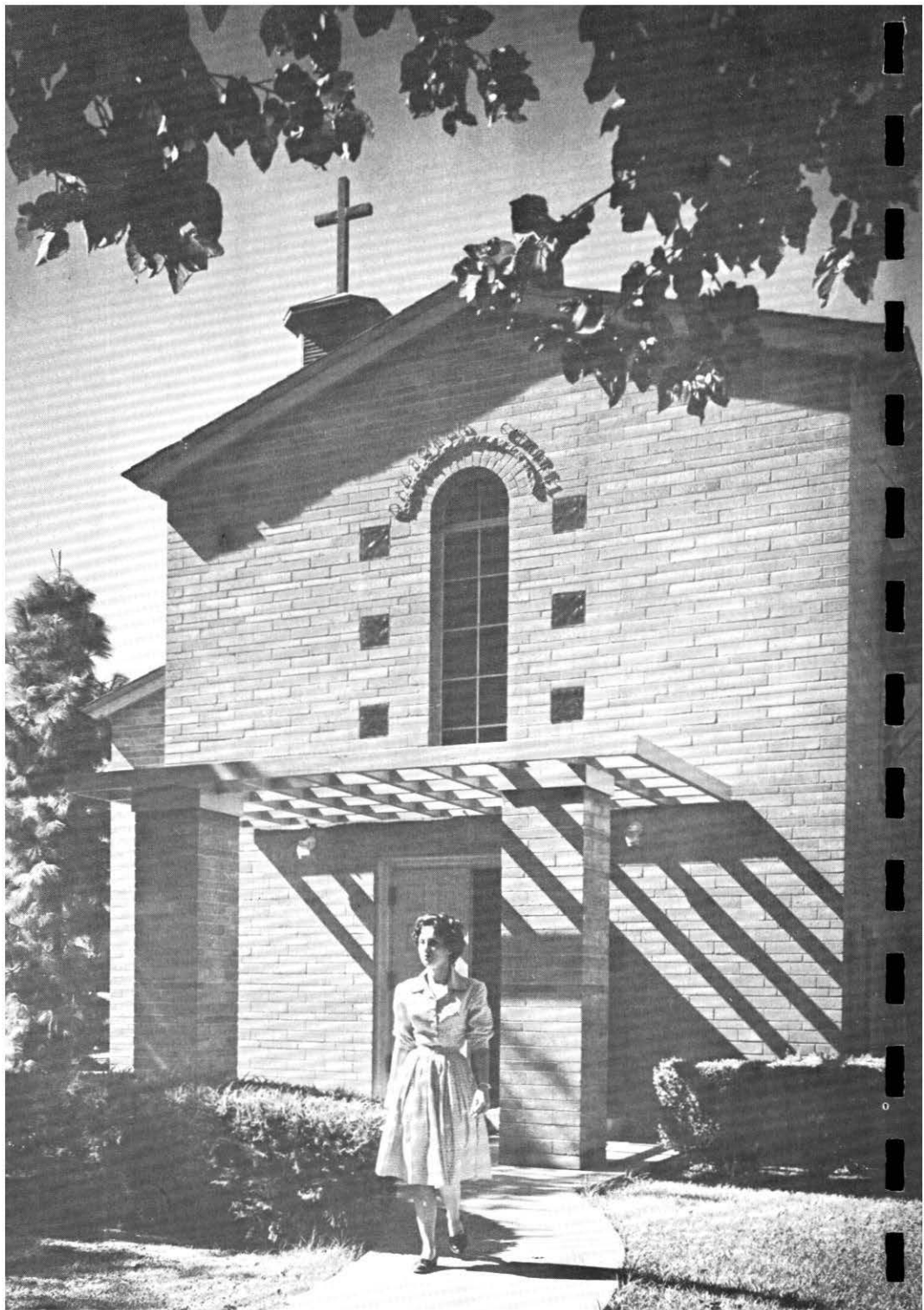
The Palm Walk leads past the Life Sciences Building, right, and the Engineering Center, left.



Matthews Library, academic heart of the campus, is the largest of several library facilities on the campus. It houses the University's Collection of American Art.

The Memorial Union ballroom is the scene of many gala social events throughout the year.





Danforth Chapel, located in the heart of the University campus, serves all students.



Wilson Hall is one of several women's residence halls built within the last five years which provide home-like atmosphere and the most modern accommodations.

Field projects like this one in the use of cactus in desert survival take students to many parts of Arizona throughout the academic year.





Work in ceramics is an important part of the flourishing fine arts offering at Arizona State University.

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