342 Applied Chemical Thermodynamics. (4 F, S
App cat on of conservat on and account ng pr nc p es w th non deal property est mat on techn ques to mode phase and chem cal equi bnum processes Lecture, rec tat on Prerequisites: CHE 312 ECE 384

351 Measurements Laboratory. (2) F
ntroduct on to aboratory pract ces and the use of measurement dev ces Prerequ s tes CHE 311, ENG 102. Pre or coreq u s tes CHE 312 or ECE 340 CHM 335. *General stud es L1 (f credit a so earned n CHE 352).*

352 Transport Laboratories. 2 S
The demonstration of transport phenomena princ ples w th experiments n f u d f ow heat and mass transfer Pre or coreq u s tes CHE 331 332 351 *General stud es L1 f credit also earned n CHE 351)*

411 Biomedical Engineering I. (3) F
Rev ew of d agnost c and prosthetic methods us ng eng neer ng methodo ogy ntroduct on to transport, metabo c, and autoregu atory processes in the human body Cross sted as BME 411 Prerequ s te nstructor approva

412 Biomedical Engineering II. (3 S
Rev ew of e ectrophys o ogy and nerve pac ng app cations ntroduct on to biomechan cs and jo nt/i mb rep acement techno ogy card ovascu ar and pulmonary f u d mechanics, and the app cat on of mathemat ca mode ng Cross l sted as BME 412 Prerequ s te: nstructor ap prova

413 Biomedical Instrumentation I. (3) F
Princ p es of med ca nstrumentat on Stud es of med ca diagnost c instruments and tech n ques for the measurement of phys o og c variab es n v ng systems Cross l sted as BME 413 Prerequis tes AGB BME 435 (grade of "C or h gher) ECE 333 or 334.

432 Principles of Chemical Engineering Design. (3) F
Mult component d sti at on eng neer ng eco nom cs equ pment s z ng and costs p ant op erat on econom cs and s mu at on and opt m zat'on techniques. Prerequ s tes CHE 333 342

442 Chemical Reactor Design. (3) F, S
App icat on of k'net cs to chem ca reactor de s gn Prerequisite: CHE 342. Pre or corequ s te CHE 333

451 Chemical Engineering Laboratory. 2) F
Operat on contro and design of exper menta and ndustr a process equ pment ndependent research projects 6 hours ab Pre- or corequ s te: CHE 352 432, 442

458 Semiconductor Material Processing. (3) N
Introduction to the process ng and character zat on of e ectronic matena s for sem conduc tor app cat ons Prerequ s tes: CHE 333, 342.

461 Process Control. (3) F
Process dynam cs nstrumentat on and feed back appl ed to automat c process contro . Lecture lab Prerequ s te ECE 301 *General stud es· N3*

462 Process Design. (3) S
App icat on of econom c pr nc p es to opt m ze equ pment select on and design deve opment and des gn of process systems Prerequ s tes CHE 432 442

475 Biochemical Engineering. (3) N
App cat on of chemica engineering methods mass transfer thermodynam cs, and transport phenomena to industria biotechno ogy Pre requ s te nstructor approva

476 Bioreaction Engineering. (3) N
Pr nc p es of analysis and des gn of reactors for process ng with ce s and other b o og ca y act ve materia s, app cations of react'on engineering n biotechno ogy Prerequis te nstructor approva

477 Bioseparation Processes. (3) N
Princ p es of separat on of bio og cal y act ve chemica s, the app cation scaleup and de s gn of separat on processes in b otechnology Prerequ s te nstructor approva .

490 Chemical Engineering Projects. (1 5) F, S SS
nd v dual projects n chem ca eng neering operations and design. Prerequisite: nstructor approva

496 Professional Seminar. (0) F S
Profess ona and eth ca aspects w th a d s cuss on of emp oyment opportun t es and respons b l t es Lectures f e d trips.

501 Introduction to Transport Phenomena. (3 F, S
Transport phenomena w th emphas s on f u d systems. Prerequ s'te: trans t on student w th nstructor approval.

502 Introduction to Energy Transport. (3) F, S
Cont nuat on of transport principles with em phasis on energy transport 'n stationary and flu d systems Prerequisite: trans tion student w th nstructor approval

503 Introduction to Mass Transport. (3) F, S
The appl cat on of transport phenomena to mass transfer. The des gn of mass transfer equ pment, ncluding staged processes. Pre requ s te trans tion student w th nstructor ap prova

504 Introduction to Chemical Thermodynamics. (3) F S
Energy relat ons and equi bnum conversions based on chem ca potentia s and phase equ libr a Prerequ'site: trans tion student w th n structor approva

505 Introduction to Chemical Reactor Design. (3) F S
App cat on of k netics to chem ca reactor de s gn Prerequ s te transition student w th n structor approva

515 Biomedical Transport Processes. (3) N
Pr nc p es of momentum, heat, and mass transport w'th app ications to med ca and bio logica systems and medical device des gn. Cross-l sted as BME 515. Prerequisite: 'n structor approva

517 Medical Transport Devices I. (3) N
Heat, mass, and momentum transfer concepts are deve oped from f rst principles and app ied to the des gn and appl cation of med ca de v ces Emphas s is an extracorporea treatment of b ood with channel d mens ons wh ch great y exceed ce ular d mens ons Cross- sted as BME 517 Prerequ'sites: part al d fferent a equat ons; at least 1 course n heat, mass or momentum transfer.

518 Introduction to Biomaterials. (3) F
Top cs inc ude structure property relat onships for synthet'c and natura biomaterials, b ocompat bi ty and uses of materia s to re p ace body parts. Cross- isted as BME 518. Prerequ s te ECE 313 or nstructor approva .

527 Advanced Applied Mathematical Analysis in Chemical Engineering. (3) F
Formu at'on and so ut on of comp ex mathemat ca re ationsh ps resu ting from the description of phys ca prob ems n mass, en ergy, and momentum transfer and chemical kinet cs

528 Process Optimization Techniques. (3) S
Method for opt m z ng engineering processes Experimenta des gn and analys s· 'near and non inear regress on methods; classical, search, and dynam c programm ng a gorithms.

533 Transport Processes I. (3) F
Un fied treatment of momentum, heat and mass transfer from molecu ar theory, and con tinuum po nts of v ew Cont nuum equat ons of m croscopic and macroscop c systems and mu t component and mu t phase systems Cross- isted as BME 533

534 Transport Processes II. (3) S
Cont nuat on of CHE/BME 533 emphas z ng mass transfer. Cross- sted as BME 534 Prerequ s te BME/CHE 533

535 Turbulent Mixing. (3) N
Turbu ence and m'x ng n mult component systems w th/w thout chem ca reactions. Computat ona models app ied to chem cal processes Prerequisite CHE 533

536 Convective Mass Transfer. (3) N
Turbu ent f ow for mu ticomponent systems, nc ud ng chem cal reactions with appl cat ons n separations and a r po lut on Prerequisite. CHE 533 or MAE 571

543 Thermodynamics of Chemical Systems. (3) F
Class cal and statist ca thermodynam cs of nonideal phys cochemica systems and processes; predict on of optimum operating con ditions Cross-l'sted as BME 543

544 Chemical Reactor Engineering. (3) S
React on rates thermodynam cs, and trans port princ ples app ied to the des gn and operat on of chem ca reactors. Cross sted as BME 544 Prerequis'te: BME/CHE 543.

548 Topics in Catalysis. (3 N
Eng neer ng cata ys s, emphas z ng adsorption, kinetics characterization, d ffusiona con s derat ons and reactor design Other top'cs include mechan sms, surface ana yses, and e ectron c structure

552 Industrial Water Quality Engineering. (3) N
Water pol utants qua ty criteria and contro , chem ca treatment process'ng, and system des gn. Case stud es Prerequ s te. CHE 331 or equ va ent.

553 Air Quality Control. (3) N
Air pol utant origins effects, and control. Phys ca and chem ca processes, ncluding dispersion combustion, samp 'ng, contro equ pment design and spec a top cs Prereq u s te CHE 331 or equivalent

554 New Energy Technology. (3) N
Gasification l quefact on pyrolysis, and com bustion processes for coal, wastes, and other raw materials n-s tu processes for coa , o , shale and geothermal energy. Environmental qual ty ssues.

556 Separation Processes. (3) N
Topics n b nary/multicomponent separation, rate governed and equ ibrat on processes, mass transfer criteria energy requ rements, separat ng agents and dev ces, and staged operat ons.

558 Electronic Materials. (3) N
Process ng and characterizat on of e ectron c materia s for sem conductor type uses. Thermodynamics and transport phenomena, phase equ ibr a and structure, mass transfer and d ffusion and therma propert es

561 Advanced Process Control. (3) S
Dynam c process representat on, l near optimal contro opt mal state reconstruction, and parameter and state estimat on techn ques for continuous and discrete time systems

562 Chemical Systems Engineering. (3) N
Process dynam cs systems ana ys s, com puter app cations and process contro .

563 Chemical Engineering Design. (3) N
Computat ona methods· the design of chem ca plants and processes

Omnibus Courses: See page 44 for omn'bus courses that may be offered.

BIOENGINEERING

BME 201 Introduction to Bioengineering. (3) F
Impact of b oengineering on soc ety. Develop ng an awareness of the contribut ons of b oengineering to so ve med ca and b o og ca prob ems. Cross isted as STE 201 Prerequ s te ENG 102 or 105

202 Global Awareness within Engineering Design. (3) F
Strateg es for integrat ng long-term env'ron menta , econom c, and eth ca cons derations nto eng neer ng design B omed ca env ronmenta , b otechno og cal, and materia s eng neer ng case stud es Lecture, crit ca dis course. Cross isted as STE 202. Prerequ s tes· ECE 106 ECN 111 or 112 ENG 102. *General studies· L1*

318 Biomaterials. (3) S
Mater a propert es of natura and art f c a b omateria s Tissue and b ood biocompati b l ty. Uses of materia s to rep ace body parts Prerequisites ECE 313, 350

331 Biomedical Engineering Transport I: Fluids. (3) F S
Transport phenomena w th emphas s on b omed cal engineering f uid systems. Prerequ sites MAT 274; PHY 131

334 Bioengineering Heat and Mass Transfer. (3) S
Appl cat on of the principles of heat and mass transfer phenomena to so ution of problems n med c ne and med'cal device des gn Prereq u s tes. BME 331 (grade of "C" or higher), ECE 340.

411 Biomedical Engineering I. (3) F
Rev ew of d agnost c and prosthetic methods us ng engineering methodology Introduction to transport, metabo ic and autoregu atory processes in the human body Cross- isted as CHE 411 Prerequ s te instructor approva

412 Biomedical Engineering II. (3) S
Rev ew of e ectrophys o ogy and nerve pac ng app cat ons ntroduction to b omechanics and jo nt/ mb rep acement technology card ovascular and pu monary fluid mechanics, and the app cat on of mathemat ca model ng Cross sted as CHE 412 Prerequ site· nstructor ap proval

413 Biomedical Instrumentation I. (3) F
Principles of med ca nstrumentat on. Studies of med cal d agnost c nstruments and techn ques for the measurement of physiologic variables in iving systems Cross- isted as CHE 413. Prerequ s tes: AGB BME 435 (grade of "C" or higher); ECE 333 or 334.

414 Biomedical Instrumentation II. (3) S
Princ p es of app ied biophysical measurements using bioelectric and radio og ca ap proaches Prerequisites: BME 413 and ECE 333 or 334, MAT 274 *or* instructor approva .

415 Biomedical Transport Processes. (4) A
Princ ples of momentum heat, and mass transfer with appl cations to medica and biolog ca systems and med cal device des gn Prerequisites MAT 274; PHY 131

416 Biomechanics. (3) F
Mechanical properties of bone muscle and soft tissues Stat c and dynam c ana ys s of human movement tasks such as ocomot on. Pre or corequ s te ECE 312, 313

417 Biomedical Engineering Design. (3) S
Techn ca , regulatory econom c, ega soc a , and eth cal aspects of med cal device systems engineering des gn Prerequ s tes BME 318 (grade of "C" or h gher), 334 (grade of "C" or h gher).

419 Biocontrol Systems. (3) S
App ication of linear and nonl near contro systems techniques toward analys s of neuromuscu oske etal card ovascu ar thermal, and mass transfer systems of the body Prerequ sites. ECE 301; MAT 274.

423 Biomedical Instrumentation Laboratory. (1 F
Laboratory experience with problems con cepts and techniques of b omed cal nstru mentation n stat c and dynam c environments. Lab. Pre or corequisites AGB BME 435 (grade of C" or h gher); BME/CHE 413, ECE 333 or 334.

435 Animal Physiology I. (4) F
Contro and function of the nervous muscular cardiovascu ar, respiratory and rena systems of domest c an ma s Lecture lab Cross- isted as AGB 435 Prerequ sites B O 181 CHM 113.

436 Animal Physiology II. (3) N
Control and function of the endocrine d gestive and reproduct ve systems of domest c an'ma s. Princ p es of adaptat on of an mals to their environment. Prerequ s te BME 435 (grade of "C" or higher) or ZOL 360

437 Animal Physiology Laboratory. (1) N
Selected physiologica experiments to accompany BME 436 Lab Pre- or coreqU s te BME 436

461 Health Physics Principles and Radiation Measurements. (3) S
Sources, characteristics, dos metry, sh elding and measurement techniques for cosmogen c, terrestrial, and anthropogenic rad ation on z- ng and nonionizing rad at'on theory. ALARA concept. Emphas s on instrumentation, detec tors, and environmenta monitor'ng. Lecture, lab. Prerequ site ECE 301

465 Clinical Nuclear Engineering I. (3) N
Fundamentals of cl n'cal nuclear eng neering and med ca hea th phys cs practice Radiat on biology, dos metry and sh elding for rad otherapy and diagnost c procedures. Cross- sted as EEE 465 Prerequ s te instructor approval.

470 Microcomputer Applications in Bioengineering. (3) S
Use of m crocomputers for real t'me data co - ection analysis and contro of exper ments nvo v ng actua and s mulated phys o og ca systems. Lecture ab. Prerequ s tes· BME/ AGB 435 and ECE 333 or 334.

490 Biomedical Engineering Projects. (1 5) F, S SS
Ind v dual projects n med ca systems or med ca device des gn and development

496 Professional Seminar. (0) F S
Profess onal and eth ca aspects w th a d s- cuss on of emp oyment opportun t es and re spons b l t es Lecture field trips

511 Biomedical Engineering. (3) A
Diagnost c and prosthetic methods us ng eng - neering methodology Transport, metabo c and autoregu atory processes n the body.

512 Biomedical Engineering II. (3) A
E ectrophysiology and nerve pacing app ca tions, ntroduct on to b omechan cs and jo nt/ mb rep acement techno ogy, card ovascu ar and pulmonary flu d mechan cs, and mathematical model ng

513 Biomedical Instrumentation I. (3) A
Princip es of medical nstrumentation. Studies of med ca d agnost c nstruments and techniques for the measurement of physiolog c variables n liv ng systems

514 Biomedical Instrumentation. (3) F
E ectrical, physical and mechan ca principles govern ng the operation of modern b omedica nstrumentat on Prerequ s tes ECE 334, MAT 274

515 Biomedical Transport Processes. (3) N
Princ p es of momentum heat and mass transport with app cat ons to medical and bio logica systems and med ca dev ce des gn. Cross sted as CHE 515. Prerequ's'te: n structor approva

516 Topics in Biomechanics. (3) S
Mechan ca propert es of bone, musc e, and soft t ssues. Static and dynamic analys s of human movement tasks, ncluding in-depth project Prerequ sites ECE 312 and 313 *or* n structor approva .

517 Medical Transport Devices I. (3) N
Heat mass, and momentum transfer concepts are deve oped from first pr nc'p es and app ed to the des gn and appl'cation of med ca de- v ces. Emphas s is an extracorporea treatment of blood w th channel d mens ons wh ch great y exceed ce lular d mens ons Cross- sted as CHE 517 Prerequ s tes: part al differ ent a equations; at least 1 course n heat mass or momentum transfer.

518 Introduction to Biomaterials. (3) F
Top cs nc ude structure property relat onsh ps for synthet c and natura b omaterials, b o- compat b l ty, and uses of materials to replace body parts Cross sted as CHE 518 Prereq u site: ECE 313 or instructor approval.

519 Topics in Biocontrol Systems. (3) F
Linear and nonl near contro systems ana ysis of neuromuscu oske eta card ovascular, ther ma , and mass transfer systems of the body nc ud ng n depth project. Prerequ s te: MAT 274

520 Bioelectric Phenomena. (3) N
Study of the orig n, propagation, and nterac t ons of b oe ectric ty n living th ngs vo ume conductor prob em mathematical analys s of b oe ectric interact ons, and uses n med ca diagnost cs.

521 Neuromuscular Control Systems. 3) S
Overv ew of sensor motor bra n structures Appl cat on of nonl near, adaptive opt ma and superv sory contro theory to eye head- hand coordinat on and ocomot on

522 Biosensor Design and Application. (3) A
Theory and princ ples of b osensor design and app cat'on n med c ne and b o ogy. Pr nc p es of measurements w th b osensors Prerequ - s te: instructor approva

523 Physiological Instrumentation Lab. (1) F
Laboratory experience with prob ems concepts, and techn ques of biomedica nstrumentat on n stat c and dynam c environments Lab. Pre or coreqU s tes AGB/BME 435 BME/CHE 413; ECE 333 or 334.

524 Fundamentals of Applied Neural Control. (3) A
Fundamental concepts of e ectrical st'mu at on and record ng in the nervous system w th the goal of funct ona contro restoration Pre- or corequis te BME 435 or nstructor approva

525 Surgical Techniques. (2) S
Principles of surgica techniques, standard operat ve procedures federa regu at ons, guide- 'nes, and state of the art methods Lecture, ab.

532 Prosthetic and Rehabilitation Engineering. (3) A
Ana ysis and cr t cal assessment of design and contro strateg es for state-of-the-art med ca dev ces used in rehab itation eng neer ng. Pre or coreqU s tes BME 416 or EPE 610) 419 435; ECE 312 313.

533 Transport Processes I. 3) F
Un fied treatment of momentum heat, and mass transfer from mo ecu ar theory and con- t'nuum points of view Cont nuum equations of m croscopic and macroscop c systems and mu ticomponent and mult phase systems Cross isted as CHE 533.

534 Transport Processes II. (3) S
Cont nuat on of BME/CHE 533 emphas z ng mass transfer Cross- sted as CHE 534 Prerequis te· BME/CHE 533

543 Thermodynamics of Chemical Systems. (3) F
C ass ca and stat st cal thermodynam cs of non dea phys cochem ca systems and processes pred ction of optimum operating condit ons. Cross sted as CHE 543

544 Chemical Reactor Engineering. (3) S
React on rates, thermodynam cs, and transport pr nc p es app ed to the des gn and op erat on of chem ca reactors. Cross I sted as CHE 544 Prerequ s te BME/CHE 543

551 Movement Biomechanics. (3 S
Mechan cs appl ed to the ana ysis and model- ng of phys o og ca movements. Computa- t ona mode ing of musc es, tendons, jo nts and the ske etal system with app cation to sports and rehabi tat on Prerequ s te BME 416 or nstructor approva

566 Medical Imaging Instrumentation. (3) N
Des gn and ana ys s of imag ng systems and nuc ear dev ces for med ca diagnos s, therapy and research Laboratory exper - ments us ng diagnost c rad o ogy, f uoroscopy u trasound, and CAT scann ng Lecture, ab. Prerequisite: BME 465 or EEE 465 or nstruc tor approva

567 Radiation Shielding and Transport. (3) F
Sh e d ng for rad at on therapy diagnost c ra d o ogy, cyc otrons and nuclear reactors Monte Car o and emp r ca computat ona methods, regulat ons, and des gn prob ems Cross- isted as EEE 567 Prerequ s te BME 465 or EEE 465

568 Medical Tomography. (3) S
CT, SPECT PET and MR 3-d mensiona *n vivo* measurements nstrument des'gn phys - olog cal mode ing c n ca protoco s recon- struction algor thms and quant tat on ssues Prerequ site EEE 465.

569 Radiochemistry and Radiopharmaceutical Production. (3) N
Advanced pr nc p es of cyc otron des gn, targetry, operat on, and uti zation Nove syn thes s, tracer preparat on, qua ity control and b od stribut on stud es. Prerequ s te BME 465 or EEE 465.

Omnibus Courses: See page 44 for omn bus courses that may be offered.

MATERIALS SCIENCE AND ENGINEERING

MSE 353 Introduction to Materials Processing and Synthesis. (3) F
Pr nc p es of materials structure and proper t es with emphasis on app icat ons n bulk and th n f m materia s process ng and synthes s Cross sted as EEE 353. Prerequisites. CHM 116 and PHY 131 *or* equivalents

354 Experiments in Materials Synthesis and Processing I. (2) S
Smal groups of students complete three ex per ments se ected from a st Each s super- v'sed by a se ected facu ty member Lab Cross- sted as EEE 354. Prerequisite EEE/ MSE 353 or equ va ent.

355 Introduction to Materials Science and Engineering. (3) F
Elements of the structure of meta s and a loys measurement of mechanical propert es, and optical metal ography Lecture, ab, f e d tr ps Prerequ site CHM 114 or 116

420 Physical Metallurgy. 4) F
Crystal structure and defects. Phase dia grams metal ography, so dif cation and cast ing deformat on, and annea ng. Lecture, ab Prerequisite: ECE 350.

430 Thermodynamics of Materials. (3) N
Pr nc p es of stat stical mechanics, statist ca thermodynam cs of s ng e crysta s so utions, phase equ l brium, free energy of reactions, free e ectron theory, and thermodynam'cs of defects Prerequ s te CHE 312 or ECE 340

431 Corrosion and Corrosion Control. 3) S ntroduct on to corros on mechan sms and methods of prevent ng corros on Topics n c ude the fo owing. e ectrochem stry, polar za tion, corrosion rates, oxidat on, coatings and cathod c protection Prerequ s te ECE 350

440 Mechanical Properties of Solids. (3) S
Effects of env ronmental and microstructural varnab es of mechan'ca properties including p astic deformation fat gue creep bnttle frac ture, and interna fnct on. Prerequ s te: ECE 350

441 Analysis of Material Failures. (3) S
Identif cation of types of fa lures Ana yt cal techn ques Fractography SEM, nondestruc tive nspection and metal ography Mechani- ca and e ectron c components Prerequ s te ECE 350.

450 X-Ray and Electron Diffraction. (3) F
Fundamenta s of X-ray d ffraction transm s- s on e ectron m croscopy and scann ng e ec- tron m croscopy Techn ques for study ng sur faces nterna m crostru tures and f uores cence Lecture demonstrat ons Prerequ s te ECE 350

453 Experiments in Materials Synthesis and Processing II. (2 F
A continuat on of MSE 354, w th emphas s on characterizat on Smal groups comp ete three exper ments superv sed by se ected faculty members Lab Cross sted as EEE 453 Pre- requis tes: EEE/MSE 353 and 354 *or* equ va- lents

454 Advanced Materials Processing and Synthesis. (3) S
Case stud es from pub ished iterature of cur rent techn ques n mater a s processing and synthesis Student part c pat on n c assroom presentations Lecture rec tat'on Cross I sted as EEE 454. Prerequ s tes· EEE/MSE 353 and 354 *or* equ va ents.

470 Polymers and Composites. (3) F
Re at onsh p between chem stry structure, and propert'es of eng neering polymers De s gn, propert es, and behav or of f ber com posite systems. Cross sted as MAE 455 Prerequisite· ECE 350

471 Introduction to Ceramics. (3) F
Principles of structure and property relat ons n ceram c mater a s Process ng techn ques App cations in mechan ca e ectron c and su perconducting systems. Prerequ s te ECE 350

472 Integrated Circuit Materials Science. (3) N
Principles of mater als sc ence appl ed to sem conductor process ng and fabr cat on in metals ceram cs, polymers, and sem conduc tors Prerequisite: ECE 350.

476 Nonmetallic Materials Laboratory. (2) S
Experimental measurement of propert'es of polymer c ceram c and e ectron c materia s. Structure characterizat on. Lecture ab. Pre requ s tes: ECE 350; MSE 355.

480 Manufacturing Engineering. (3) F
Analysis and opt m zation of manufacturing processes Prerequis te ECE 350.

482 Materials Engineering Design. (3) F S
Princ ples of the des gn process Feasib ity and optimizat on Manufacturing processes materia s se ect on fa lure ana ysis and eco- nom cs Prerequ s tes ECE 313 350

490 Capstone Design Project. (1–3) F S
For sma groups n fundamenta or appl ed aspects of engineer ng mater a s; emphas s on exper menta prob ems and design. Prereq u s tes: MSE 430, 440 450

496 Professional Seminar. (0) F S
Profess ona and eth'ca aspects w th a d s cuss on of emp oyment opportun t es and re- spons b lities Lectures, f e d trips

510 X-Ray and Electron Diffraction. 3) F
Fundamentals of X ray d ffraction transm s s'on e ectr n m croscopy, and scann'ng elec tron m croscopy Techniques for study ng sur faces nterna m crostructures, and f uores cence Lecture demonstrat ons Prerequis te: trans t on student w th nstructor approval

511 Corrosion and Corrosion Control. (3) S
Introduct on to corros on mechanisms and methods of preventing corros on Top'cs in- clude the fol ow ng. e ectrochem stry po ariza t on corros'on rates, ox dation coat'ngs, and cathod'c protect'on Prerequisite· trans tion student w th 'nstructor approva

512 Analysis of Material Failures. (3) S
Identification of types of failures. Analytical techniques. Fractography, SEM, nondestructive inspection, and metallography. Mechanical and electronic components. Prerequisite: transition student with instructor approval.

513 Polymers and Composites. (3) F
Relationship between chemistry, structure, and properties of engineering polymers. Design, properties, and behavior of fiber composite systems.

514 Physical Metallurgy. (4) F
Crystal structure and defects. Phase diagrams, metallography, solidification and casting, and deformation and annealing. Lecture, lab. Prerequisite: transition student with instructor approval.

515 Thermodynamics of Materials. (3) N
Principles of statistical mechanics, statistical thermodynamics of single crystals, solutions, phase equilibrium, free energy of reactions, free electron theory, and thermodynamics of defects. Prerequisite: transition student with instructor approval.

516 Mechanical Properties of Solids. (3) S
Effects of environmental and microstructional variables of mechanical properties, including plastic deformation, fatigue, creep, brittle fracture, and internal friction. Prerequisite: transition student with instructor approval.

517 Introduction to Ceramics. (3) F
Principles of structure, property relations in ceramic materials. Processing techniques. Applications in mechanical, electronic, and superconducting systems. Prerequisite: transition student with instructor approval.

518 Integrated Circuits Materials Science. (3) N
Principles of materials science applied to semiconductor processing and fabrication in metals, ceramics, polymers, and semiconductors. Prerequisite: transition student with instructor approval.

520 Theory of Crystalline Solids. (3) F
Anisotropic properties of crystals; tensor treatment of elastic, magnetic, electric and thermal properties, and crystallography of Martensitic transformations.

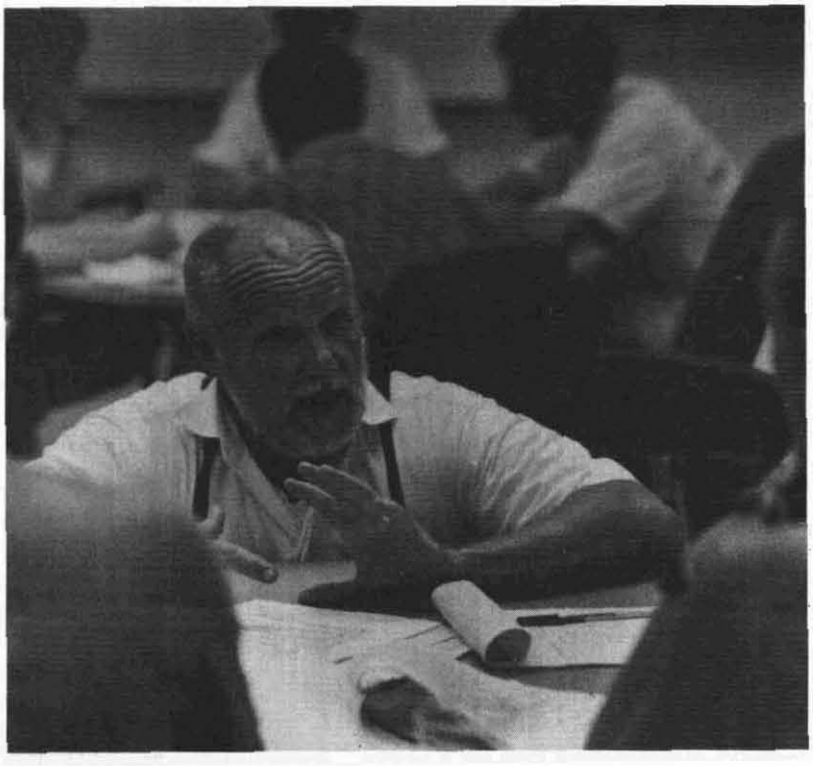
521 Defects in Crystalline Solids. (3) S
Introduction to the geometry, interaction, and equilibrium between dislocations and point defects. Relations between defects and properties will be discussed. Prerequisite: ECE 350 or instructor approval.

530 Materials Thermodynamics and Kinetics. (3) S
Thermodynamics of alloy systems, diffusion in solids, kinetics of precipitation, and phase transformations in solids. Prerequisites: CHE 312 or ECE 340; ECE 350.

531 Statistical Thermodynamics. (3) N
Kinetic and quantum theory. Statistical mechanics; ensemble theory. Structure and thermodynamics of non-interacting and interacting particles. Boltzmann integro-differential equation. Cross-listed as MAE 582. Prerequisite: MAE 581.

533 Direct Energy Conversion. (3) N
Advanced selected topics in direct energy conversion, theory, design, and applications. Cross-listed as MAE 537. Prerequisite: MAE 581.

540 Fracture, Fatigue, and Creep. (3) F
Relationship between microstructure and fracture; fatigue and creep properties of materials. Environmental effects and recent developments. Current theories and experimental results. Prerequisite: MSE 440 or equivalent.



549 Manufacturing Analysis. (3) S
Analysis and optimization of manufacturing processes. Prerequisite: MSE 480.

550 Advanced Materials Characterization. (3) N
Analytical instrumentation for characterization of materials; SEM, SIMS, Auger, analytical TEM, and other advanced research techniques.

556 Electron Microscopy Laboratory. (3) F
Laboratory support for MSE 558. Cross-listed as SEM 556. Pre- or corequisite: MSE/SEM 558.

557 Electron Microscopy Laboratory. (3) S
Lab support for MSE 559. Cross-listed as SEM 557. Pre- or corequisite: MSE/SEM 559.

558 Electron Microscopy I. (3) F
Microanalysis of the structure and composition of materials using images, diffraction and X-ray, and energy loss spectroscopy. Knowledge of elementary crystallography, reciprocal lattice, stereographic projections, and complex variables is required. Cross-listed as SEM 558. Prerequisite: instructor approval.

559 Electron Microscopy II. (3) S
Microanalysis of the structure and composition of materials using images, diffraction and X-ray, and energy loss spectroscopy. Knowledge of elementary crystallography, reciprocal lattice, stereographic projections, and complex variables is required. Cross-listed as SEM 559. Prerequisite: instructor approval.

560 Strengthening Mechanisms. (3) S
Deformation of crystalline materials. Properties of dislocations. Theories of strain hardening, solid solution, precipitation, and transformation strengthening. Prerequisite: ECE 350 or equivalent.

561 Phase Transformation in Solids. (3) N
Heterogeneous and homogeneous precipitation reactions, shear displacive reactions, and order-disorder transformation.

562 Ion Implantation. (3) S
Includes defect production and annealing. Generalized treatment, including ion implantation, neutron irradiation damage, and the interaction of other incident beams. Prerequisite: MSE 450.

570 Polymer Structure and Properties. (3) F
Relationships between structure and properties of synthetic polymers, including glass transition, molecular relaxations, crystalline state viscoelasticity, morphological characterization, and processing.

571 Ceramics. (3) A
Includes ceramic processing, casting, molding, firing, sintering, crystal defects, and mechanical, electronic, and physical properties. Prerequisites: MSE 521, 561.

572 Semiconductor Phase Diagrams. (3) A
Analysis of binary and ternary phase diagrams and application to semiconductor growth and vapor and liquid phase epitaxy. Prerequisite: MSE 521.

573 Magnetic Materials. (3) A
Emphasis on ferromagnetic and ferrimagnetic phenomena. Domains, magnetic anisotrophy, and magnetastriction. Study of commercial magnetic materials. Prerequisite: MSE 520 or equivalent.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Civil Engineering

Larry W. Mays
Chair
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PROFESSORS
W. HOUSTON, MAMLOUK, MATTHIAS, MAYS, O BANNON, RUFF, SINGHAL, UPCHURCH

ASSOCIATE PROFESSORS
DUFFY, FAFITIS, HINKS, S. HOUSTON, RAJAN, ZANIEWSK

ASSISTANT PROFESSORS
BAAJ, BAKER FOX MOBASHER

PROFESSORS EMERITI
BETZ, BLACKBURN, BORGO KLOCK, LUNDGREN, PIAN

Civil engineers deal with some of the most critical and visible problems con fronting the world's societies Civil en gineering projects are typically large and costly with potentially profound environmental, social, and economic impacts. Examples are rebuilding the decaying infrastructure (e.g., highways, bridges, urban water supply, and sew age disposal systems) of the United States and the construction of new in frastructures in the developing world. Civil engineers, as "society's engi neers," play a leadership role in the planning, design, construction, opera tion, and management of these projects.

The Department of Civil Engineering offers challenging programs of study designed to provide students with the scientific and technical resources to pursue a broad and multifaceted range of careers Areas of study in civil engi neering are described below.

Environmental engineering. This area of study deals with the quality of air, water, and land resources; transport, use, and disposal of hazardous wastes; water and wastewater treatment, water reuse

Geotechnical engineering. This area of study includes the analysis and design of foundation systems· seepage control, earthdams and water resource struc tures; earthwork operations, fluid flow through porous media, response of foundations and embankments to earth quakes.

Hydraulic engineering This area of study is involved with structures for the control of water such as dams, pipe net works, canals; flood control; irrigation; hydropower.

Structural engineering This area of study considers the planning, analysis and design of steel and concrete bridges, buildings, dams; special off shore and space structures; composite materials.

Transportation engineering This area of study involves the planning and de sign of transportation systems so that they provide safe, rapid, comfortable, convenient, and economical movement of people and goods; mass transit sys tems, railroads; airports; waterways and pipelines.

Water resources engineering. This area of study is concerned with surface and groundwater flow; planning and management of water supply; water distribution system modeling.

The undergraduate program provides an excellent background for entry to graduate study in engineering.

ENTRANCE REQUIREMENTS

See "Admission," and "Degrees and Majors," pages 241 242 for informa tion regarding entrance requirements.

DEGREE REQUIREMENTS

The B.S.E. degree in Civil Engineer ing requires a minimum of 133 semes ter hours of course work, not including the university First Year Composition requirement. The minimum require ments are for a student who has suc cessfully completed at least a year (each) of high school chemistry, phys ics, computer programming, and pre calculus algebra and trigonometry.

The B.S.E. degree program consists of three categories:

1. general studies and university First Year Composition (see pages 49 71, 72);
2. engineering core (see pages 244–245); and
3. major (Civil Engineering).

The major consists of the Civil Engi neering core, design electives, and technical electives.

Civil Engineering Core

Thirty five hours are required. CEE courses, except CEE 296 and 321, may not be taken until all mathematics (MAT) and all engineering core courses (ECE), except ECE 383, 384, and 400, have been completed with an average grade of "C" or better. No CEE 400 level courses may be taken until ECE 383 and 384 have been com pleted.

			Seme ter Hours
CEE	296	Introduction to Civil Engineering	1
CEE	321	Structural Analysis	3
CEE	322	Steel Structures	3
CEE	323	Concrete Structures	3
CEE	341	Hydraulic Engineering	4
CEE	351	Soil Mechanics	4
CEE	361, 362	Environmental Engineering	6
CEE	372	Transportation Engineering	4
CEE	496	Topics n Civil Engineering Practice	1
IEE	300	Economic Analysis for Engineers	3
MAE	371	Fluid Mechanics	3

Civil Engineering Design Electives

Two courses (six semester hours) from the following list are required.

			Semester Hours
CEE	423	Structural Design	3
CEE	441	Water Resources Engineering	3
CEE	452	Foundations	3
CEE	466	Sanitary Systems Design	3
CEE	475	Highway Geometric Design	3

Civil Engineering Technical Electives

Eleven hours are required. The de sign elective courses that have not been selected to satisfy the design electives requirement (see above) may be used as technical electives

A maximum of six hours may be se lected outside civil engineering with advisor's approval. Courses in addition to those listed below are available and are indicated as CEE 498 on the three year teaching plan of the department.

Construction. CON 341, 383, 495, 496. Only one of these courses may be selected for technical elective credit.

Environmental Engineering. Water treatment, industrial and domestic waste treatment and disposal, public health engineering, industrial hygiene. CEE 466; CHM 231; MIC 220 (or 205 and 206).

Geotechnical Engineering. Assessment of engineering properties and design utilizing soils and rocks as engineering materials CEE 452

Structural Engineering. Analysis and design of structures for buildings, bridges, space frames, structural me chanics. CEE 423, 432.

Transportation Engineering. Analysis and design of transportation facilities, transportation planning and economics, transportation in the urban environment. CEE 412, 471, 475.

Water Resources Engineering. Planning and design of facilities for collection, storage and distribution of water, water systems management, estimating availability of water resources. CEE 440, 441.

Civil Engineering Program of Study

A Four-Year Sequence

Freshman Year

			Semester Hours
First Semester			
CEE	296	Introduction to Civil Engineering	1
CHM	114	General Chemistry for Engineers[2]	4
ECE	105	Introduction to Languages of Engineering	3
ENG	101	First Year Composition	3
MAT	270	Calculus with Analytic Geometry I	4
HU or SB elective[1]			3
Total			18
Second Semester			
ECE	106	Introduction to Computer Aided Engineering	3
ENG	102	First-Year Composition	3
MAT	271	Calculus with Analytic Geometry II	4
PHY	121	University Physics I: Mechanics	3
PHY	122	University Physics Laboratory I	1
HU or SB elective[1]			3
Total			17

Sophomore Year

First Semester			
ECE	210	Engineering Mechanics I. Statics	3
MAT	272	Calculus with Analytic Geometry III	4
MAT	274	Elementary Differential Equations	3
PHY	131	University Physics II Electricity and Magnetism	3
PHY	132	University Physics Laboratory II	1
L1 elective[1, 3]			3
Total			17
Second Semester			
ECE	301	Electrical Networks I	4
ECE	312	Engineering Mechanics II: Dynamics	3
ECE	313	Introduction to Deformable Solids	3
ECE	340	Thermodynamics	3
ECE	383	Probability and Statistics for Engineers	2
ECN	111	Macroeconomic Principles or ECN 112 Microeconomic Principles (3)	3
Total			18

Junior Year

First Semester			
CEE	321	Structural Analysis	3
ECE	351	Engineering Materials	3
ECE	384	Numerical Analysis for Engineers I	2
IEE	300	Economic Analysis for Engineers	3
MAE	371	Fluid Mechanics	3
Basic science elective[4]			3
Total			17
Second Semester			
CEE	322	Steel Structures	3
CEE	341	Hydraulic Engineering	4
CEE	351	Geotechnical Engineering	4
CEE	361	Environmental Engineering	3
CEE	372	Transportation Engineering	4
Total			18

Senior Year

First Semester			
CEE	323	Concrete Structures	3
CEE	362	Environmental Engineering	3
CEE	496	Topics in Civil Engineering Practice	1
Design elective			3
HU or SB elective[1]			3
Technical elective			6
Total			19
Second Semester			
CEE	400	Microcomputer Applications in Civil Engineering	3
ECE	400	Engineering Communications	3
Design elective			3
HU or SB elective[1]			3
Technical elective			5
Total			17

Graduation requirements: 133 semester hours minimum plus English proficiency.

[1] See pages 53–71 for the requirements and the approved list.

[2] Students who have taken no high school chemistry should take CHM 113 and 116.

[3] See page 244 for special requirements and selection of an L1 elective.

[4] Must be an earth science or life science course, if physics or chemistry, the course must be of a more advanced level than PHY 131 or CHM 114/116.

Seventeen semester hours of design and technical electives with an average grade of "C" or better is required. Two graduate courses may be taken for undergraduate credit by students whose cumulative GPA is 3.00 or better and with the approval of the instructor, advisor, department chair, and dean of the college.

Concurrent Studies in Architecture and Civil Engineering

Undergraduate. Qualified lower division students interested in combining studies in architecture and civil engineering may prepare for upper-division and graduate courses in both programs by taking courses listed in option "B" of the School of Architecture (page 167).

Graduate. Qualified students may develop a program of study that leads to the concurrent degrees Master of Architecture and M.S.E. with a focus in Civil Engineering. The student's program of study is developed in conjunction with advisors in both departments. For specific details consult with advisors in the departments.

CIVIL ENGINEERING

CEE 296 Introduction to Civil Engineering. (1) F, S
Introduction to the profession. Description of areas of specialization. Degree requirements, academic standing and advising procedures. Introduction to ab fac it es. Prerequ'site: freshman standing

310 Testing of Materials for Construction. (3) F S
Structural and behavioral characteristics engineering properties, measurements, and application of construction materials. Lecture ab. Not open to engineering students. Prerequisite: CON 323

321 Structural Analysis. (3) F S
Statically determinate and indeterminate structures by classical and matrix methods such as trusses, beams and frames. 2 hours lecture, 2 hours recitation. Prerequisite: ECE 313

322 Steel Structures. (3) F
Behavior of structural components and systems. Design of steel members and connections. Load and resistance factor design methods. Lecture, recitation. Prerequisites: CEE 321, completion of engineering core (except ECE 383, 384, and 400), minimum core grade requirements satisfied.

323 Concrete Structures. (3) S
Behavior of concrete structures and the design of reinforced and prestressed concrete members including footings. Partial design of concrete building system. Lecture, recitation. Prerequisites: CEE 321, completion of engineering core (except ECE 383, 384, and 400), minimum core grade requirements satisfied.

340 Hydraulics and Hydrology. (3) F S
Application of hydraulic engineering principles to flow of liquids in pipe systems and open channels; hydrostatics characteristics of pumps and turbines. Introduction to hydrology. Not open to engineering students. Lecture, lab. Prerequisite: CON 221

341 Hydraulic Engineering. (4) F S
Fundamental prnc ples and methods of f u d mechan cs formng ana yt ca bas s for water resources engineering Flow n condu ts and open channels ntroduct on to hydro ogy Lec ture, lab Prerequ sites MAE 371; comp etion of eng neering core (except ECE 383 384 and 400); m n mum core grade requ rements sat sfied

351 Soil Mechanics. (4) F, S
ndex propert es and engineering characteris- tics of so ls. Compact on, permeab ty and seepage, compressibi ty and sett ement and shear strength Lecture ab Prerequisites CEE 321· comp etion of eng neer ng core ex- cept ECE 383 384, and 400) mn mum core grade requirements satisf ed.

361 Environmental Engineering. (3) F S
Natura env ronment water resources, hydro og'c cyc e, chem'stry of natural waters qua ty requ rements and water treatment and water d stribution systems Prerequ s te: MAE 371.

362 Environmental Engineering. (3) S
Natura env ronment the carbon cyc e and b ochem stry of wastes prnc ples of waste treatment and drainage systems. Prerequ s tes: CEE 341, 361

371 Introduction to Urban Planning. (3) N
Theoretical and pract ca aspects of c ty plan- n ng. Interre at onsh ps among phys ca p an- n ng environment government, and soc ety Not acceptab e as a technical e ective for CEE students.

372 Transportation Engineering. (4) F S
Highway, ra l, water and a r transportat on Operationa characteris cs and traff c contro dev ces of each transport mode Impact on ur- ban form Prerequisites: CEE 321 comp etion of engineer ng core (except ECE 383, 384, and 400)· minimum core grade requ rements sat'sf ed

400 Microcomputer Applications in Civil Engineering. (3) S
Development of microcomputer l teracy in c v eng neering app icat ons Prerequ's'tes: CEE 351, 361, 372 ECE 106.

412 Pavement Analysis and Design. (3) F
Des gn of flex ble and rig d pavements for h ghways and airports Surface, base, and subgrade courses. Cost ana ys s and pave- ment se ect on Prerequ s tes CEE 351 ECE 351.

423 Structural Design. (3) F
Ana ys s and des gn of re nforced concrete stee , masonry, and t mber structures. Lec ture, ab Prerequ s tes CEE 322, 323

432 Matrix and Computer Applications in Structural Engineering. (3) S
Matrix and computer app cations to structura eng neering and structural mechanics Stiff ness and flex bi ty methods, f n te e ements, and d fferences Prerequ s te CEE 321

440 Engineering Hydrology. (3) F
Descript ve hydro ogy, ncluding hydrolog c cycle, systems, and mode s Rain-runoff mod- e s. Hydro og c des gn. Concepts, propert es and bas c equat ons of groundwater f ow. Pre requisite: CEE 341

441 Water Resources Engineering. (3) S
App icat on of the princip es of hydraul cs and hydro ogy to the eng neering of water re sources projects, design and operat on of wa ter resources systems; water qua ty. Prereq- u site CEE 341

450 Soil Mechanics in Construction. (3) F S
So mechan cs as appl ed to the construction f eld, including foundations h ghways reta n- ng wa ls and s ope stab l ty Re ationsh p be tween so characteristics and geo og c forma tions. Not open to engineering students Lec ture, lab Prerequisite: CON 323.

452 Foundations. (3) F S
App cations of soi mechan cs to foundat on systems bearing capacity, ateral earth pres- sure, and slope stab l ty Prerequ s te. CEE 351

466 Sanitary Systems Design. (3) F
Capacity, planning and des gn of water sup p y, domestic and storm dra nage, and so d waste systems. Prerequ s te CEE 361.

471 Planning and Design of Urban Sys- tems. (3) N
For students in c ty planning urban systems, c v engineering and re ated areas working as nterd scip nary plann ng and des gn teams. Effect of econom c base emp oyment and popula on on urban land use requ rements Locat on and requ red capac ty of urban sys tems to serve urban land uses Lecture lab Prerequ'site: sen or stand ng.

475 Highway Geometric Design. 3) F
Des gn of the v s b e elements of the roadway Fundamental design contro s w th app icat on to rura roads, at-grade intersect ons, free ways and nterchanges Lecture recitation Prerequ'site: CEE 372.

496 Topics in Civil Engineering Practice. (1) F S
Professiona eng neering pract ce Interv ew ng and résume writ ng, profess onal registra t on requ rements, cont nu ng educat on graduate study, financ a plann ng and em- p oyment Prerequisite: sen or stand ng.

512 Pavement Performance and Manage- ment. (3) F
Pavement management systems, ncluding data co lect on eva uation opt mizat on eco- nom c ana ys s, and computer app cations for h ghway and a rport des gn Prerequ s te. CEE 412

514 Bituminous Materials and Mixture. (3) F
Types of bitum nous materia s used n pave ment mixtures Chem ca composit on and physical propert es des rab e aggregate char acteris cs, and optimum aspha t contents Lecture ab Prerequ s te ECE 351

515 Properties of Concrete. (3) S
Materials sc ence of concrete Cement chem- istry mechan sms of hydration nterrelat on sh ps among micro and macro propert es of cement-based mater a s. Mechanical proper t es, fa ure theories fracture mechan cs of concrete materials Cement-based compos te materials and the durab ty aspects Lecture lab Prerequis'te: ECE 350 or 351

521 Stress Analysis. (3) F
Advanced top cs n the analyt cal determ na t on of stress and stra'n. Prerequ s te CEE 321.

524 Advanced Steel Structures. (3) F
Strength propert es of stee and the r effects on structural behav or. Elast c des gn of steel structures P ast c ana ys s and des gn of beams, frames and bents Plast c deflections. Plast c des gn requ rements Mult story bu d ngs Prerequisite. CEE 322.

526 Finite Element Methods in Civil Engi- neering. (3) F
Fin te element formu at on for so ut ons of structural geotechn cal, and hydrau c prob- lems Prerequ s te CEE 432

527 Advanced Concrete Structures. (3) N
U timate strength des gn Comb ned shear and tors on Serv ceab ty P ast c ana ys s Spec a systems Prerequisite CEE 323

528 Stability of Structures. (3) N
E ast c and inelast c buck ng of rol ed and cold-formed columns and beams Stabi ity of plates, r g d frames, and trusses Prerequ' sites CEE 322 nstructor approva

529 Complex Structures. (3) N
C assica and numer ca nvestigat ons of l n- ear and non near structures composed of flat and curved surfaces and near or curvi near elements. Prerequ s te nstructor approval

530 Prestressed Concrete. (3) F 95
Materia s and methods of prestressing Analy- s s and des gn for f exure shear and torsion Prestress losses due to fr ct on creep, shrink age, and anchorage set. Statical y ndetermi nate structures Des gn of f at s abs bridges, and compos te beams. Prerequ site: CEE 323.

531 Theory of Structures. (3) N
Genera theorems re at ng to elastic systems· def ect on of trusses and beams statically n determinate trusses, beams, r ngs, arches, and frames by cons stent deformat on, east work, and e ast c center honzonta ly curved members 'n bend ng and tors on Prerequ's'te: CEE 321

533 Applied Optimal Design. (3) S 95
Linear and non 'near programming Prob em formu at on Des gn sensit v ty ana ys s FEM- based optima des gn of structural and me- chan ca systems. Prerequ s te: graduate stand ng or nstructor approval.

536 Structural Dynamics. (3 F
Structures and structura members subjected to dynam c loadings response spectra theory appl cat ons to br dges and power p ants, n vestigat ons of the responses of mu tidegree of freedom structures, and matrix and numeri- cal methods of ana ysis Lecture, rec tation Prerequisites CEE 321 nstructor approval

537 Topics in Structural Engineering. (1 3) F, S
Advanced top cs, nc uding wind eng neering, earthquake eng neer ng probab ist c con- cepts and bridge and bu d ng engineering Prerequis te· nstructor approval

540 Groundwater Hydrology. (3) F
Physical propert es of aqu fers, groundwater exp oration we l construct on, and pumping; subsurface f ow model ng; land subs'dence, groundwater pol ut on and water rights. Pre- requ s te CEE 341 or nstructor approval

541 Surface Water Hydrology. (3) S
Hydro og c cyc e and mechanisms nc ud ng prec p tat on evaporat on and transpiration hydrograph ana ysis f ood rout ng statist cal methods in hydro ogy and hydro og c des gn Prerequ s te: CEE 341 or nstructor approval

542 Water Resources Systems Planning. (2) A
Ph losophy of water resources p ann ng; eco- nom c socia , and eng neer ng interact'on; n troduct on to the theory and app ication of quant tat ve p ann ng methodo og es n water resources p ann ng Guest ecturers case stud es Prerequ s te instructor approva

543 Water Resources Systems I. (3) A
Theory and app ication of quantitat ve p an n ng methodo og es for the des gn and opera tion of water resources systems; c ass pro jects us ng a computer case studies Pre or corequ's te CEE 542 or nstructor approval

544 Water Resources Systems II. (3) F '94
Advanced computer-oriented workshop n the app cat on of quantitat ve p anning techniques to the des gn and operat on of water resources systems Prerequ s te CEE 543.

545 Foundations of Hydraulic Engineering. (2) S 95
Rev ew of ncompress b e f u d dynam cs F ow n p pes and channe s; unsteady and var ed f ows wave mot on. Prerequ s te: CEE 341

546 Free Surface Hydraulics. (2) F '95
Derivation of 1-d mensiona equations used n open channel flow analysis computat ons for uniform and nonun form f ows unsteady flow and flood rout ng. Mathematica and phys cal mode s. Prerequ s te CEE 341

547 Principles of River Engineering. (2) N
Uses of r vers study of watershed and chan ne processes Sed ment sources, y eld and contro , hydrolog c ana ys s. Case stud es Prerequ s te CEE 341 or nstructor approva

548 Sedimentation Engineering. (2) F 94
Introduction to the transportat on of granular sed mentary materia s by mov ng f u ds Degradat on, aggregat on and oca scour n a lu v a channe s Mathematical and phys ca models Prerequ site CEE 547 or nstructor approva

550 Soil Behavior. (3) S
Phys cochem cal aspects of so behav or sta b zat on of soils, and eng neer ng propert es of soi s Prerequ s te CEE 351.

551 Advanced Soil Mechanics Laboratory. (3) F
Odometer, tnax'al (stat c and cycl c) back pressure saturated and unsaturated samples, pore pressure measurements resonant co - umn automatic data acqu sit on, and n-s tu test ng Lecture labs Prerequ s te CEE 351

552 Geological Engineering. (3) S
Geological nvest gat ons for eng neer ng pur poses, case h stories, geo ogic structure weather ng, remote sens ng, geophys cs, and a r photo nterpretat on for engineering s te o- cat ons Lecture f eld trips Prerequ s te CEE 351

553 Advanced Soil Mechanics. (3) S
App cation of theories of e astic ty and p astic ity to soi s, theor es of consol dat on fa lure theories and response to static and dynam c load ng Prerequ s te: CEE 351

554 Shear Strength and Slope Stability. (3 F
Shear strength of saturated and unsaturated so s strength-deformation re at'onsh ps, t me dependent strength parameters, effects of sampl ng and advanced slope stab ity Pre requ s te CEE 351.

555 Applied Soil Mechanics. (3) S
Deep foundations braced excavat ons an- chored bulkheads reinforced earth underp'n- n ng and dewatering Prerequisite CEE 452

556 Seepage and Earth Dams. (3) F
Trans ent and steady state flu d f ow through so !, conf ned and unconfined f ow pore water pressures, and app cation to earth dams Pre- requ s te· CEE 351.

557 Topics in Geotechnical Engineering. (3) N
New and develop ng techno ogy n geotechnica eng neering. Prerequ s tes graduate stand ng instructor approva .

558 Numerical Methods. (3) N
Const tut ve relat ons for soi s and numerica techn ques app ied to geotechn ca eng neer- ing nc ud ng computer app cations Prerequ sites· CEE 351; computer programming graduate stand ng

559 Earthquake Engineering. (3) F
Character st cs of earthquake motions se ec- t on of des gn earthquakes s te response ana yses se sm c s ope stab ty and l quefac- t on Prerequ s tes CEE 351, graduate stand- ng.

560 Hazardous Waste: Site Assessment and Mitigation Measures. (3) N
Techn ques for hazardous waste s te assess- ment and m tigat on Case h stor es presented by nstructor and guest speakers Prerequ s te graduate stand ng n C v Engineering

561 Physical-Chemical Treatment of Water and Waste. (3) F
Theory and design of phys ca and chem ca processes for the treatment of water and waste waters Prerequ s te CEE 361

562 Environmental Biochemistry and Waste Treatment. (3) S
Theory and des gn of b'o og cal waste treat- ment systems Po ut on and environmenta ass m ation of wastes. Prerequ s te· CEE 362

563 Environmental Chemistry Laboratory. (3) F
Ana ysis of water domestic and ndustria wastes, laboratory procedures for po lut on eva uat on, and the control of water and waste treatment processes Lecture, ab Prerequi- s te CEE 361 or 362

566 Industrial/Hazardous Waste Treatment. (3) N
Emphas s on treatment of oca ndustr a haz ardous waste problems nc ud ng so vent re covery and meta s Lecture, project Prerequ sites CEE 561 and 563.

573 Traffic Engineering. 3 F
Driver veh c e, and roadway characterist cs aws and ord nances, traff c contro dev ces traff c engineering stud es and Transportation System Management measures Prerequ s te CEE 372.

574 Highway Capacity. (3) S
Highway capac ty for a funct ona c asses of h ghways Traff c s gna zat on nc ud ng traff c stud es, warrants cyc e engths t m ng, phas ng and coord nat on Prerequ s te CEE 372

575 Traffic Flow Theory and Safety Analy sis. (3) S
Traffic flow theory d str but ons queu ng de- ay mode s and car-fo ow ng H ghway safety, acc dent records systems, acc dent ana ys s dentify ng prob em ocations, and acc dent countermeasures Prerequ s te CEE 573 or 574

576 Airport Engineering. (3) F
P ann ng and des gn of a rport faci t es Effect of aircraft characteris cs, a r traff c control pro- cedures and aircraft demand for runway and passenger hand ng fac ties on s te selec t on, runway configurat on, and terminal de sign Prerequ s te. CEE 372

577 Urban Transportation Planning. (3) F
Appl cat on of and use parameters traff c gen- eration theory, traffic distribution and ass'gn ment mode s trans t analysis and econom c factors to the solution of the urban transporta tion prob em Prerequ s te CEE 372.

578 Highway Engineering, Planning, and Economics. (3) S
H ghway transportat on, nc uding des gn, op erat on p ann ng, env ronmental mpact, eco- nom c feas bil ty and f nanc ng H ghways as a regiona system Prerequisite: CEE 372.

Students enrol ed in CEE 580 590 592 599 792, and 799 are required to attend graduate student seminars at the times shown in the Schedule of C asses *Each semester, every graduate student enrolled for more than eight semester hours is to enroll for at least one semester hour of CEE 592, 599 792 or 799 Each civil engineering graduate student hold ing an appo ntment as a teach ng or research assistant or associate is to enroll for one se mester hour of CEE 580, such credit does not apply toward graduat on.*

Omnibus Courses: See page 44 for omn bus courses that may be offered.

Computer Science and Engineering

Ben M. Huey
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PROFESSORS
ASHCROFT, BARNHILL, BLACKLEDGE COLLOFELLO, FAR N, FINDLER LEWIS, NIELSON J. URBAN WOODF LL

ASSOCIATE PROFESSORS
DASGUPTA, FALTZ, FAUSTINI FOLEY, GOLSHAN , HUEY, LINDQUIST MILLER, O'GRADY, PHEANIS, ROCKWOOD, SEN

ASSISTANT PROFESSORS
CALLISS, DIETRICH, ELGOT-DRAPKIN, KAMBHAMPATI, S URBAN

PROFESSOR EMERITUS
ROBBINS

Computers have a significant impact on our daily lives, and this impact is likely to be even greater in the future as computer professionals continue to develop more powerful, smaller, faster, and less expensive computing systems. Computer science and computer engi neering deal with the study, design, development, construction, and applica tion of modern computing machinery. Other important topics include comput ing techniques and appropriate lan

guages for general information process ing, for scientific computation, for the recognition, storage, retrieval, and pro cessing of data of all kinds, and for the automatic control and simulation of processes.

The curricula offered by the Depart ment of Computer Science and Engi neering prepare the student to be a par ticipant in this rapidly changing area of technology by presenting in depth treatments of the fundamentals of com puter science and computer engineer ing. The department offers two under graduate degrees: a B.S. in Computer Science and a B.S.E. in Computer Sys tems Engineering.

DEGREE REQUIREMENTS

Minimum Scholastic Requirements. In addition to the requirement for a cu mulative GPA of 2.00 or higher, all computer science and computer sys tems engineering students must obtain a minimum grade of "C" in all CSE courses used for degree credit.

Computer Science—B.S.

The Department of Computer Sci ence and Engineering offers a B.S. de gree that prepares the student for a ca reer in computer science. A student pursuing a B.S. degree must complete an English proficiency requirement, the general studies requirements described below, the computer science core courses, a senior-level breadth require ment in the major, and a set of techni cal electives.

English Proficiency		*Semester Hours*
ENG 101, 102	First Year Composition or ENG 105 Advanced First Year Composition 3)	6

General Studies

*Humanities and Fine Arts and Social and Behavioral Sciences**
(18 semester hours minimum
These courses must include at least one upper division course, at least two courses from the same department, and courses from at least two departments

Humanities and fine arts	6–12
Social and behavioral sciences	12–6

Literacy and Critical Inquiry

ECE 400	Engineering Communications	3
One L1 course*		3

Numeracy

ECE 383	Probability and Statistics for Engineers	2
MAT 270	Calculus with Analytic Geometry I or MAT 290 Calculus I (5)	4

Natural Science

PHY 121	University Physics I Mechanics	3
PHY 122	University Physics Laboratory I	1
PHY 131	University Physics II: Electricity and Magnetism	3
PHY 132	University Physics Laboratory II	1
Any physics courses requiring PHY 131 as a prerequisite or any laboratory science satisfying the S1 or S2 general studies require ments (except PHS 110; PHY 101, 105, 111, 112)		6
Total general studies		44

NOTE Six semester hours taken in two of the three awareness areas* are re quired in the final list of courses in the student's graduation program of study. These can be included in the HU and SB course selections

*See pages 53 71 for the requirements and the approved list

Computer Science Core		*Semester Hours*
CSE 100	Introduction to Computer Science I	3
CSE 101	Introduction to Computer Science II	3
CSE 120	Digital Design Funda mentals	3
CSE 201	Application Languages Pro gramming Laboratory	1 2
CSE 202	Functional Languages Pro-gramming Laboratory	2 1
CSE 225	Assembly Language Pro-gramming (Motorola)	3
	or CSE 226 Assembly Language Programming (Intel) (3)	
CSE 310	Data Structures	3
CSE 325	System Design with Micro processors (Motorola)	3
	or CSE 326 System Design with Microprocessors (Intel) (3)	
CSE 330	Computer Organization and Architecture	3
CSE 340	Structure of Programming Languages	3
CSE 355	Introduction to Theoretical Computer Science	3
MAT 243	Discrete Mathematical Structures	3
MAT 271	Calculus with Analytic Geometry II	4
	or MAT 291 Calculus II (5)	
MAT 272	Calculus w th Analytic Geometry III	4
	or MAT 291 Calculus II (5)	
MAT 342	Linear Algebra	3
Total computer science core		44
Computer science breadth requirement Each student must complete 18 hours of CSE 400-level courses.		18
Technical electives Each student must complete nine hours of courses chosen from the computer science technical elective list and approved by the student's advisor.		9
Unrestricted electives		7
Total degree requirements		128

Computer Science Program of Study
Typical Four-Year Sequence
Freshman Year

First Semester		*Semester Hours*
CSE 100	Introduction to Computer Science I	3
ENG 101	First Year Composition	3
MAT 270	Calculus with Analytic Geometry I	4
HU or SB elective[1]		3
Laboratory science (S1)[1, 2]		3
Total		16
Second Semester		
CSE 101	Introduction to Computer Science II	3
CSE 120	Digital Design Funda mentals	3
ENG 102	First Year Composition	3
MAT 271	Calculus with Analytic Geometry II	4
Laboratory science (S2)[1, 2]		3
Total		16

Sophomore Year

First Semester		
CSE 201	Application Languages Programming Laboratory	1
CSE 202	Functional Languages Programming Laboratory	1
MAT 243	Discrete Mathematical Structures	3
MAT 272	Calculus with Analytic Geometry III	4
PHY 121	University Physics I: Mechanics	3
PHY 122	University Physics Laboratory I	1
HU or SB elective[1]		3
Total		16
Second Semester		
CSE 225	Assembly Language Pro-gramming (Motorola)	3
CSE 310	Data Structures	3
PHY 131	University Physics II: Elec tricity and Magnetism	3
PHY 132	University Physics Laboratory II	1
HU or SB elective[1]		3
L1 elective[1]		3
Total		16

Junior Year

First Semester

CSE	201	Application Languages Programming Laboratory	1
CSE	325	System Design with Microprocessors (Motorola)	3
CSE	340	Structure of Programming Languages	3
MAT	342	Linear Algebra	3
HU or SB elective[1]			3
Unrestricted elective			3
Total			16

Second Semester

CSE	330	Computer Organization and Architecture	3
CSE	355	Introduction to Theoretical Computer Science	3
ECE	383	Probability and Statistics for Engineers	2
HU or SB elective[1]			3
Technical elective			3
Unrestricted elective			2
Total			16

Senior Year

First Semester

ECE	400	Engineering Communications	3
400 level CSE computer science breadth electives			9
Technical elective			3
Unrestricted elective			1
Total			16

Second Semester

HU or SB elective[1]			3
400 level CSE computer science breadth electives			9
Technical elective			3
Unrestricted elective			1
Total			16

[1] See pages 53 71 for the requirements and the approved list.

[2] Any physics courses requiring PHY 131 as a prerequisite or any laboratory science course satisfying the S1 or S2 general studies requirements (except PHS 110; PHY 101, 105, 111, 112).

Computer Systems Engineering—B.S.E.

The Department of Computer Science and Engineering offers a B.S.E. degree that prepares the student for a career in computer systems engineering. This degree program provides training in both engineering and computer science. The degree requirements for the School of Engineering on pages 242 244 show the requirements for English proficiency and general studies for the B.S.E. degree. The following list specifies the remaining requirements for the B.S.E. degree.

Engineering Core			Semester Hours
CHM	114	General Chemistry for Engineers	4
		or CHM 116	
CSE	225	Assembly Language Programming (Motorola) 3 or CSE 226 Assembly Language Programming (Intel 3)	
ECE	105	Introduction to Languages of Engineering	3
ECE	210	Engineering Mechanics I: Statics	3
ECE	301	Electrical Networks I	4
ECE	312	Engineering Mechanics II: Dynamics	3
ECE	333	Electrical Instrumentation	3
ECE	340	Thermodynamics	3
ECE	352	Properties of Electronic Materials	3
ECE	383	Probability and Statistics for Engineers	2
MAT	274	Elementary Differential Equations	3
MAT	291	Calculus II	5
		or MAT 271 (4) and 272 4)	
MAT	342	Linear Algebra	3
PHY	361	Introductory Modern Physics*	3
Total			45

* Basic science elective

Computer Science Core			Semester Hours
CSE	120	Digital Design Fundamentals	3
CSE	200	Concepts of Computer Science	4
CSE	201	Application Languages Programming Laboratory	1
CSE	202	Functional Languages Programming Laboratory	1
CSE	310	Data Structures	3
CSE	325	System Design with Microprocessors (Motorola)	3
		or CSE 326 System Design with Microprocessors (Intel) (3)	
CSE	330	Computer Organization and Architecture	3
CSE	340	Structure of Programming Languages	3
CSE	355	Introduction to Theoretical Computer Science	3
CSE	421	Microprocessor System Design I	4
CSE	422	Microprocessor System Design II	4
CSE	423	Microcomputer System Hardware	3
MAT	243	Discrete Mathematical Structures	3
Technical electives			13
Total			51

The student selects technical electives from an approved list with approval of an advisor.

Computer Systems Engineering Program of Study

Typical Four-Year Sequence

Freshman Year

First Semester

			Semester Hours
CHM	114	General Chemistry for Engineers	4
ECE	105	Introduction to Languages of Engineering	3
ENG	101	First Year Composition	3
MAT	290	Calculus I	5
HU or SB elective[1]			3
Total			18

Second Semester

CSE	120	Digital Design Fundamentals	3
CSE	200	Concepts of Computer Science	4
ECE	106	Introduction to Computer Aided Engineering	3
ENG	102	First Year Composition	3
MAT	291	Calculus II	5
Total			18

Sophomore Year

First Semester

CSE	201	Application Languages Programming Laboratory	1
CSE	225	Assembly Language Programming (Motorola)	3
ECN	111	Macroeconomic Principles	3
MAT	243	Discrete Mathematical Structures	3
MAT	274	Elementary Differential Equations	3
PHY	121	University Physics I: Mechanics	3
PHY	122	University Physics Laboratory I	1
Total			17

Second Semester

CSE	202	Functional Languages Programming Laboratory	1
CSE	310	Data Structures	3
CSE	325	System Design with Microprocessors (Motorola)	3
ECE	210	Engineering Mechanics I: Statics	3
PHY	131	University Physics II Electricity and Magnetism	3
PHY	132	University Physics Laboratory II	1
L1 elective[1, 2]			3
Total			17

Junior Year

First Semester

CSE	330	Computer Organization and Architecture	3
CSE	340	Structure of Programming Languages	3
ECE	312	Engineering Mechanics II: Dynamics	3

ECE	383	Probability and Statistics for Engineers	2
PHY	361	Introductory Modern Physics	3
HU or SB elective[1]			3
Total			17

Second Semester

CSE	355	Introduction to Theoretical Computer Science	3
CSE	421	Microprocessor System Design I	4
ECE	301	Electrical Networks I	4
MAT	342	Linear Algebra	3
HU or SB elective[1]			3
Total			17

Senior Year

First Semester

CSE	422	Microprocessor System Design II	4
ECE	333	Electrical Instrumentation	3
ECE	340	Thermodynamics	3
ECE	400	Engineering Communi cations	3
Technical elective			4
Total			17

Second Semester

CSE	423	Microcomputer System Hardware	3
ECE	352	Properties of Electronic Materials	3
HU or SB elective[1]			3
Technical electives			9
Total			18

[1] See pages 53–71 for the requirements and the approved list.

[2] See page 244 for special requirements and selection of an L1 elective.

COMPUTER SCIENCE AND ENGINEERING

CSE 100 Introduction to Computer Science I. (3) F S SS
Concepts of problem so v ng, algonthm de s gn, structured programm'ng, fundamental al gonthms and techn ques and computer sys tems concepts. Soc al and eth ca respons'b ty Prerequis te. MAT 170.

101 Introduction to Computer Science II. (3) F, S, SS
Advanced programm ng techn ques fi e pro- cess ng; mplementing stacks, queues, l nked ists, and b nary search trees; large program deve opment· team programm ng Profes- s onal responsib ity. Prerequ site CSE 100 *General studies. N3*

120 Digital Design Fundamentals. (3) F, S, SS
Number systems, convers on methods, b nary and complement anthmetic, Boo ean and sw'tch ng algebra c rcu t min mizat on ROMs PLAs f pflops synchronous sequent'al cir cuits, and reg ster transfer des gn Lecture, ab Cross isted as EEE 120. Prerequ s te CSE 100 or ECE 105

180 Computer Literacy. (3) F, S, SS
Introduct on to general prob em-so v ng ap- proaches us ng widely avai ab e software too s such as database packages word processors, spreadsheets, and report generators. IBM PC or Mac ntosh Nonmajors only *General stud ies: N3*

181 Applied Problem Solving with BASIC. (3) F S, SS
ntroduct on to systematic def nit on of prob- ems solut on formu at on, and method va ida tion. Computer solut on us ng BAS C requ red for projects Lecture, ab. Nonmajors only. Prerequisite. MAT 117 *General studies N3*

183 Applied Problem Solving with FOR- TRAN. (3) F
A human oriented, systems approach to prob em def n tion formu at on, and so ution using FORTRAN. Computer so ut on requ red for projects Nonmajors on y. Prerequ's te. MAT 170 *General studies N3*

200 Concepts of Computer Science. (4) A
Accelerated coverage of fundamenta s of computer sc ence using Pasca ; profess onal respons b l ty For students w th a strong back- ground n at least one other h gh-leve pro- gramming anguage Prerequ s te ECE 105 or equiva ent *General studies N3*

201 Application Languages Programming Laboratory. (1) F, S, SS
Each modu e ntroduces a programm ng an- guage such as C, FORTRAN PL/1 or CO- BOL. Includes programm ng exerc ses May be repeated for d fferent anguages Note CSE 201 "C" and ECE 105 cannot both count for cred t n one program of study Prerequi s te: CSE 101 or 200.

202 Functional Languages Programming Laboratory. (1) F S, SS
Each module ntroduces a programm ng an- guage such as APL L SP or PROLOG In- cludes programm'ng exerc ses. May be re peated for d fferent languages Prerequisite: CSE 101 or 200

225 Assembly Language Programming (Motorola). (3) F, S SS
Assemb y language programm ng register eve computer organizat on, data structure and address ng modes assemblers, and l nk ers. Motoro a-based assignments Cross- sted as EEE 225. Prerequisite: CSE/EEE 120. *General studies: N3.*

226 Assembly Language Programming (Intel). (3) F S
Assemb y language programm ng register eve computer organizat on data structure and address ng modes assemblers, and l nk- ers. Inte -based assignments Cross-l sted as EEE 226 Prerequisite: CSE/EEE 120. *Gen eral studies· N3.*

310 Data Structures. (3) F S SS
Advanced treatment of representation arrays, stacks, queues l sts, dynamic storage a oca tion n-ary trees, strings, graphs AVL trees data abstract on pr vacy, protect on, and regu ation Prerequ'sites: CSE 101 or 200; MAT 243.

325 System Design with Microprocessors (Motorola). (3) F, S SS
CPU, memory, and periphera dev ce inter faces and programming. M crocomputer sys- tems, standard systems buses, serial and par al e l O, d rect memory access devices, com municat ons safety and re ab l ty Lecture lab Cross- sted as EEE 325 Prerequis te CSE/EEE 225.

326 System Design with Microprocessors (Intel). (3) F, S SS
CPU, memory, and peripheral dev ce nter faces and programm ng M crocomputer sys- tems, standard system buses, serial and par- alle l O, d rect memory access dev ces, com municat ons safety and re ab l'ty. Lecture lab Cross sted as EEE 326 Prerequ site CSE/EEE 226

330 Computer Organization and Archi- tecture. (3) F S, SS
Hardw red t m'ng and contro m crocontrol, pipel n ng, memory med a organ zat on, and management vectored nterrupts and DMA Prerequ s te CSE/EEE 325 or 326.

340 Structure of Programming Languages. (3) F, S
Forma specif'cations for language syntax and dynam c runt me env ronments and an ntro- duct on to anguage trans ation Prerequ s tes CSE 201 (or 202 or ECE 105) 225 (or 226), 310.

355 Introduction to Theoretical Computer Science. (3) F, S
ntroduct on to forma language theory and au- tomata, Tur ng mach nes decidab l ty unde c dab ity, recurs ve funct on theory and ntro duct on to comp exity theory Prerequ s te CSE 310.

383 Applied FORTRAN Programming. (3) F S
Advanced FORTRAN nc ud ng character handl ng, mach ne dependency sorting and merg ng p ott ng, tapes d sks time-sharing term nals and brary programs Lecture, lab Nonmajors only Prerequisite: CSE 183

408 Multimedia Information Systems. (3) F
Des gn, use, and app icat ons of mu t med a systems An introduction to acqu sit on, com- press on, storage retneva and presentat on of data from different med a such as images text, vo ce, and alphanumenc. Prerequ s te CSE 410

410 Information Processing. (3) A
Primary and secondary f le access organiza- t ons Mult -attribute ndex ng Fi e process ng. ntroduct on to database management and document retneva Socia and eth ca imp ca- t ons Prerequisite· CSE 310

412 Database Management. (3) F, S
ntroduct on to DBMS concepts Data mode s and languages Relat ona database theory Database securty ntegnty and concurrency Prerequ site CSE 310

420 Computer Architecture I. (3) S
Computer arch tecture. Performance versus cost trade offs nstruct on set des gn Bas'c processor mplementat on and p pe 'ning Pre- requisite. CSE 330

421 Microprocessor System Design I. (4) F S
Assemb y-language programming and logica hardware design of systems using 8-b t m'cro- processors and m crocontrol ers Fundamenta concepts of d gita system des gn. Rel ab ity and soc a , ega imp cations. Lecture, lab Pre- or coreqU s te CSE/EEE 225 (or 226), 325 (or 326).

422 Microprocessor System Design II. (4) F S
Des gn of microcomputer systems using con temporary logic and m crocomputer system components Requ res assemb y anguage programm ng Prerequ s te CSE 421

423 Microcomputer System Hardware. (3) S
Information and techn ques presented n CSE 422 are used to deve op the hardware des gn of a mu t processor mu t programm ng, m cro processor based system Prerequ s te· CSE 422.

428 Computer-Aided Processes. (3) A
Hardware and software cons derations for computenzed manufacturng systems Spe cif c concentrat on on automat c nspection numencal contro robotics and ntegrated manufacturng systems Prerequisite: CSE 330.

430 Operating Systems. (3) F S
Operat ng system structure and services, processor schedu ing concurrent processes synchronizat on techn'ques, memory management v rtual memory input/output, storage management and fi e systems. Prerequis tes CSE 330, 340

434 Computer Networks. (3) A
Computer network protocols hardware elements and software algorithms Error hand ng rout ng, f ow control, host to-host com mun cation and oca area networks Prereq uisite CSE 330

438 Systems Programming. (3) A
Design and imp ementat on of systems pro grams, ncluding text ed tors, f e ut ities mon tors assemb ers relocat ng nk ng loaders I O hand ers and schedu ers Prerequ s te CSE 421 or nstructor approva .

440 Compiler Construction I. (3) F
ntroduct on to programm ng language mp e mentation mplementat on strateg es such as comp ation nterpretat on, and translat on. Major comp ation phases such as ex ca ana ysis semant c ana ysis optim zat on, and code generat on Prerequis'tes: CSE 340 355.

450 Analysis of Algorithms. (3) F
Des gn and analysis of computer algorithms us ng ana yt ca and empirica methods com plexity measures design methodologies and survey of mportant a gorithms Prerequ s te CSE 310

451 Switching Theory. (3) N
Comb'nat onal log c funct ona decomposit on, NAND (NOR) circu t analys s and synthes s og c arrays, terat ve networks fau t d agnos s s, sequentia c rcuit representat on, and memory dev ces Prerequisites CSE 120 MAT 243

457 Theory of Formal Languages. (3) A
Theory of grammar methods of syntact c analys s and specif cation types of artif c a anguages, re ationsh p between forma languages, and automata Cross l sted as MAT 401 Prerequisite: CSE 355

459 Logic for Computing Scientists I. (3) F
Propos'tiona og c, syntax and semant cs proof theory versus model theory, soundness, cons stency and completeness, f rst order log c, og ca theories, automated theorem prov ng, ground resolut on, pattern matching unification and resolution, D jkstras og c, proof obl gat ons, and program prov ng Pre requ s te CSE 355

460 Software Project Management and Development I. (3) F, S
Software l fe cyc e ana ysis; programm ng teams requ rements, specifications, docu mentat on and mi estones, des gn testing and maintenance too s and techn'ques. Eth ca and profess onal respons b ties Prerequi s tes· CSE 310 340. Pre- or coreqU's te CSE 355

470 Computer Graphics. (3) F, S
Disp ay dev ces data structures transforma t ons nteract ve graph cs 3-d mens ona graph cs, and h dden ine problem Prerequ s tes CSE 310, MAT 342

471 Introduction to Artificial Intelligence. (3) F, S
State space search, heurist c search games know edge representat on techn ques expert systems, and automated reason ng Prerequ sites CSE 202 (LISP and PROLOG), 310.

473 Nonprocedural Programming Languages. (3) S
Functiona and logic programming us ng lan guages ike Luc d and Prolog Typ ca app ica tions wou d be a Screen Editor and an Expert System. Prerequ s te. CSE 355.

474 Modeling for Computer Simulation. (3) A
Mathematical descript on of general dynam c systems (discrete event d screte t me, and cont nuous) n forms su table for computer imp ementat on. Prerequ s tes· CSE 310, ECE 383.

475 Simulation Theory and Languages. (3) A
Stat st cal background for s mu ation Mode construction and va idat on and the ana ys's of resu ts Languages that support simu at on Prerequ s te CSE 474

476 Introduction to Natural Language Processing. (3) F
Princ ples of computat ona l nguist cs forma syntax, and semantics as app ied to the de s gn of software w th natural (human) anguage O Prerequ s te CSE 310 or nstructor approval

477 Introduction to Computer-Aided Geometric Design. (3) F, S
ntroduct on to parametnc curves and sur faces, Bez er and B spl ne nterpo at on, and approx mation techn ques. Prerequis'tes: CSE 101 (or 200) 470 MAT 342.

508 Digital Image Processing I. (3) F
D g tal mage fundamenta s, mage trans forms mage enhancement and restorat on techn ques, image encod ng and segmenta t on methods Prerequ's te EEE 303 or 'n structor approva

509 Digital Image Processing II. (3) S
Advanced analytica techniques appl ed to d g tal mage processing computer v s on, and appl cat ons, inc ud ng robotics Prerequ s te CSE 508.

510 Advanced Database Management. (3) F, S
Advanced data model ng, deduct ve data bases, object-oriented databases d stributed and mu t database systems emerging database techno og es Prerequ s te: CSE 412.

512 Distributed Databases. (3) A
Fragmentation design Query optim zat on Distributed jo ns Concurrency contro . D strib uted dead ock detection Prerequisite CSE 510

513 Deductive Databases. (3) A
Log c as a data model Query opt mizat on emphas z ng the top-down and bottom up eva uation of dec arative ru es Prerequ s te CSE 510

514 Object-Oriented Database Systems. (3) A
Object oriented data mode ng, database and anguage ntegrat on object a gebras, extens b ty, transactions object managers vers on ng/conf guration act ve data, nonstandard ap p cat ons Research sem nar Prerequ s te. CSE 510

516 Digital Testing and Reliability. (3) A
Fau t mode ng test generat on, and s'mu a tion for combinat onal and sequent a c rcu ts, memory test ng, se f-check ng og c, fault to erant og c, and re ab ity analys s. Prerequ s tes CSE 330 (or 423), 355 (or 451)

517 Digital Design Automation. (3) N
Typ cal computer aided des gn system S mulat on techn ques, test generat on, m croprogrammed contro des gn a ds and specif cat on sheet analys s Appl cat ons Prerequ s te CSE 520 or 524.

518 Hardware Design Languages. (3) N
Introduction to hardware design anguages (HDL s) HDL descr ption of ntegrated circu t components and systems HDL description of computer organ zat ons Prerequ s te CSE 330

520 Computer Architecture II. (3) F
Computer architecture descr pt on languages, computer arithmet c memory-hierarchy de s gn, paral e , vector, and mu t processors and nput/output Prerequ s tes CSE 420 430

521 Microprocessor Applications. (4) S
M croprocessor techno ogy and ts application to the des gn of pract cal d g ta systems. Hardware assembly anguage programm ng, and interfac ng of m croprocessor-based sys tems Lecture ab Prerequis te· CSE 421

523 Microcomputer Systems Software. 3) F
Deve op ng system software for a mu tiproces sor, mu t programm ng, m croprocessor-based system us ng nformat on and techn ques presented in CSE 421, 422. Prerequisite CSE 422

526 Parallel Processing. (3) N
Rea and apparent concurrency. Hardware organizat on of mu tiprocessors mu t ple computer systems, sc entif c attached processors and other para e systems. Prerequ s te CSE 330 or 423.

527 High-Level-Language Machines. 3) N
Advantages and d sadvantages of h gh evel language mach nes Languages suitabil ty Mi croprogramm ng and nterpretive execution. I O operat ons Examp es Prerequ'site: CSE 520 or 524

529 RISC Design Methodology. (3) N
Opt mal computer arch tecture des gn method ology based on the symbiot c re at onship of hardware and software disc pl nes Prerequ s'te: CSE 330 or 423

530 Operating System Internals. (3) F
Implementat on of process management and synchron zat on system ca and nterrupt hand ng memory management, device drivers and f e systems n UNIX Prerequ sites CSE 430 know edge of C anguage.

531 Distributed and Multiprocessor Operating Systems. (3 N
Distr buted systems arch tecture, remote f e access, message-based systems object-based systems c ent/server parad gms, d str buted a gor thms repl cat on and cons s tency and mu t processor operating systems. Prerequ s te CSE 530 or nstructor approval.

532 Advanced Operating System Internals. (3) F
Memory processor, process and commun ca t on management, and concurrency contro n the Mach mu t processor and d stributed oper at ng system kerne s and servers Prerequ s te. CSE 530 or nstructor approval

535 Performance Evaluation. (3) S
Top cs n computer system measurement and eva uation, nc ud ng hardware software mon - tors, work oad characterizat on, program be hav or adapt ve schedu ng, s mulat on mod els, and measurement nterpretat'on Prereq uis'te: CSE 430

536 Theory of Operating Systems. (3) S
Protection Commun cation and synchron za tion in d str buted systems, distnbuted f e sys tems, dead ock theory virtua memory theory, and un processor and mult processor thread management Prerequisite CSE 430

540 Compiler Construction II. (3) S
Forma pars ng strategies optim zat on tech- niques, code generat on, extens b l ty and transportabi ty cons derat ons and recent de velopments Prerequ site CSE 440

545 Programming Language Design. (3) N
Language constructs, extens b l ty and ab stractions and runt me support Language de s gn process Prerequisite CSE 440.

550 Combinatorial Algorithms and Intractability. (3) N
Comb nator a algor thms nondetermin'st c a gor thms, classes P and NP, NP-hard and NP comp ete problems and 'ntractab l ty Des gn techn ques for fast comb nator a a gor thms Prerequisite CSE 450

554 Advanced Switching Theory. (3) S
Latt ces Boo ean a gebras, post algebras Boo ean d fferential ca cu us multiva ued og c fuzzy og c, and f n te state machines Prerequisite· CSE 451

555 Automata Theory. (3) N
F nite state machines pushdown automata inear bounded automata Tur ng mach nes register mach nes, rams, and rasps relat on- sh ps to computabi ty and forma anguages Prerequ s te CSE 355

556 Expert Systems. (3) S
Know edge acquisit on and representat on, rule based systems, frame-based systems va idat on of know edge bases, nexact rea- son ng, and expert database systems. Prereq u site: CSE 471

560 Software Project Management and Development II. (3) F S
Software project management cost estima t on, configurat'on management and qua ty assurance Advanced software eng neer ng l fe cyc e topics Prerequis te. CSE 460.

563 Software Requirements and Specification. (3) F
Examinat on of the definit ona stage of soft- ware development; ana ys s of spec f cat on representat ons and techn ques emphas z ng important app cat on ssues Prerequ s te: CSE 460

564 Software Design. (3 S
Exam nation of software des gn issues and techn ques nc udes a survey f design repre- sentations and a comparison of des gn meth- ods Prerequ s te CSE 460

565 Software Validation. 3 F
Software re ab l ty models and measures pro gram test ng theory, fau t tolerant software, program verif cat on, rel ab e software des gn and development and regress'on test ng Pre- requisite CSE 460

566 Software Maintenance. (3) S
Survey of software ma ntenance prob ems, too s, metrics, and management approaches mp ication s of software maintenance on soft ware development Prerequ s te CSE 460

570 Advanced Computer Graphics I. (3) F
H dden surface a gor thms l ght'ng models and shad ng techn ques. User interface de sign An mat on techn ques Fracta s and sto chast c models Raster a gorithms Prerequ - site. CSE 470

571 Artificial Intelligence. 3) S
Def nit ons of nte l gence, computer problem solving game p ay ng, pattern recognit on, theorem proving and semant c nformat on process ng, evo ut onary systems heurist c programm ng Prerequ s te CSE 471.

572 Pattern Recognition. (3) N
Pattern c ass f cation by distance funct ons and ke ihood functions determ n stic and sta tist ca approaches to tra nab e pattern c ass fi ers and syntact c pattern recognit on Prereq u s te ECE 383 or STP 326

573 Advanced Computer Graphics II. (3) S
Mode 'ng of natura phenomena terra n c ouds f re water and trees Part c e sys- tems deformat on of sol ds antia as ng, and vo ume v sua zat on Lecture ab. Prerequ s te CSE 470

576 Topics in Natural Language Processing. (3) S
Comparat ve pars ng strateg es scop'ng and reference prob ems, non f rst-order logical se mant c representations, and d scourse struc- ture. Prerequ s te CSE 476 or nstructor ap- prova

577 Advanced Computer-Aided Geometric Design I. (3 F
General nterpolat on, rev ew of curve nterpo lat on and approx mation sp ne curves visua smoothness of curves parameterizat on of curves, ntroduct on to surface interpo at on and approx mation Prerequ s tes· CSE 470 and 477 *or* nstructor approva

578 Advanced Computer-Aided Geometric Design II. (3 S
Coons patches and Bez er patches triangu ar patches arb trar ly ocated data methods; ge ometry process ng of surfaces h gher dimen siona surfaces Prerequ sites CSE 470 and 477 *or* nstructor approva

Omnibus Courses: See page 44 for omn bus courses that may be offered.

Electrical Engineering

Peter E. Crouch
Chair
(ERC 552) 602/965–3424

REGENTS' PROFESSORS
BALANIS, FERRY

PROFESSORS
AKERS, BACKUS, CHANG, CROUCH, DeMASSA, H GGINS, KARADY, KAUFMAN, KELLY, LUDERER, MARACAS, PALAIS, ROEDEL, SCHRODER, WANG

ASSOCIATE PROFESSORS
DAV S EL-GHAZALY, GORUR, GREENEICH, GRONDIN KOZICKI SADOWSKY, SHEN, SKROMME, SPANIAS, TYLAVSKY

ASSISTANT PROFESSORS
ABERLE, ALLEE, CHAKRABARTI, COCHRAN, EL-SHARAWY, HASHEMI-YEGANEH HOLBERT, MORRELL, RODRIGUEZ, S , SPECTOR, TSAKAL S

PROFESSORS EMERITI
AX, BARKSON, DONNELLY, RUSSELL, SCHWUTTKE, SIRKIS, THOMPSON, TICE, WELCH, Z MMER

The professional activities of electri cal engineers directly affect the lives of most of the world's population every day. They are responsible for the de sign and development of radio and tele vision transmitters and receivers, tele- phone networks and switching systems, computer systems, and electric power generation and distribution. Within the broad scope of these systems, the elec trical engineer is concerned with a chal lenging and diverse array of design and development problems.

Electrical engineers design minus cule semiconductor integrated circuits that contain many thousands of elemen tary devices. They design systems for automatically controlling mechanical devices and a variety of processes. They are responsible for the design of satellite communication links as well as patient monitoring systems for hospi tals. The development of the micropro- cessor has expanded the opportunities for electrical engineers to improve the design of familiar products since these devices are now incorporated in auto mobiles, consumer and office products,

entertainment systems, and a vast variety of test and measurement instruments and machine tools.

Students who earn a B.S.E. degree majoring in Electrical Engineering will be involved in a variety of electrical and electronic problems in the course of their careers. To ensure the necessary breadth of knowledge, the Electrical Engineering curriculum includes basic (core) engineering courses and courses in networks and electronic circuits, electromagnetic fields and waves, microprocessors, communication and control systems, solid state electronics, electrical power systems, and other specialty courses.

ELECTRICAL ENGINEERING—B.S.E.

The curriculum in Electrical Engineering builds upon the base provided by the engineering core. Beyond the engineering core, the curriculum includes a number of required electrical engineering and technical elective courses. Approved technical elective courses serve to provide students with an opportunity either to broaden their background in electrical engineering or to study, in greater depth, technical subjects in which they have special interests. Successful completion of the curriculum leaves the student prepared to embark on a career in electrical engineering or to pursue advanced education in graduate school.

DEGREE REQUIREMENTS

Electrical Engineering Core

Students in Electrical Engineering fulfill the requirements of the engineering core by taking ECE 334 and 352 and EEE 225 or 226. No credit is given for ECE 333. Students may replace ECE 210 and 312 with PHY 321 and 322. Only ECE 313 may be deleted The mathematics and basic science electives are met by taking the following courses:

			Semester Hours
MAT	342	Linear Algebra	3
MAT	362	Advanced Mathematics for Engineers and Scientists I	3
PHY	361	Introductory Modern Physics	3

In addition, the following courses are required to fulfill the electrical engineering core:

			Semester Hours
EEE	120	Digital Design Fundamentals	3
EEE	302	Electrical Networks II	3
EEE	303	Signals and Systems	3
EEE	325	System Design with Microprocessors (Motorola)	3
		or EEE 326 System Design with Microprocessors (Intel) (3	
EEE	340	Electromagnetic Engineering I	3
EEE	341	Electromagnetic Engineering II	4
EEE	350	Random Signal Analysis	3
EEE	360	Energy Conversion and Transport	4
EEE	490	Senior Design Laboratory	3
Total			29

Technical Electives in Electrical Engineering

The program in Electrical Engineering requires a total of 20 hours of technical electives. To ensure breadth of knowledge, students *must* select courses from not less than three of the following six areas. In addition, to ensure depth, two courses must be taken in one area

Communications. EEE 407, 451, 455, 459

Control. EEE 480, 482.

Electromagnetics. EEE 443, 445, 448.

Electronic Circuits. EEE 405, 425, 433.

Power Systems. EEE 463, 470, 471, 473.

Solid State Electronics. EEE 434, 435, 436, 439.

Of the remaining technical electives, two courses may be taken outside electrical engineering. With faculty advisor approval, qualified students may choose two technical electives from other courses in engineering, mathematics, and the sciences at or above the 300 level, including graduate courses. Students must have a GPA of not less than 3.00 and approval of the instructor to enroll in EEE graduate level courses. In addition, these technical electives may be chosen from the approved list of courses from the College of Business.

Electrical Engineering Program of Study Typical Four-Year Sequence

Freshman Year

First Semester			*Semester Hours*
CHM	114	General Chemistry for Engineers or CHM 116 General Chemistry (4)	4
ECE	105	Introduction to Languages of Engineering	3
ENG	101	First Year Composition	3
MAT	290	Calculus I	5
HU or SB elective[1]			3
Total			18
Second Semester			
ECE	106	Introduction to Computer Aided Engineering	3
EEE	120	Digital Design Fundamentals	3
ENG	102	First Year Composition	3
MAT	291	Calculus II	5
PHY	121	University Physics I: Mechanics	3
PHY	122	University Physics Laboratory I	1
Total			18

Sophomore Year

First Semester			
ECE	210	Engineering Mechanics I: Statics	3
ECE	301	Electrical Networks I	4
EEE	225, 226	Assembly Language Programming	3
MAT	274	Elementary Differential Equations	3
PHY	131	University Physics II: Electricity and Magnetism	3
PHY	132	University Physics Laboratory II	1
Total			17
Second Semester			
ECE	312	Engineering Mechanics II: Dynamics	3
ECE	334	Electronic Devices and Instrumentation	4
EEE	302	Electrical Networks II	3
EEE	325, 326	System Design with Microprocessors	3
MAT	342	Linear Algebra	3
MAT	362	Advanced Mathematics for Engineers and Scientists I	3
Total			19

Junior Year

First Semester			
ECE	352	Properties of Electronic Materials	3
ECN	111	Macroeconomics	3
EEE	303	Signals and Systems	3
EEE	340	Electromagnetic Engineering I	3

PHY 361 Introductory Modern Physics 3
L1 elective[1, 2] 3

Total 18

Second Semester

ECE 340 Thermodynamics 3
EEE 341 Electromagnetic Engineering II 4
EEE 350 Random Signal Analysis.... . . 3
EEE 360 Energy Conversion and Transport 4
HU or SB elective[1] 3

Total . .. .17

Senior Year

First Semester

EEE 490 Senior Design Laboratory 3
HU or SB elective[1] 3
Technical electives 11

Total 17

Second Semester

ECE 400 Engineering Communications 3
HU or SB elective[1] 3
Technical electives 9

Total 15

[1] See pages 53 71 for the requirements and the approved list

[2] See page 244 for special requirements and selection of an L1 elective

GRADUATION REQUIREMENTS

The attention of the student is directed to the retention and graduation requirements of the university and the School of Engineering. In addition to those requirements, a student must earn a grade of "C" or better in the mathematics and physics courses listed in the program of study. The student must also have an overall GPA of at least 2.00 for the following group of courses: ECE 301, 334, 352; all courses with an EEE prefix; all other courses used as technical electives.

ELECTRICAL ENGINEERING

EEE 120 Digital Design Fundamentals. (3) F, S SS
Number systems, conversion methods binary and complement arithmetic, Boolean and switching algebra circuit minimization, ROMs, PLAs flip flops synchronous sequential circuits, and register transfer design Lecture, lab. Cross listed as CSE 120 Prerequisite: CSE 100 or ECE 105.

225 Assembly Language Programming (Motorola). (3) F, S SS
Assembly language programming register level computer organization data structure and addressing modes assemblers, and linkers. Motorola based assignments Cross-listed as CSE 225 Prerequisite CSE/EEE 120. *General studies N3*

226 Assembly Language Programming (Intel). (3) F S
Assembly language programming register level computer organization data structure and addressing modes assemblers, and linkers. Interface based assignments Cross listed as CSE 226 Prerequisite CSE/EEE 120 *General studies N3*

302 Electrical Networks II. (3) F S SS
Analysis of linear and nonlinear networks Analytical and numerical methods Prerequisite ECE 301.

303 Signals and Systems. 3) F S SS
Introduction to continuous and discrete time signal and system analysis, linear systems, Fourier, and z transforms Prerequisite EEE 302 Pre- or corequisite MAT 342

325 System Design with Microprocessors (Motorola). (3) F S, SS
CPU memory and peripheral device interfaces and programming Microcomputer systems standard systems buses serial and parallel I O, direct memory access devices, communications safety and reliability Lecture, lab Cross- listed as CSE 325 Prerequisite: CSE/EEE 225

326 System Design with Microprocessors (Intel). (3) F, S
CPU, memory, and peripheral device interfaces and programming Microcomputer systems standard system buses serial and parallel I O, direct memory access devices communications, safety and reliability. Lecture lab. Cross listed as CSE 326 Prerequisite CSE/EEE 226

340 Electromagnetic Engineering I. (3) F, S, SS
Static and time varying vector fields boundary value problems dielectric and magnetic materials Maxwell's equations· boundary conditions Prerequisites MAT 362; PHY 131.

341 Electromagnetic Engineering II. (4) F, S
Second half of an introductory course in electromagnetic theory and its application in electrical engineering. Plane waves in lossless and lossy media, polarization, reflection and refraction, transmission line theory waveguides cavities, antennas and radiating systems Lecture, lab. Prerequisites ECE 105, 301, EEE 340

350 Random Signal Analysis. (3) F, S
Probabilistic and statistical analysis as applied to electrical signals and systems Prerequisite EEE 303.

353 Introduction to Materials Processing and Synthesis. (3) F
Principles of materials structure and properties with emphasis on applications in bulk and thin film materials processing and synthesis. Cross listed as MSE 353 Prerequisites CHM 116 and PHY 131 *or* equivalents

354 Experiments in Materials Synthesis and Processing I. (2) S
Small groups of students complete three experiments selected from a list Each supervised by a selected faculty member Lab Cross listed as MSE 354 Prerequisite: EEE/MSE 353 or equivalent

360 Energy Conversion and Transport. (4) F S
Three phase circuits Energy supply systems. Magnetic circuit analysis synchronous generators, transformers, induction machines and DC circuits Load flow and short circuit calculations Lecture, lab. Prerequisite EEE 302.

405 Filter Design. (3) F
Principles of active and passive analog filter design frequency domain approximations, sensitivity and synthesis of filters. Prerequisite EEE 303.

407 Digital Signal Processing. (4) F
Time and frequency domain analysis, difference equations z transform FIR and IIR Digital Filter Design, Discrete Fourier Transform FFT, and random sequences. Lecture, lab Prerequisites EEE 303, MAT 342

425 Digital Systems and Circuits. (4) F, S
Digital logic gate analysis propagation delay times figures of merit, and noise margins Application of MOS and bipolar logic families including NMOS, CMOS standard and advanced TTL and ECL, regenerative logic circuits, memories and VLSI circuits; computer simulations using PSPICE. Lecture lab Prerequisite ECE 334

433 Analog Integrated Circuits. (3) S
Analysis, design, and applications of modern analog circuits using integrated bipolar and field effect transistor technologies. Prerequisite ECE 334

434 Quantum Mechanics for Engineers. (3) F
Angular momentum wave packets, Schroedinger wave equation, probability problems in one dimension, principles of wave mechanics scattering, tunneling central forces angular momentum, hydrogen atom perturbation theory variational techniques. Prerequisite EEE 340

435 Microelectronics. (3) S
Practice of solid state device fabrication technique including thin film and integrated circuit fabrication principles Lecture lab Pre- or corequisite EEE 436

436 Fundamentals of Solid State Devices. (3) F S
Metal-semiconductor contacts, P N junctions, light interacting devices Schottky diodes bipolar and field effect transistors, planar and thin film integrated circuit (IC) devices Prerequisite: ECE 352.

437 Optoelectronics. (3) N
Basic operating principles of various types of optoelectronic devices which play important roles in commerce and communication electronics· light emitting diodes, injection lasers and photodetectors Prerequisites ECE 352 EEE 436.

439 Semiconductor Facilities and Cleanroom Practices. (3) F
Microcontamination, controlled environments, cleanroom layout and systems, modeling, codes and legislation ultrapure water production materials, personnel and operations, hazard management advanced concepts. Prerequisite: EEE 435 or instructor approval

443 Antennas. (3) S
Fundamental parameters, engineering principles and radiation integrals, linear wire antennas loops and arrays; numerical computations, measurements Prerequisite: EEE 341 or equivalent

445 Microwaves. (4) F
Waveguides; circuit theory for waveguiding systems microwave devices systems and energy sources striplines and microstrips, impedance matching transformers measurements. Lecture, lab Prerequisite· EEE 341 or equivalent.

448 Fiber Optics. (4) F
Principles of f ber-optic communicat ons Lectures lab. Prerequ s tes EEE 303, 340.

451 Error-Correcting Codes. (3) S
App 'cat on of modern algebra to the design of random error-detecting and error-correct ng b ock codes Prerequ s te CSE/EEE 120

453 Experiments in Materials Synthes's and Processing II. (2) F
A cont nuat on of EEE 354, with emphasis on character zat on Sma groups comp ete 3 ex periments superv sed by selected faculty members Lab Cross isted as MSE 453 Prerequ s tes EEE/MSE 353 and 354 *or* equ va ents.

454 Advanced Materials Processing and Synthesis. (3) S
Case stud es from pub shed terature of cur rent techn ques n mater a s processing and synthesis Student part cipation n c assroom presentat ons Lecture, rec'tat on Cross- sted as MSE 454 Prerequisites· EEE/MSE 353 and 354 *or* equiva ents

455 Communication Systems. 4) F S
S gnal ana ysis techniques app ed to the op eration of e ectr ca commun cat on systems An introduct on to and overv ew of modern d g tal and analog commun'cations Lecture, lab. Prerequ s te EEE 303.

459 Data Communication Systems. (3) F
System characterist cs. Commun cat ons me d a Commun cat on codes. Data va idity check ng L ne protoco s, terminals and system conf gurations Examples Prerequ s te· EEE 303.

460 Nuclear Concepts for the 21st Century. (3) N
Neutron nteract ons w th matter. Princ ples of neutron chain react ng systems Neutron d ffu sion and moderat on. Heat remova from nuc ear reactors Po nt reactor k netics Pre requ s te: PHY 361.

461 Health Physics Principles and Radiation Measurements. (3) N
Sources character st'cs dosimetry sh e d ng, and measurement techn ques for natura and synthet c radiat on. Phi osophy of rad ation protect on Emphas s on nstrumentat on detectors, and env ronmenta monitoring Lec ture, ab Prerequis te ECE 301

462 Reactor Safety Analysis. (3) N
Power reactor safety and 'censing methodo g es Reactor trans ent and accident analys s Time dependent so ut on to neutron d ffusion equat on. Use of 'ndustry codes to assess f s s on product bu dup, emergency core coo ng behav or reactivity, off site re eases, and dose ca cu ations. Prerequ s te EEE 460.

463 Electrical Power Plant. (3) F
Nuclear, fossi , and so ar energy sources Analysis and des gn of steam supply systems, e ectrical generat ng systems and auxi ary systems Power plant effic ency, operat on, and costs and ana yses Prerequ s tes ECE 301 340.

464 Nuclear Engineering Experiments. (3) N
Theory and appl ed concepts n reactor de sign nstrumentat on, electronics and shie d- ng Exper mental measurements of nuc ear parameters us ng subcr tica reactors and fu sion neutron generator Fast and thermal act - vat on analys s Mossbauer spectrometry Lecture, lab Pre or corequisite: EEE 460

465 Reactor Theory and Design. (3) N
Reactor phys cs core therma hydrau ics, re actor k net cs and trans ent behav or nuc ear fuel steady state performance core heat re mova core therma des gn of PWR BWR and LMFR systems Prerequ s te EEE 460

470 Electric Power Devices. 3) F
Ana ys s of dev'ces used for short c rcu't pro tect on, ncluding c rcu t breakers, re ays and current and vo tage transducers Protect on aga nst sw tch ng and 'ghtn ng over voltages nsu at on coord nation Prerequ s'te: EEE 360

471 Power System Analysis. (3) S
Rev ew of transm ss on ine parameter ca cu- at on Zero sequence impedance symmetri- ca components for fau t ana ys s short c rcuit ca cu at on rev ew of power f ow ana ys s power system stab ty and power system control concepts. Prerequ s te EEE 360.

473 Electrical Machinery. (3) F
Operat ng pr nciples construct ona deta ls and des gn aspects of convent ona DC and AC mach nes transformers and mach nes used n computer d sc drives, pr nters wrist watches, and automobi es Prerequis te EEE 360

480 Feedback Systems. (4) F S
Ana ys s and des gn of near feedback systems Frequency response and root ocus techn ques ser es compensat on and state vanab e feedback Lecture ab Prerequis te EEE 303

482 Introduction to State Space Methods. (3 F
Discrete and cont nuous systems n state space form contro ab ty stab ity, and po e placement Observab i ty and observers. Pre or corequ s tes· EEE 303 480 MAT 342

490 Senior Design Laboratory. 3 F, S
Project-oriented laboratory Each student must comp ete one or more des gn projects dur ng the semester. Lecture ab. Prerequ s tes· ECE 334 EEE 303· sen or status or n structor appr val *General stud es L2*

506 Digital Spectral Analysis. (3) S
Princ ples and app cations of d g tal spectra ana ys s east squares, random sequences, parametr c and non-parametric methods for spectra est mation Prerequ s tes EEE 407, 554

525 VLSI Design. (3) F S
Ana ys s and des'gn of Very Large Sca e nte grated (VLS C rcu ts Phys cs of sma de vices, fabricat on regu ar structures and sys tem t ming Open on y to graduate students

526 VLSI Architectures. (3) F
Spec a purpose architectures for s gna pro cess ng. Des gn of array processor systems at the system eve and processor eve H gh- eve synthesis Prerequ site CSE 330 or EEE 407 or instructor approva

530 Advanced Silicon Processing. (3) S
Th n f ms CVD, ox dat on diffus on, on m p antat on for VLS meta zat on, s c des advanced thography dry etch ng rap d therma process ng Pre or corequ s te· EEE 435

531 Semiconductor Device Theory I. (3) F
Transport and recomb nat on theory pn and Schottky barrier d odes b po ar and junct on f e d-effect trans stors and MOS capacitors and trans st rs Prerequ s te EEE 436 or equ va ent

532 Semiconductor Device Theory II. (3) S
Advanced MOSFETs charge-coupled de v ces so ar ce ls photodetectors, l ght emit ting d odes, m crowave devices, and modu a- t on-doped structures Prerequis'te: EEE 531

533 MOS Integrated Circuit Engineering. (3) F
MOS device phys cs, ntegrated circuit fabrica- t on, CMOS, ana og and d g'tal c rcuit des gn, s mu at on and ayout and yield and re iab l ty mode s Prerequisite: EEE 436 or equiva ent

534 Semiconductor Transport. (3) F
Carrier transport in sem conductors Hall ef fect h gh e ectric field Bo tzmann equat on, corre at on funct ons, and carrier-carr er nter act ons Prerequisite: EEE 434 or equivalent

535 Solar Cells. (3) N
Photovolta c dev ces, nc ud'ng homojunct ons and heterojunct ons. Photogenerat on of carri- ers spectra response e ectrical character s- t cs and eff c ency. Prerequ s te EEE 436 or equ va ent

536 Semiconductor Characterization. (3) S
Measurement techn ques for sem conductor materials and dev ces Electrical, optical, phys cal, and chem ca characterization meth ods Prerequis te EEE 436 or equiva ent

537 Semiconductor Optoelectronics I. (3) N
E ectron c states n sem conductors quantum theory of rad ation, absorpt on processes, ra- d ative processes nonradiative processes photolum nescence, and photonic dev ces Prerequ s te EEE 434

538 Semiconductor Optoelectronics II. (3) N
Materia and dev ce phys cs of sem'conductor lasers ight em tt ng diodes, and photodetec- tors Emerg ng materia and device techno ogy in I I V sem conductors. Prerequ s te EEE 537.

539 Introduction to Solid State Electronics. (3) S
Crysta lattices, rec proca latt ces quantum stat stics att ce dynam'cs, equi brium and nonequ brium processes in semiconductors Prerequ s te EEE 434.

541 Electromagnetic Fields and Guided Waves. (3) F
Po arizat on and magnetizat on, d e ectric, conduct ng an sotrop c, and sem conduct ng med a; dual ty, uniqueness, and mage theory, p ane wave functions, waveguides, resona tors, and surface gu ded waves. Prerequ s te EEE 341 or equ'valent.

542 Selected Microwave Devices. (3) N
Use of ferrite, semiconductor, and p ezoelec- tric materia s n m crowave systems. Prerequ - sites ECE 352 and EEE 445 *or* equ va ents

543 Antenna Analysis and Design. (3) F
Impedances broadband antennas frequency ndependent antennas, m n aturization, aper- ture antennas horns, reflectors lens anten- nas and continuous sources des gn tech n ques. Prerequ s te EEE 443 or equivalent

544 High Resolution Radar. (3) F
Fundamenta s, w deband coherent design waveforms, and process ng, stepped fre- quency, synthetic aperture radar (SAR); n verse synthet c aperture radar (SAR), mag- ing Prerequ sites EEE 303 and 340 *or* equ va ents.

545 Microwave Circuit Design. (3) N
Ana ys s and des gn of m crowave attenua tors, in phase and quadrature-phase power d - v ders, mag c tee's d rect ona coup ers phase shifters DC b ocks and equa izers Prerequisite EEE 445 or nstructor approva

546 Advanced Fiber-Optics. (3) S
Theory of propagat on 'n f bers couplers and connectors distribut on networks, modulat on, no se and detection system des gn and f ber sensors Prerequ s te EEE 448 or nstructor approva .

547 Microwave Solid State Circuit Design I. (3) N
App 'cat on of sem conductor characteristics to pract cal design of m crowave m xers detec tors, miters sw tches attenuators, mu tip ers phase sh fters and amp if ers Prerequi s te EEE 545 or instructor approva

548 Coherent Optics. (3) N
Diffraction, enses opt ca process ng, ho og raphy, electro-opt cs and lasers Prerequ'site: EEE 341

549 Lasers. (3) N
Theory and design of gas, so d, and semiconductor asers Prerequ s te EEE 448 or n- structor approva

550 Transform Theory and Applications. (3) F
ntroduct on to abstract ntegrat on funct on spaces, and complex ana ys s n the context of ntegral transform theory App cat ons to s gna ana ys s, communicat on theory, and system theory Prerequ'site: EEE 303.

551 Information and Coding Theory. (3) N
Fundamental theorems of informat on theory for sources and channe s· convo ut ona and burst codes Prerequ s tes EEE 451, 554.

552 Coherent Communications. (3) N
Systems ana ys s and des gn of te ecommuni cat on systems us ng phase- ocked loops Prerequ site: EEE 554

554 Random Signal Theory I. (3) F
Appl cation of stat st ca techniques to the representation and ana ys s of e ectrica s gna s and to commun cations systems ana ys s Prerequ s te: EEE 303 and 350 *or* 'nstructor approva

555 Random Signal Theory II. (3) S
Processing of s gna s in the presence of no se Random s gna s, corre at on frequency spectra, est mation f ter ng, noise pred ct on and trans ents Prerequis te: EEE 554.

556 Detection and Estimation Theory. (3) N
Comb nation of the c ass ca techniques of statist ca inference and the random process characterization of commun cation radar and other modern data process ng systems Pre requ s tes· EEE 455, 554

558 Modulation Theory. (3) N
No se performance of ana og and d gita modulat on systems Emphasis on modern d g tal techn ques n terrestr a and sate ite commun cat ons systems Prerequ s tes EEE 455 554

566 Nuclear Instrumentation. (3) N
Des gn and ana ys s of mag'ng systems for nuclear sciences app cations and research Laboratory exper ments using computer zed mu t channe ana yzer systems, whole body counting systems and computer zed tomo graphy Lecture, ab. Prerequ s te EEE 465 or nstructor approva

567 Radiation Shielding and Transport. (3) F
Sh eld ng for rad ation therapy d agnost c ra d ology, cyc otrons and nuc ear reactors. Monte Carlo and emp rical computationa methods, regu ations and design problems Cross sted as BME 567 Prerequ s te· BME/ EEE 465.

569 Radiochemistry and Advanced Nuclear Instrumentation. (3) N
Advanced concepts n env ronmental and power p ant rad'ochem stry. Chem ca separa t ons for od ne, strontium, rad um and ura n um. Advanced detect'on concepts n alpha, gamma spectrometry and quid sc nt lat on Lecture ab Prerequ s te BME/EEE 465

571 Power System Transients. (3) N
Ana ys s of trans ent currents and vo tages generated by d sturbances n power networks EMTP method Trave l ng waves Trans ents n transformers and generators Protect on aga nst transients Prerequ s te EEE 471

572 Advanced Power Electronics. (3) N
Ana ys s of dev ce operat on nclud ng thyris tors, gate turn off thyristors, and trans stors Des gn of rectif er and nverter c rcuits. Appl' cat'ons such as vanab e speed dr ves, HVDC, motor control and un nterruptable power sup p ies. Prerequ site· EEE 471

573 Power System Control. (3) N
Concepts of econom c and secure operat on of power systems load frequency control, economic d'spatch un t comm tment, state es timat'on, and cont ngency ana ys s. Prerequ s tes EEE 470, 471

574 Computer Solution of Power Systems. (3) N
A gonthms for digita computat on for power flow, fault and stab ity ana ysis Sparse ma- trix and vector programming methods opt m zation, and stochast c methods Prerequisites: EEE 470, 471.

577 Power System Planning. (3) F
Power f ow and trans ent stabi ty analys s oad forecasting methods, and rel ab ity con cepts Transmiss on plann ng oss of load probab ity and product on cost ana ys s, and optimal network and generat on expans on Prerequisites EEE 470 471

579 Power Transmission and Distribution. (3) S
H gh vo tage transm ss on l ne design such as conductors, corona and R and TV no se DC transmiss on. D str bution system analysis n c ud ng oad characterist cs, feeder vo tage drop, and capacitor appl cat ons. Prerequ s te: EEE 471

581 Filtering of Stochastic Processes. (3) N
Model ng, estimation and f tering of stochas tic processes, with emphas s on the Kalman fi ter and its appl cat ons n signal processing and contro Prerequisites EEE 482, 550, 554.

582 Linear System Theory. (3) S
Control ab ity, observab ity, and realization theory for mu tivanab e cont nuous time sys- tems. Stab zat on and asymptotic state estimation Disturbance decoupl ng, non nter act ng control Prerequ s te EEE 482

585 Digital Control Systems. (3) N
Analysis and des gn of d g tal and samp ed data control systems nc ud ng samp ing theory, z transforms, the state transit on method, stabil ty, des gn, and synthesis Pre requ s tes· EEE 482, 550

586 Nonlinear Control Systems. (3) N
Stabi ity theory, nc ud ng phase-plane, de scribing funct on, Liapunov's method, and fre quency doma n criteria for continuous and dis- crete non near and time vary ng systems Prerequis te EEE 482

587 Optimal Control Systems. (3) N
App cation of ca cu us of var at'ons, Pon tryagin's principle, and dynam c programming to contro problems. Computat onal tech n ques for so v ng opt mal contro prob ems Prerequisite: EEE 482.

631 Heterojunctions and Superlattices. (3) F
Principles of heterojunct ons and quantum we l structures band ne-ups opt ca , and e ectrical propert es Introduct on to hetero- junct on dev ces Prerequ s tes EEE 436 531

632 Heterojunction Devices. (3) S
Principles of sem conductor heterojunctions and quantum we s are app ed to the ana ysis of advanced electron c and opt ca dev ces Devices stud ed are modu ation doped f eld ef- fect trans stors (MODFETs), pseudomorph c MODFETs, heterojunct on b po ar transistors, quantum we l and superlattice opt cal detec tors modu ators and lasers. Prerequ s tes: EEE 434 (or equ va ent), 436, 531, 631.

641 Advanced Electromagnetic Field Theory. (3) S
Cy ndr cal wave functions, wavegu des and resonators, spherical wave funct ons and resonators; scatter'ng from p anar, cy indrical, and spherical surfaces; Green's funct ons. Prerequisite. EEE 541 or equ va ent

643 Advanced Topics in Electromagnetic Radiation. (3) S
H gh-frequency asymptot c techn ques, geo- metrica and physical theories of diffraction (GTD and PTD) moment method (MM) radar cross section (RCS) predict on, Fourier trans forms n radiation, and synthes s methods Prerequ site EEE 543

645 Microwave Filter Design. (3) N
Analysis and des'gn of microwave low pass, h gh pass band pass and band stop f lters and m crowave d plexers/mult plexers. Prereq u s te EEE 545 or nstructor approva

647 Microwave Solid State Circuit Design II. (3) F
Practica design of m crowave free-runn ng and voltage-controlled osc l ators using Gunn and Impatt d odes and trans stors, ana ysis of noise characteristics of the osc l ator Prereq- uis tes: EEE 545, 547.

731 Small MOS Devices. (3) S
Subthreshold current, threshold voltage modu- ation scal ng, and other sma l-s ze im tat ons Prerequ site: EEE 532

732 Advanced Bipolar Devices and Cir- cuits. (3) F
Crit ca examinat on of new b po ar dev ce and c rcu t techno og'es. Performance trade-offs, sca ing effects and model ng techn ques. Pre- requ s te EEE 531

770 Advanced Topics in Power Systems. (3) N
Power system problems of current interest, approached at an advanced technica level, for mature students. Prerequ s'tes: EEE 577 and 579 *or* equ va ents; instructor approval

Omnibus Courses: See page 44 for omn bus courses that may be offered.

Industrial and Management Systems Engineering

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PROFESSORS
BAILEY, MONTGOMERY, SMITH, UTTAL, WOLFE

ASSOCIATE PROFESSORS
ANDERSON, COCHRAN, DEAN, HUBELE, KEATS, MACKULAK, MOOR, ROLLIER, SHUNK

ASSISTANT PROFESSORS
NUÑO, ROBERTS

PROFESSORS EMERITI
BEDWORTH, HOYT, KNIGHT, YOUNG

The industrial engineer (IE) provides leadership for American organizations in reestablishing competitiveness in the global marketplace through system integration and productivity improvement. No challenge to a young man or woman can be greater than improving productivity, which is the application of knowledge and skills to provide improved goods and services to enhance the quality of life, both on and off the job. This improvement must be achieved without waste of physical and human resources while maintaining the environmental balance. Industrial engineers are the "productivity people" who provide the necessary leadership and skills to integrate technology. This gives IEs a wide range of interests and responsibilities.

As in other engineering fields, industrial engineering is concerned with solving problems through the application of scientific and practical knowledge. What sets industrial engineering apart from other engineering disciplines is its broader scope. An IE relates to the total picture of productivity. An IE looks at the "big picture" of what makes society perform best the right combination of human resources, natural resources, synthetic structures, and equipment. An IE bridges the gap between management and operations, dealing with and motivating people as well as determining what tools should be used and how they should be used.

An IE deals with people as well as things. In fact, industrial engineering is often called the "people oriented profession." It is a primary function of the IE to integrate people and technology oriented systems. Therefore, IEs are active in the fields of ergonomics and human factors.

To be competitive in this global economy, it is essential to emphasize and continually improve the quality of goods and services. Industrial engineering is the only engineering discipline offering course work in designing and implementing quality assurance systems.

The IE's skills are applicable to every kind of organization. IEs learn how to approach, think about, and solve productivity and integration problems regardless of their settings. IEs work in manufacturing facilities, banks, hospitals, government, transportation, construction, and social services. Within this wide variety of organizations, IEs get involved in projects such as designing and implementing quality control systems, independent work groups, the work flow in a medical laboratory, real time production control systems, computer based management information systems, and manufacturing operating systems, to name a few. A unique feature of most industrial engineering assignments is that they involve interdisciplinary teams. For example, the IE might be the leader of a team consisting of electrical and mechanical engineers, accountants, computer scientists, and planners. This IE program gives the student the skills necessary to be a leader of these teams. These skills include team building, brainstorming, group dynamics, and interpersonal relationships.

IEs have a sound background in technology integration, management theory and application, engineering economics and cost analysis. They are well equipped to deal with problems never seen before, making them prime candidates for promotion through the management career path, especially in high tech organizations. In fact, more than half of all practicing IEs are in management positions. This area of expertise has placed the IE in the leadership role in the establishment of a new field of activity called "management of technology."

Industrial engineers are well trained in the development and use of analytical tools, and their most distinctive skill is in the area of model building. IEs must quickly learn and understand the problems of their clients. In this context, good people skills and good analytic skills are essential. This industrial engineering program offers both

INDUSTRIAL ENGINEERING—B.S.E.

Degree Requirements

The following three courses are required to satisfy the mathematics content electives and microcomputer elective in the engineering core:

			Semester Hours
ECE	383	Probability and Statistics for Engineers	2
IEE	463	Computer Aided Manufacturing and Control	3
MAT	242	Linear Algebra	2

In addition, the following courses are required for the Industrial Engineering major:

			Semester Hours
ASE	485	Engineering Statistics	3
IEE	205	Microcomputer Applications in Industrial Engineering	3
IEE	300	Economic Analysis for Engineers	3
IEE	305	Information Engineering	3
IEE	367	Methods Engineering and Facilities Design	4
IEE	374	Quality Control	3
IEE	431	Engineering Administration	3
IEE	461	Integrated Production Control	3
IEE	475	Introduction to Simulation	3
IEE	476	Operations Research Techniques Applications	4
IEE	488	Industrial Engineering Analysis	3
IEE	490	Project in Design and Development	3
MET	343	Material Processes	4
Technical electives			10
Total			52

Technical Electives in Industrial Engineering

In consultation with an advisor, technical electives may be selected from one or more areas. A maximum of two courses are allowed outside the School of Engineering. Graduate courses may be taken for undergraduate credit, with department chair approval, provided the student has a GPA greater than or equal to 3.00.

Areas include communication/people skills, computer skills, integration skills, management skills, manufacturing skills, quality skills, and quantitative skills. See the *Manual of Undergraduate Study* in the Industrial and Management Systems Engineering office for specifics.

With departmental approval, technical electives may also be chosen from other courses in engineering, mathematics, the sciences, and business administration at or above the 300 level. A minimum of six hours of technical electives must be taken from the College of Engineering and Applied Sciences, with the approval of an advisor.

Industrial Engineering
Program of Study
Typical Four-Year Sequence

Freshman Year

			Semester Hours
First Semester			
CHM	114	General Chemistry for Engineers[1]	4
ECE	105	Introduction to Languages of Engineering	3
ENG	101	First Year Composition	3
MAT	270	Calculus with Analytic Geometry I	4
HU or SB elective[2]			3
Total			17
Second Semester			
ECE	106	Introduction to Computer Aided Engineering	3
ENG	102	First Year Composition	3
MAT	271	Calculus with Analytic Geometry II	4
PHY	121	University Physics I Mechanics	3
PHY	122	University Physics Laboratory I	1
HU or SB elective[2]			4
Total			18

Sophomore Year

First Semester			
ECN	111	Macroeconomic Principles or ECN 112 Microeconomic Principles (3	3
IEE	300	Economic Analysis for Engineers	3
MAT	242	Elementary Linear Algebra	2
MAT	272	Calculus with Analytic Geometry III	4
PHY	131	University Physics II Electricity and Magnetism	3
PHY	132	University Physics Laboratory II	1
HU or SB elective[2]			2
Total			18
Second Semester			
ECE	210	Engineering Mechanics I Statics	3
ECE	383	Probability and Statistics for Engineers	2
IEE	205	Microcomputer Applications in Industrial Engineering	3
MAT	274	Elementary Differential Equations	3
Basic science elective[4]			3
LI elective[2, 3]			3
Total			17

Junior Year

First Semester			
ASE	485	Engineering Statistics	3
ECE	312	Engineering Mechanics II: Dynamics	3
IEE	367	Methods Engineering and Facility Design	4
IEE	374	Quality Control	3
IEE	431	Engineering Administration	3
HU or SB elective[2]			3
Total			19
Second Semester			
ECE	301	Electrical Networks	4
ECE	340	Thermodynamics	3
ECE	350	Structure and Properties of Materials	3
IEE	305	Information Engineering	3
Technical electives			5
Total			18

Senior Year

First Semester			
ECE	333	Electrical Instrumentation	3
IEE	461	Integrated Production Control	3
IEE	475	Introduction to Simulation	3
MET	343	Materials Processing	4
Technical electives			5
Total			18
Second Semester			
ECE	400	Engineering Communications	3
IEE	463	Computer Aided Manufacturing and Control	3
IEE	476	Operations Research Techniques/Applications	4
IEE	488	Industrial Engineering Analysis	3
IEE	490	Project in Design and Development	3
Total			16

Degree requirements: 133 semester hours minimum plus English proficiency

[1] Students who have taken no high school chemistry should take CHM 113 and 116.

[2] See pages 53-71 for the requirements and the approved list.

[3] See page 244 for special requirements and selection of an LI elective.

[4] Must be an earth science or life science course, if physics or chemistry, the course must be of a more advanced level than CHM 114 or 116 or PHY 131.

Manufacturing Engineering

Manufacturing engineering is concerned with the application of the principles of science to increase productivity in industry. This involves the design of systems that allow for the best utilization of people, machines, material, and money. Modern manufacturing engineering is concerned with the application of technology, including computers, robots, graphics, mathematical and digital models, information and database systems, microtechnology, and systems theory.

Emphasis is placed on management and economics as well as technology. Graduates of the program are well qualified to participate in the introduction of CAD/CAM/CIM and factory automation technology to industry.

The following courses are required as part of the engineering core, mathematics content requirement and the microcomputer elective (only ECE 333 Electrical Instrumentation may be deleted from the engineering core):

			Semester Hours
ECE	350	Structure and Properties of Materials	3
ECE	383	Probability and Statistics for Engineers	2
IEE	463	Computer Aided Manufacturing and Control	3

The basic science elective may be selected from BIO 181, CHM 331, GLG 100, PHY 361, and ZOL 201.

In addition, the following courses are required for the manufacturing engineering option:

			Semester Hours
IEE	205	Microcomputer Applications in Industrial Engineering	3
IEE	300	Economic Analysis for Engineers	3
IEE	305	Information Engineering	3
IEE	374	Quality Control	3
IEE	431	Engineering Administration	3
IEE	464	Concurrent Engineering Design	3
IEE	490	Project in Design and Development	3
MAE	317	Dynamic Systems and Control	4
MET	331	Design for Manufacturing I	3
MET	343	Material Processes	4
MET	438	Design for Manufacturing II	4
MET	443	N/C Computer Programming	3
MET	451	Introduction to Robotics	3
Technical electives*			10
Total			52

* Two courses of engineering science and one course of engineering design content required

INDUSTRIAL AND MANAGEMENT SYSTEMS ENGINEERING

IEE 205 Microcomputer Applications in Industrial Engineering. (3) F S
Concepts re ated to deve opment of opera tional capab l ty in the use of m crocomputer hardware software and networkıng as re ated to ndustrıal eng neerıng appl cations. Prereq- u site ECE 105 *General studıes N3*

300 Economic Analysis for Engineers. (3) F, S
Econom c eva uation of a ternat ves for engi neer ng decis ons emphas z ng the time va ue of money. Prerequ s te MAT 270

305 Information Systems Engineering. (3) F
Emphas s on systems ana ys s, des gn and 'mp ementat on of nformation systems us ng fourth generat on anguages and a ternat ve data base structures. Prerequ s te IEE 205

367 Methods Engineering and Facilities Design. (4) F
Ana ysis and des gn of work systems; produc- t v ty motion and t me study techn ques hu man factors. Analys s and des gn of faci t es for automated and man machine systems emphas s on process des gn, material han- dl ng, layout des gn, and faci it es ocat on Lecture, lab Prerequ s tes EE 205 (or equiva ent), 300.

374 Quality Control. (3) F
In-depth analys s of contro chart and other statist cal process contro techn'ques Organ - zat on and managena aspects of qual'ty as surance Attribute and vanab e acceptance samp ıng plans. Prerequ s te ECE 383

411 Engineering Economy. (3) N
Equ pment rep acement ana ysıs, treatment of nflat on n cash f ow stud es, and consider- at on of risk and uncerta nty Prerequis te IEE 300

422 Information Systems Design. (3) N
Emphasis on the app cat on of system ana y- s s and design to informat on systems Micro processor M S project requ red Prerequ s te: IEE 205 or equ va ent

431 Engineering Administration. (3) F
Eng neering organizat on and adm n stration· ntroduction to dec s on makıng, quantitat ve and qua itative approaches to management, and eng neering adm n strat on.

437 Human Factors Engineering. (3) F
Study of people at work designıng for human performance effectiveness and productivity Cons'derations of human phys o og ca and psycho og ca factors. Prerequ site EE 367

461 Integrated Production Control. (3) F
Product on contro techniques for the p an ning, ana ysıs control, and eva uat on of oper- atıng systems Time series forecastıng, net- work plann ng, schedul ng, and control Pre- requ s tes ECE 383; IEE 205 or equivalent.

463 Computer-Aided Manufacturing and Control. (3) F S
Emphas s on computer contro ın manufactur ng real time concepts, CIM NC group tech- nology and process planning and robot'cs Prerequ s te EE 205 or equ va ent. *General stud'es. N3*

464 Concurrent Engineering. (3) S
Concurrent engineerıng refers to sımu taneous cons deration of product, manufacturıng pro cess, and serv ce ssues n product des gn. The course covers ssues and methods to solve th s more complex des gn prob em Pre requ s tes ECE 106, IEE 205 or equ va ent

475 Introduction to Simulation. (3) F S
Use of s mu ation n the ana ys s and design of network and d screte systems Methods for us ng a sımu ation anguage ntroduct on to stat stıcal aspects to s mu at on Prerequisites· ECE 383, EE 205 or equ va ent *General studıes N3*

476 Operations Research Techniques/Applications. (4) F, S
Top cs nc ude inear programming network opt m zat on dynam c programm ng Markov processes and queu ng mode s. Emphas s on the design and deve opment of models for solving dec s on prob ems n ındustrıa sys tems. Prerequ s tes· ECE 383, MAT 242 *Gen- eral stud'es: N2*

488 Industrial Engineering Analysis. (3) S
Labor mater a and overhead cost analys s parametr c cost estimat ng risk ana ys's n vo v ng budget m tat ons, assurance of est - mates qua ty cost systems and fe cyc e cost analys s, ncludıng effects on eng neer ng design, re 'ab' ıty, mainta nabı ty serv ceabı - ty testab l ty and ava labi ty Prerequisites ECE 383; IEE 300.

490 Project in Design and Development. (3) F, S
Ind vıdual project n creative des gn and syn thesis Prerequ site: sen or stand ng

501 Foundations of Industrial Engineering I. (3) N
Techn ques for the ana ysıs and des gn of man mach ne systems Emphasis on work p ann ng, methods, measurements materıa handl ng, and facıl ty des gn. Not ava ab e for E. graduate cred t

502 Foundations of Industrial Engineering II. (3) N
Introduction to quant tat ve product on contro techniques, 'nclud ng plann ng forecast ng, n- ventory contro and MRP, and schedu ıng. In- fluence of CAD CAM and automat on on pro duct on contro process. Not ava ab e for .E graduate cred t Prerequ s te ECE 383 or 500

503 Economic Analysis for Engineers. (3) F S
Econom c evaluat on of a ternat ves for eng - neerıng dec sions, emphas z ng the t me va ue of money Not avaı ab e for .E. graduate cred t Prerequisite: MAT 270.

504 Math Tools/Industrial Engineers. (3) N
ntroduct on to and extens on of, fundamenta mathemat'cal techn ques. Extensive use of a comprehens ve computer based mathemati ca env ronment to both exp ore and verify mathemat ca theorems and prob ems, l near algebra probabı ty stat st cs opt mizat on transform theory and og c.

505 Applications Engineering. (3) F
Develop workıng knowledge of appl cat on systems deve opment tools needed for com- puter ntegrated enterprise ınc udes tech n ques for appl cation generation n fourth and f fth generat on software env ronments. Topics nclude cl ent server network systems dec - sion support systems and transact on sys tems in d str buted environment.

510 Measurement of Productivity. (3) S '95
The eng neerıng economic audit and ts use w th app cations to break-even ana ysıs, vari ab e budget control cost analysıs and product pr c ng. Prerequ'sites: ECE 383 or 500; EE 205 or equ valent.

511 Analysis of Decision Processes. (3) S
Methods of mak ng dec s ons n comp ex env - ronments and statist ca dec s on theory; ef fects of r sk, uncertainty and strategy on eng - neerıng and managerıal dec s ons Prerequ site ECE 383 or 500

520 Ergonomics Design. (3) S
Human phys o og ca and psychologıca fac- tors n the des gn of work environments and n the employment of people n man-mach ne systems Open-shop ab ass gnments n add t on to class work Prerequ s te EE 437 or 547.

531 Topics in Engineering Administration. (3) S '96
Cons'derat on g ven to ph losophical psycho og cal, pol tical, and social mp 'cat ons of ad- ministrative dec s ons Prerequ site IEE 532 or perm ss on of nstructor

532 Management of Technology. (3) F
Top cs nc ude designıng a techn ca strategy techno og ca forecastıng ınterfac ng market ng engineer ng and manufacturıng des'gning and manag ng innovat on systems creat vity appl'cat on of basic management princ p es to technology management. Prerequisite. IEE 431 or 541 or ınstructor approva

533 Scheduling and Network Analysis Models. (3) S '96
App ıcat'on of schedu ing and sequenc'ng al gorithms determinıstic and stochastic network ana ys s, and f ow a gorithms. Prerequ's tes. ECE 383 or 500, IEE 476 or 546.

540 Engineering Economy. (3) N
Equ'pment replacement ana ysis treatment of nf at on ın cash f ow stud es, and consider- ation of r sk and uncertainty Open only to stu- dents without prev ous cred t for IEE 411 Pre requ'site: IEE 300 or 503

541 Engineering Administration. (3) F SS
Eng neer ng organizat on and administration, ntroduction to dec s on making quant tative and qua itative approaches to management and eng neerıng adm'n strat on Open only to students w thout prev ous cred t for EE 431.

542 Information System Design. (3) N
Emphas s on the app ıcat on of system analy- sıs and des gn to nformation systems. M cro- processor MIS project requ red Open only to students without previous credit for EE 422. Prerequ site EE 205 or equ valent

543 Computer-Aided Manufacturing and Control. (3) F, S
Emphasis on computer control n manufactur- ıng real-time concepts CIM, NC group tech- no ogy and process p ann ng, and robot cs. Open on y to students w thout previous cred t for IEE 463. Prerequ s te. IEE 205 or equiva ent

544 Concurrent Engineering. (3) S
Concurrent eng neerıng refers to sımu taneous cons derat'on of product, manufacturıng pro- cess, and service ıssues n product des gn The course covers 'ssues and methods to so ve this more comp ex des gn prob em Open on y to students w'thout prev ous credit for IEE 464 Prerequ s tes· ECE 106; EE 205 or equ va ent

545 Introduction to Simulation. (3 F S
Use of s mu at on n the ana ysis and des gn of network and discrete systems Methods for us ng a s mu at on anguage ntroduction t statist ca aspects of s mu at on Open on y to students w thout prev ous credit for IEE 475. Prerequisites: ECE 383 or 500 EE 205 or equivalent.

546 Operations Research Techniques/Applications. (4) F, S
Top cs nc ude near programm ng network opt m zat on, dynamic programm ng Markov processes, and queu ng mode s Emphasis on the des gn and development of models for so v ng dec s on prob ems n ndustria systems. Open on y to students w thout prev ous credit for EE 476. Prerequ s tes: ECE 383 or 500, MAT 242

547 Human Factors Engineering. (3) F
Study of people at work, des gn ng for human performance effect veness and product v ty Cons derations of human phys ological and psycho og ca factors Open only to students w thout prev ous cred t for EE 437

548 Industrial Engineering Analysis. (3) S
Labor mater a and overhead cost ana ys s, parametric cost est mat ng r sk ana ys s nvo v ng budget im tat ons, assurance of est mates, qual ty cost systems and fe cycle analys s nc ud ng effects on eng neering des gn, re ab' ty ma ntainabil ty serv ceabi ty, testab l ty and ava abi ity. Open on y to stu dents w thout prev ous cred t for EE 488 Pre requ s tes ECE 383 or 500, EE 300 or 503

552 Strategic Technological Planning. (3) S
Study of concept of strategy strategy formula tion process, and strateg c plann ng methodo og es with emphasis on eng neer ng design and manufacturing strategy, complemented w th case studies An ana yt ca executive p anning deci s on support system s presented and used throughout course Pre- or coreq u s te EE 545 or 566 or 567 or 574 or 575

560 Database Concepts for Industrial Management Systems. (3) S
Appl cat on of data base concepts to ndustrial systems problems. Top cs inc ude conceptua model ng, data structures database software and perspect ves from expert and know edge base systems.

561 Production Control Information Systems. (3) F
Deve opment of informat on system des gns for product on control. Top cs include MRP MRP I, schedu ng sequenc ng and inven tory contro On-l ne design concepts are cov ered Prerequ s tes ASE 485 or 500 EE 461· MAT 242

562 Computer-Aided Manufacturing (CAM) Tools. (3) F
Current top cs in automation d stributed con trol, contro code generat on contro og c va dat on, CAM ntegrat on CAD CAM data structures, p ann ng for control systems Top ics vary by semester. Prerequisite: IEE 463 or 543 or equ va ent

563 Systems Analysis for Distributed Systems. 3) S
Ana ys s and des gn of d stributed systems for computer ntegrated manufacturing and nformat on processing Concepts of host dr ven microprocessors to co ect store and commu n cate data Prerequisite: ECE 383 or 500

564 Planning for Computer-Integrated Manufacturing. (3) F
Theory and use of DEF methodo ogy n plann ng for f ex b e manufacturing, robot cs, and rea time contro . Simu ation concepts appl ed to computer-integrated manufacturing p ann ng Prerequ s te. EE 463 or 543.

565 Computer-Integrated Manufacturing Research. (3) S
Determ nat on and eva uat on of research ar eas n computer ntegrated manufacturing n c ud ng real-time software, manufactur ng information systems, flex ble and ntegrated manufacturing systems robotics and computer graph cs Prerequ s te: IEE 564.

566 Simulation in Computer-Integrated Manufacturing Planning. 3) F
Use of simu ation n the p anning of computer ntegrated manufacturing p anning re ated to robotics flexible and ntegrated manufactur ng systems Use of computer graphics comb ned w th s mu at on analys s for CIM dec s on support Prerequ s te EE 475 or 545

567 System Simulation. (3) F
Use of s mulat on in the ana ys s and design of systems nvolving continuous and d screte processes s mulat on languages statist cal aspects of s mu ation Prerequ s te. IEE 475 or 545

569 Advanced Statistical Methods. (3) F '94
Appl cat on of statist ca inference procedures based on ranks, to eng neer ng problems Eff' c ent alternatives to c ass ca statist ca inference constrained by norma ty assumptions Prerequ s te ASE 485 or 500.

570 Advanced Quality Control. (3) S
Economic-based acceptance samp ng, mu t attr bute acceptance samp ing narrow 'm t gaug ng in nspector error and attr butes ac ceptance samp ng, pr nc p es of qua ty man agement and se ected top cs from current t erature Prerequisite: ASE 485 or 500 or equ va ent

571 Quality Management. (3) F
Tota qua ty concepts, qua ity strateg es, qua ty and compet t ve position qual ty costs ven dor re at ons, the qual ty manual and qua ty n the services Prerequ s te EE 431 or 541

572 Design of Engineering Experiments. (3) F, S
Analys s of variance and experimenta des gn. Topics include genera des gn methodology, ncomplete b ocks confound ng fract ona rep cation and response surface methodology Prerequ s te ASE 485 or 500

573 Reliability Engineering. (3) S
Topics include the nature of rel ab ity, t me to fa ure dens t es, espec a y the exponent al and We bul ser es/paral e standby systems complex system re ab l ty Bayes an re ab l ty ana ys s, and sequent a re iab ty tests Prerequ s te: ECE 383 or 500

574 Applied Deterministic Operations Research Models. (3) F
Formulat on, so ut on ana ysis and appl ca tion of determ n st c mode s n operat ons re search nc ud ng those of near programming nteger programming and nonl near program m ng. Prerequ s te: EE 476 or 546.

575 Applied Stochastic Operations Research Models. (3) S
Appl cat on of stochastic models nc ud ng inventory theory queu ng theory Markov processes stochastic programming and renewa theory Prerequ s te ASE 485 or 500

576 Applications of Operations Research. (3) N
Case studies of app cation of inear and non near models and general types of search techniques. Prerequ s te EE 574 or instructor approva

577 Decision and Expert Systems Methodology. (3) F
Systems approach to the ana ys s design and mp ementat on of dec s on support sys tems Emphas s on development of data bases mode bases d a ogs, and systems ar ch tecture as wel as systems effectiveness ntroduction to expert systems as dec s on a d included. Term project required Prerequ site EE 205 or equivalent

578 Regression Analysis. (3) F
A course in regress on mode bui d ng oriented toward eng neers/phys ca sc entists Top cs include l near regression d agnostics biased and robust fitting nonl near regression Prerequisite ASE 485 or 500

579 Time Series Analysis and Forecasting. (3) F '95
Forecast ng t me series by the Box Jenkins and exponential smooth ng techn ques· exist ing d g tal computer programs are ut l zed to augment the theory Prerequ sites ASE 485 or 500 EE 461

582 Response Surfaces and Process Optimization. (3) S
An ntroduction to response surface method and its app cations. Top cs inc ude steepest ascent, canon'cal analysis designs, and optima 'ty criteria Prerequisite: IEE 572.

678 Advanced Decision Theory. (3) N
Advanced dec sion theory techn ques for n dustria systems Top cs inc ude conjugate fam ies of d stributions, value theory dec s ons with mult p e objectives, and goa programm ng. Prerequ s te EE 511

681 Reliability, Availability, and Serviceability. (3) F '94
ncludes organ z ng for RAS hardware and software RAS, ntegrity and fault tolerant de s gn, ma ntenance des gn and ma ntenance strategy Markov mode s for RAS fau t free analys s, and mi itary standards for RAS. Pre requ site: ECE 383 or 500.

Omnibus Courses: See page 44 for omn bus courses that may be offered

Mechanical and Aerospace Engineering

Don L. Boyer
Chair
(ECG 346) 602/965-3291

PROFESSORS
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ASSOCIATE PROFESSORS
HENDERSON KOURIS, KUO, LAANANEN, MIGNOLET NATSIAVAS, RANK N, SHAH

ASSISTANT PROFESSORS
CHATTOPADHYAY K CHEN, LEE, McNE LL, WELLS

PROFESSORS EMERITI
AVERY BEAKLEY, S CHEN, DITSWORTH FRY, KAUFMAN, LOGAN, RICE, SHAW, THOMPSON, TURNBOW W LCOX WOOLDR DGE

The Department of Mechanical and Aerospace Engineering is the adminis trative home for two undergraduate ma jors: Aerospace Engineering and Me chanical Engineering.

Both majors build on the broad expo sure to the engineering, chemical, and physical sciences and the mathematics embodied in the general studies and en gineering core courses required of all engineering students.

The *Aerospace Engineering* major provides students an education in tech nological areas critical to the design and development of aerospace vehicles and systems. Aerospace Engineering graduates are typically employed at government laboratories (e.g., NASA) and in a wide range of aerospace and mechanical industries The *Mechanical Engineering* major is perhaps one of the most broadly applicable programs in engineering, providing education for a wide variety of employment opportu nities.

The two majors, discussed in more detail below, can serve as entry points to immediate professional employment or to graduate study. The emphasis in all fields is on the development of fun damental knowledge that will have long lasting utility in our rapidly changing technical society. Employ ers' desire for this emphasis is a strong point in favor of these choices of cur ricula over technology or special pro grams that emphasize current applica tions or specific industries.

DEGREE REQUIREMENTS

All degree programs in the depart ment require that students attain a mini mum GPA of 2.00 in the engineering core and in the major in order to be eli gible for graduation. Also, the depart ment may require additional or reme dial work for those students who have demonstrated a trend of academic diffi culty

Engineering Core Options

Among the options listed on page 244 as part of the engineering core re quirements, students in the Department of Mechanical and Aerospace Engi neering are required to select the fol lowing

			Semester Hours
ECE	210	Engineering Mechanics I Statics	3
ECE	312	Engineering Mechanics II: Dynamics	3
ECE	313	Introduction to Deformable Solids	3
ECE	340	Thermodynamics	3
ECE	350	Structure and Properties of Materials	3
MAE	305	Measurements and Microcomputers	4

AEROSPACE ENGINEERING—B.S.E.

The primary concern of aerospace engineers is the design and develop ment of a wide variety of aircraft and space vehicles and systems. The cur rent challenges to the aerospace engi neer include the design of a new gen eration of high efficiency transport air craft, the development of the next generation of space transports, and the design of large space systems. In addi tion to the design of vehicles, the aero space engineer is involved in the fur ther development of the many spin offs of the aerospace industry. These in clude contributions to power genera tion, communications, air and water pollution monitoring, management of the earth's resources, and the under standing of weather Future contribu tions are anticipated in the area of zero gravity manufacturing of high purity materials and medicines, and the design of solar power satellites.

The undergraduate curriculum in cludes the study of flight mechanics, aerospace structures and materials, aerodynamics and propulsion. These subjects provide the foundation neces sary for design of aircraft and space ve hicles.

Aerospace Engineering Major

Aerospace Engineering students are required to select the following courses in the engineering core:

			Semester Hours
ECE	386	Partial Differential Equations for Engineers	2
MAT	342	Linear Algebra	3
PHY	361	Introductory Modern Physics	3

The Aerospace Engineering major consists of the following courses:

			Semester Hours
MAE	317	Dynamic Systems and Control	4
MAE	361	Aerodynamics I	3
MAE	413	Spacecraft Dynamics and Control	3
MAE	415	Vibration Analysis	4
MAE	425	Aerospace Structures I	3
MAE	426	Aerospace Structures II	4
MAE	441	Design Theory and Techniques	3
MAE	460	Gas Dynamics	3
MAE	461	Aerodynamics II	3
MAE	462	Dynamics of Flight	3
MAE	463	Propulsion	3
MAE	464	Aerospace Laboratory	2
MAE	467	Aircraft Performance	3
MAE	468	Aerospace Systems Design	3
Area of emphasis technical electives			6
Total			50

Aerospace Engineering Areas of Emphasis

Technical electives may be selected from among any of the courses listed below or from courses listed under the Mechanical Engineering areas of em phasis. The courses are grouped so that the student may select an elective pack age of closely related courses. A stu dent may with prior approval of the ad visor and department, select a general area and a corresponding set of courses not listed below that would support a career objective not covered by the fol lowing categories.

Aerodynamics. MAE 434, 466, 471, 490; MAT 466

Aerospace Materials. ECE 383; MAE 455; MSE 355, 420, 440, 441, 450, 470.

Aerospace Structures. ECE 383; MAE 404, 455, 490

Computer Methods ASE 485; CSE 310, 320, 422, 428; ECE 383; IEE 463, 464, 475; MAE 403, 404, 406, 471, 541; MAT 464, 465, 466.

Design. MAE 341, 403, 404, 406, 435, 442, 446, 455, 466, 490; MSE 440, 441.

Mechanical. Any courses listed under Mechanical Engineering Areas of Emphasis.

Propulsion. MAE 382, 434, 436, 465, 489, 490.

System Dynamics and Control. CSE 428; ECE 383; EEE 480, 482; MAE 417, 447, 490.

Aerospace Engineering Program of Study Typical Four-Year Sequence

The first two years are usually devoted to the general studies and engineering core requirements. Thus, the degree programs in the department share essentially the same course schedule for that period of time. A typical schedule is given below:

Program of Study Typical Four-Year Sequence

Freshman Year

			Semester Hours
First Semester			
CHM	114	General Chemistry for Engineers or CHM 116 General Chemistry (4	4
ECE	105	Introduction to Languages of Engineering	3
ENG	101	First Year Composition	3
MAT	290	Calculus I	5
HU or SB elective[1]			3
Total			18
Second Semester			
ECE	106	Introduction to Computer Aided Engineering	3
ENG	102	First Year Composition	3
MAT	291	Calculus II	5
PHY	121	University Physics I: Mechanics	3
PHY	122	University Physics Laboratory I	1
HU or SB elective[1]			3
Total			18

Sophomore Year

First Semester			
ECE	210	Engineering Mechanics I Statics	3
MAT	342	Linear Algebra	3
MAT	274	Elementary Differential Equations	3
PHY	131	University Physics II: Electricity and Magnetism	3
PHY	132	University Physics Laboratory II	1
L1 elective[1, 2]			3
Total			16
Second Semester			
ECE	301	Electrical Networks I	4
ECE	312	Engineering Mechanics II Dynamics	3
ECE	313	Introduction to Deformable Solids	3
ECE	340	Thermodynamics	3
ECE	350	Structure and Properties of Materials.	3
ECE	386	Partial Differential Equations for Engineers	2
Total			18

Junior Year

			Semester Hours
First Semester			
MAE	305	Measurements and Microcomputers	4
MAE	361	Aerodynamics I	3
MAE	413	Spacecraft Dynamics and Control	3
MAE	475	Aerospace Structures I	3
PHY	361	Introductory Modern Physics	3
HU or SB elective[1]			3
Total			19
Second Semester			
MAE	317	Dynamic Systems and Control	4
MAE	426	Aerospace Structures II	4
MAE	441	Design Theory and Techniques	3
MAE	460	Gas Dynamics	3
MAE	467	Aircraft Performance	3
Total			17

Senior Year

First Semester			
MAE	415	Vibration Analysis	4
MAE	461	Aerodynamics II	3
MAE	462	Dynamics of Flight	3
MAE	463	Propulsion	3
HU or SB elective[1]			3
Total			16
Second Semester			
ECE	400	Engineering Communications	3
MAE	464	Aerospace Laboratory	2
MAE	468	Aerospace Systems Design	3
HU or SB elective[1]			3
Technical electives			6
Total			17

[1] See pages 53-71 for the specific requirements and the approved list.

[2] See page 244 for special requirements and selection of an L1 elective

MECHANICAL ENGINEERING—B.S.E.

Mechanical engineering is a creative discipline that draws upon a number of basic sciences to design the devices, machines, processes, and systems that involve mechanical work and its conversion from and into other forms. It includes the conversion of thermal, chemical, and nuclear energy into mechanical energy through various engines and power plants; the transport of energy via devices like heat exchangers, pipelines, gears, and linkages; the use of energy to perform a variety of tasks for the benefit of society, such as in transportation vehicles of all types, manufacturing tools and equipment, and household appliances. Furthermore, since all manufactured products must be constructed of solid materials and because most products contain parts that transmit forces, Mechanical Engineering is involved in the structural integrity and materials selection for almost every product on the market.

Mechanical engineers are employed in virtually every kind of industry. They are involved with seeking new knowledge through research, with doing creative design and development, and with the construction, control, management, and sales of the devices and systems needed by society. Therefore, a major strength of a mechanical engineering education is the flexibility it provides in future employment opportunities for its graduates.

The undergraduate curriculum includes the study of: the principles governing the use of energy; the principles of design, instruments and control devices; and the application of these studies to the creative solution of practical, modern problems.

Mechanical Engineering Major

Mechanical Engineering students are required to select the following courses in the engineering core:

			Semester Hours
ECE	386	Partial Differential Equations for Engineers	2
MAT	242	Elementary Linear Algebra	2
PHY	361	Introductory Modern Physics	3

The Mechanical Engineering major requires the following courses:

			Semester Hours
ECE	384	Numerical Analysis for Engineers I	2
MAE	317	Dynamic Systems and Control	4
MAE	371	Fluid Mechanics	3
MAE	372	Fluid Mechanics	4
MAE	382	Thermodynamics	3
MAE	388	Heat Transfer	3
MAE	415	Vibration Analysis	4
MAE	422	Mechanics of Materials	4
MAE	441	Design Theory and Techniques	3
MAE	442	Mechanical Systems Design or MAE 446 Thermal Systems Design (3)	3
MAE	443	Engineering Design	3
MAE	490	Projects in Design and Development	2
MAE	491	Experimental Mechanical Engineering	3
Area of emphasis (technical electives			10
Total			51

Mechanical Engineering Areas of Emphasis

Technical electives may be selected from among any of the courses listed below or from courses listed under the Aerospace Engineering areas of emphasis. The courses are grouped so that the student may select an elective package of closely related courses. With prior approval of the advisor and department, a student may select a general area and a corresponding set of courses not listed below that would support a career objective not covered by the following categories.

Aerospace. Any courses listed under Aerospace Engineering areas of emphasis.

Biomechanical. BME 411, 412, 416, 419, 517 (recommended); EEE 302, 434.

Computer Methods. ASE 485; CSE 310, 422, 428; ECE 383; IEE 463, 464, 475; MAE 403, 404, 406, 471, 541; MAT 464, 465, 466.

Control and Dynamic Systems. CSE 428, ECE 383; EEE 360; IEE 463, MAE 413, 417, 462, 467.

Design. MAE 341, 351, 403, 404, 406, 417, 434, 435, 438, 442, 446, 447.

Energy Systems. EEE 360, MAE 430, 434, 435, 436, 437, 438, 446.

Engineering Mechanics. MAE 341, 402, 404, 413, 426, 442, 460, 461, 471; MAT 464, 466.

Manufacturing. CSE 428; IEE 300, 374, 411, 461, 463, MAE 341, 351, 403, 404, 442, 447, 455; MSE 355, 420, 431, 440

Stress Analysis, Failure Prevention, and Materials. ECE 383, MAE 341, 404, 426, 447, 455; MSE 355, 420, 431, 440, 450.

Thermosciences. MAE 336, 430, 434, 435, 436, 437, 446, 460, 463, 471.

Mechanical Engineering Program of Study Typical Four-Year Sequence

Freshman Year

First Semester			Semester Hours
CHM	114	General Chemistry for Engineers or CHM 116 General Chemistry (4	4
ECE	105	Introduction to Languages of Engineering	3
ENG	101	First Year Composition	3
MAT	290	Calculus I	5
HU or SB elective[1]			3
Total			18
Second Semester			
ECE	106	Introduction to Computer-Aided Engineering	3
ENG	102	First-Year Composition	3
MAT	291	Calculus II	5
PHY	121	University Physics I Mechanics	3
PHY	122	University Physics Laboratory I	1
HU or SB elective[1]			3
Total			18

Sophomore Year

First Semester			
ECE	210	Engineering Mechanics I: Statics	3
MAT	242	Elementary Linear Algebra	2
MAT	274	Elementary Differential Equations	3
PHY	131	University Physics II Electricity and Magnetism	3
PHY	132	University Physics Laboratory II	1
HU or SB elective[1]			3
L1 elective[1] [2]			3
Total			18
Second Semester			
ECE	301	Electrical Networks I	4
ECE	312	Engineering Mechanics II Dynamics	3
ECE	313	Introduction to Deformable Solids	3
ECE	340	Thermodynamics	3
ECE	350	Structure and Properties of Materials	3
ECE	386	Partial Differential Equations for Engineers	2
Total			18

Junior Year

First Semester			
ECE	384	Numerical Analysis for Engineers I	2
MAE	305	Measurements and Microcomputers	4
MAE	371	Fluid Mechanics	3
MAE	382	Thermodynamics	3
MAE	422	Mechanics of Materials	4
PHY	361	Introductory Modern Physics	3
Total			19
Second Semester			
MAE	317	Dynamic Systems and Control	4
MAE	372	Fluid Mechanics	4
MAE	388	Heat Transfer	3
MAE	441	Design Theory and Techniques	3
HU or SB elective[1]			3
Total			17

Senior Year

First Semester			
MAE	415	Vibration Analysis	4
MAE	442	Mechanical Systems Design or MAE 446 Thermal Systems Design (3	3
MAE	491	Experimental Mechanical Engineering	3
Technical electives			6
Total			16
Second Semester			
ECE	400	Engineering Communications	3
MAE	443	Engineering Design	3
MAE	490	Projects in Design and Development	2
HU or SB elective[1]			3
Technical electives			4
Total			15

[1] See pages 53–71 for the requirements and the approved list

[2] See page 244 for special requirements and selection of an L1 elective.

SPECIAL PROGRAMS

An engineering mechanics option is available under the Engineering Special Studies. See pages 278 279 for details and course requirements.

MECHANICAL AND AEROSPACE ENGINEERING

MAE 305 Measurements and Microcomputers. (4) F S
Science of measurements, microcomputer architecture and fundamentals and interfacing microcomputers to laboratory experiments sensors and data acquisition Lecture, lab. Prerequisite ECE 301

317 Dynamic Systems and Control. (4) F S
Mode ng and representat ons of dynam c physica systems nc ud ng transfer funct ons, b ock d agrams, and state equat ons. Tran s ent response. Pr nc p es of feedback contro and near system ana ysis nclud ng root lo- cus and frequency response Lecture lab Prerequisites ECE 301 312 Pre or coreq- u s te ECE 386

336 Air Conditioning and Refrigeration. (3 F
Refrigeration cycles, refrigerant propert es, heating, and coo ing oads psychrometry and purif cation temperature and humidity control. Prerequis te: MAE 382 or MET 432 or 'nstruc tor approva

341 Mechanism Analysis and Design. 3) F
Pos tions ve oc t es and acce erat ons of ma- ch ne parts cams, gears flexib e connectors and rol ng contact ntroduct on to synthes s Prerequ s te ECE 312

351 Manufacturing Processes Survey. (3) F S
Production techniques and equ pment. Cast ing and mold ng, pressure form'ng, mater al remova join ng and assemb y processes, au- tomat on, and material hand ng Lecture, rec- tat on Prerequ s te ECE 350

361 Aerodynamics I. (3) F, S
F uid stat cs, conservation pr nc p es, stream funct on ve ocity potentia vort city, nviscid flow, Kutta-Joukowsk thin-a rfo theory, and panel methods Prerequ s tes ECE 312, 340

371 Fluid Mechanics. (3) F, S
Introductory concepts of f u d mot ons f u d statics contro volume forms of bas c pr n- c p es; ntroduction to loca princ p es. Prereq- u s tes. ECE 312, 340

372 Fluid Mechanics. (4) F S
Appl cat on of bas c principles of f u d mechan- cs to prob ems in viscous and compressible f ow Lab exper mentat on, demonstrat ons Prerequ s tes ECE 384, 386 MAE 371

382 Thermodynamics. (3) F, S
Appl ed thermodynam cs; gas m xtures, psychrometr cs, property relationsh ps, power and refrigerat on cyc es, and react ve systems. Prerequ s te· ECE 340

388 Heat Transfer. (3) F, S
Steady and unsteady heat conduct on, includ ng numerical solut ons; therma boundary ayer concepts and app ication ons to free and forced convection Thermal rad at on con- cepts Prerequis te MAE 371

402 Introduction to Continuum Mechanics. (3) S
Appl cat on of the pr nc p es of continuum me chan cs to such f e ds as f ow in porous med a, biomechan cs, electromagnet c continua and magneto-flu d mechanics Prerequisites ECE 313 MAE 361 or 371, MAT 242 or 342

403 CAD Systems Development. (3) S
Design and imp ementat on of CAD System user nterface design computer graph cs data structures and extensive code development. Prerequ s tes ECE 105 or equ va ent· jun or standing n program.

404 Finite Elements in Engineering. (3) S
Introduct on to deas and methodo ogy of fin te element ana ys's. App ication ons to so id me chan cs, heat transfer, fluid mechan cs, and vi- brations Prerequ s tes ECE 313· MAT 242 or 342.

406 CAD/CAM Applications in MAE. (3) F
So ution of eng neering prob ems with the a d of state-of the art software too s n so d mod e ng eng neer ng ana ysis, and manufactur ng select on of model ng parameters; re 'ab l ty tests on software Prerequisite nstructor approval.

413 Spacecraft Dynamics and Control. (3) F, S
K nemat cs of part c es and rig d bod es, Eu er's moment equations sate te orb ts and maneuvers and spacecraft att tude dynam cs and contro Prerequisites: ECE 312; MAT 242 or 342

415 Vibration Analysis. (4) F, S
Free and forced response of s ng e and mul tip e degree of freedom systems cont nuous systems app cat'ons in mechanical and aero- space systems numerica methods Lecture ab Prerequ s tes ECE 312, MAE 305 422 (or 425) MAT 242 or 342

417 Control System Design. (3) S
Too s and methods of contro system des gn and compensat on, nc ud ng s mulat on, re sponse opt m zat on, frequency domain tech n ques state variab e feedback and sensit v ty analys s Introduction to nonl near and d s- crete t me systems Prerequisite MAE 317

422 Mechanics of Materials. (4) F, S
Fa ure theories, energy methods f n te e e ment methods p ates, torsion of nonc rcu ar members, unsymmetr ca bend ng, shear cen- ter, and beam co umn. Lecture, ab Prerequ - s tes: ECE 313 MAT 242 or 342 Pre- or coreq u s te ECE 386

425 Analysis of Aerospace Structures. (3) F, S
Stab ity, energy methods f n te elements tor- sion, unsymmetrical bend ng bend ng and tor- sion of mult ce led structures Prerequisites· ECE 313; MAT 242 or 342.

426 Design of Aerospace Structures. (4) F, S
F ght veh c e oads design of semi monocoque structures, oca buck ng and cripp ng fat gue aerospace materials, com- pos tes jo nts and f n te e ement app 'cations Lecture, lab Prerequisites MAE 361, 425

430 Introduction to Nuclear Engineering. (3) F
Neutron interact ons with matter. Princ p es of neutron chain reacting systems Neutron diffu- sion and moderat on Heat removal from nuc ear reactors Po nt reactor kinet cs Pre- requ s te. PHY 361.

434 Internal Combustion Engines. (3) S
Performance characterist cs, combustion car buret on and fuel- njection, and the coo ing and contro of nternal combust on eng nes Computer mode ing Lab Prerequ site MAE 382

435 Turbomachinery. (3) S
Design and performance of turbomach nes, in- cluding steam, gas and hydrau 'c turbines, centrifugal pumps compressors, fans and blowers Pre- or coreq u s te MAE 372 or 461

436 Combustion. (3) N
Thermochemica and react on rate processes; combust on of gaseous and condensed-phase fue s. Applicat ons to propulsion and heat'ng systems. Po utant formation Prerequisite. MAE 382

437 Direct Energy Conversion. (3) N
Unconvent ona methods of energy conver s on; fuel ce s thermoelectrics, therm on cs, photovo ta cs and magnetohydrodynam cs Prerequis tes ECE 340 350

438 Solar Energy. (3) S
Solar rad ation and nstrumentat on, design and test ng of co ectors performance ana y ses of systems, therma storage, photovolta cs, materials and economic analys s Prereq u s tes. MAE 382, 388

441 Design Theory and Techniques. (3) F, S
The des gn process, including problem def ni- t on, conceptua des gn, form and funct on, de- c sion making qua ity, material select on, manufacturab ity, modes of fai ure, fatigue, professional sm and eth'cs. Prerequ s tes: ECE 106, 313, 350.

442 Mechanical Systems Design. (3) F, S
Appl cat on of des gn princ p es and tech n ques to the synthes s, model ng and opt mi zat on of mechan ca , e ectromechanical and hydraulic systems Prerequisites: MAE 422 (or 425), 441.

443 Engineering Design. (3) F S
Group projects to des gn eng neering compo- nents and systems Prob em defin tion de- at on, model ng, and ana ysis dec s on mak ng and documentat on act v t es emphas zed 6 hours ab Prerequ s te MAE 442 or 446.

446 Thermal Systems Design. (3) F
App ication of engineering princ p es and tech- niques to the mode ing and ana ys s of therm a systems and components Opt mizat on techn ques are presented and their use dem onstrated Prerequ s te· MAE 441.

447 Robotics and Its Influence on Design. (3) S
Robot appl cat ons conf gurat ons s ngu ar pos tions and work space modes of control; v s on programm ng exerc ses design of parts for assembly Prerequisite: MAE 317

455 Polymers and Composites. (3) F
Relat onship between chemistry, structure and propert es of engineering polymers. De s'gn propert'es and behav or of f ber com pos te systems Cross-l sted as MSE 470 Prerequ s te ECE 350

460 Gas Dynamics. (3) F S
Compress ble flow at subson c and superson c speeds duct flow; norma and ob que shocks, perturbation theory, and wind tunnel design Prerequ s te MAE 361 or 371

461 Aerodynamics II. (3) F S
Transon c/hypersonic f ows, w ng theory, Nav er Stokes, lam nar/turbu ent shear f ows, pressure drop n tubes, separation, drag v s cous/'nv sc d 'nteract on, and wing des gn. Prerequ s te MAE 460.

462 Dynamics of Flight. (3) F, S
Aerodynam c forces and moments, stat c sta b l ty and contro , stab ity derivatives, and lat- eral and long tudinal motion and control A r- craft des gn for ong'tud na and latera direc t ona stab l ty w th cons deration of fly ng qua it es Lecture, des gn projects Prerequ - sites MAE 413 467.

463 Propulsion. (3) F, S
Fundamenta s of gas turb ne eng nes and de sign of components such as d ffusers com- pressors turbines combustors and nozz es Pr nc p es and design of rocket propulsion and alternative dev ces Lecture design projects Pre or coreq u s te MAE 460.

464 Aerospace Laboratory. (2) F S
Measurements of aerodynam c parameters n both subson c and superson c f ows f ow over a rfo s and bod es of revo ut on Flow visua - zat on Computer aided data acqu s t on and process ng. Lecture ab. Prerequ s tes MAE 305 460 Pre or corequisite MAE 461

465 Rocket Propulsion. (3) S
Rocket f ight performance nozz e des gn; combust on of qu d and so d prope ants component des gn, advanced propu s on sys tems; nterplanetary m ss ons, test ng Prereq u s te MAE 460.

466 Rotary Wing Aerodynamics and Performance. (3) F S
Introduct on to he 'copter and prope er ana y s s techn ques Momentum b ade e ement and vortex methods. Hover and forward fl ght Ground effect autorotation and compressib ty effects Prerequ s tes ECE 386 MAE 361 or nstructor appr val

467 Aircraft Performance. (3) F S
ntegrat on of aerodynamic and propulsive forces nto a rcraft performance des gn Est - mat on of drag parameters for conceptual de s gn. Eng ne selection a rfo l se ect on Introduct on to a rcraft conceptual des'gn method o ogy Lecture des gn projects. Prerequ site: MAE 361 Pre or corequisite: MAE 441.

468 Aerospace Systems Design. (3) F S
Gro p projects re ated to aerospace veh cle des gn work ng from m ss on def n tion and cont nu ng through pre m nary des gn; dec s on mak ng and commun cation act'v ties em phas zed Prerequisites MAE 426 441, 462

471 Computational Fluid Dynamics. 3) F
Numerica so ut ons for se ected problems n f u d mechan cs Prerequ s te: MAE 372 or 461

489 Thermophysics. (3) F
Bas c pr nc p es of heat transfer and the r ap - p cat on to aerospace systems propu s on de- vices, spacecraft thermal contro , and waste heat re ection systems Prerequ s te ECE 340.

490 Projects in Design and Development. 2 F S
Capstone projects n fundamenta or app ied aspects of eng neering Prerequis tes for Me- chan ca Engineering majors MAE 441, 491 Prerequ s te for Eng neer ng Spec a Studies engineer ng mechan cs majors MAE 422

491 Experimental Mechanical Engineering. (3 F S
Exper menta and ana yt ca stud es of phe- nomena and performance of f u d f ow heat transfer, thermodynam cs refrigerat on, and mechan'ca power systems 6 hours lab Pre- requ s tes MAE 305 372 382 388.

498 Pro-Seminar. (1 3) N
Spec a top'cs for advanced students. App ica t on of the eng neering d scipl nes to des gn and analys s of modern techn ca dev ces and systems Prerequis te nstructor approval.

504 Laser Diagnostics. (3) S
Fundamentals of optics and the nteract on of ight w'th matter Laser sources aser spec- troscopy, ve oc metry, part c e sizing and sur- face characterizat on

505 Perturbation Methods in Mechanics. (3 N
Non near osci at ons strained coord nates, renorma zation mu t p e sca es, boundary ay- ers matched asymptot c expansions turning po nt prob ems and WKBJ method.

506 Advanced System Modeling, Dynamics, and Control. (3) S
Lumped parameter mode ng of physical sys tems with examp es State var ab e represen tations and dynam c response Introduction to modern contro Prerequis'te· ASE 582 or MAT 442

507 Optimal Control Theory and Application. (3) F
Optima control of phys cal systems Ca cu us of varat ons, Pontryagin's pr nc p e m nimum time fuel prob ems, near quadratic regu ator and numerica methods Prerequ s te MAE 506

508 Dynamics and Control of Aerospace Vehicles. (3) F
Dynam c mode ing gu dance and feedback control of atmospheric f ight veh cles Att tude dynam cs and trajectory gu dance, moda ana ys s feedback compensat on s ng e- and mult - oop systems Prerequis tes MAE 462 506

509 Robust Multivariable Control. 3) S
Characterizat on of uncerta nty in feedback systems, robustness analys s synthes s tech n ques, multivariable Nyquist criteria, com puter a ded ana ys s and des gn. Prerequ sites MAE 417 506

510 Dynamics and Vibrations. (3) F
Lagrange's and Ham lton's equat ons r g d body dynam cs gyroscop c mot on, and sma osc at on theory.

511 Acoustics. (3) F
Princ ples underly ng the generat on transm s s on, and recept on of acoustic waves. App i cat ons to no se control, arch'tectura acous t cs, random v brat ons and acoust c fat gue

512 Random Vibrations. (3 S
Review of probab l ty theory random pro cesses stationarity, power spectrum wh te noise process, random response of s ngle and mu t p e DOF systems, and Markov processes s mu ation Prerequis te MAE 510 or nstruc tor approval

515 Structural Dynamics. (3 S
Free v brat on and forced response of d screte and continuous systems exact and approxi- mate methods of so ution fin te e ement mod e ng, and computat onal techn ques Prereq u s te MAE 510 or nstructor approva .

517 Nonlinear Oscillations. (3) F
Ex stence stab ity, and bifurcat on of solu t ons of non near dynam ca systems Meth- ods of ana ys s of regu ar and chaot c re- sponses Prerequ site MAE 510 or nstructor approval.

518 Dynamics of Rotor-Bearing Systems. (3) S
Natural wh r frequency, cnt cal speed and re sponse ana ys s of r g'd and f ex b e rotor sys tems Bearing nf uence and representat on Stab ty ana ys s. Methods of ba ancing

520 Solid Mechanics. (3) F
ntroduct on to tensors: k'nemat cs k net cs, and const tut ve assumptions lead ng to e as t c, plast c, and v scoe ast c behav'or. App ca t ons

522 Variational Principles of Mechanics. (3) S
Virtual work stationary and complementary potent a energies Ham lton's princ ple App - cat on of these and d rect methods to v bra- t ons, elast c ty and stab ty Prerequ site MAE 520 or equiva ent

523 Theory of Plates and Shells. (3) F
Linear and non near theories of plates Mem- brane and bend ng theor es of shel s. She s of revolut on. Prerequ s te MAE 520.

524 Theory of Elasticity. (3) S
Formu at on and so ut on of 2 and 3-d men s ona boundary va ue prob ems. Prerequ s te MAE 520

527 Finite Element Methods in Engineering Science. (3) F
D scret zat on, interpo at on e ementa matr - ces assemb y and computer mp ementat on. App cat on to so d and f u d mechan cs heat transfer, and t me dependent problems Pre- requ s te ASE 582

529 Theory of Elastic Stability. (3) S
Stab l ty of d screte and cont nuous mechani ca systems. Stabi ty of conservative and nonconservat ve systems Dynamic nstab ty Prerequisite MAE 523

536 Combustion. (3 N
Thermodynam cs chemical k'net cs of com bust on Exp os on and gn t on theories Reac t ve gas dynam cs. Structure propagation and stab ty of flames Experimenta methods. Prerequ's te: MAE 436 or nstructor approva .

537 Direct Energy Conversion. (3) N
Advanced se ected top cs n d rect energy convers on theory des'gn and app cat ons Cross sted as MSE 533 Prerequ s te MAE 581.

540 Advances in Engineering Design Theory. (3) F
Survey of research n eng neer ng des gn pro cess, artifact and design know edge, forma and nformal og c heur st c and numerica searches theory of structure and comp ex ty Prerequ s te graduate stand ng

541 CAD Tools for Engineers. (3) F
E ements of computer techn ques requ red to deve op CAD software. Data structures n- clud ng sts trees and graphs. Computer graph cs nc ud ng 2 and 3 dimens ona algo rithms and user 'nterface techn ques.

542 Geometric Modeling in CAD/CAM. (3) S
Geometric and sol d mode ng, curve and sur- face des gn CAD database architectures and ntegrat on of so d mode ng nto eng neering processes. Prerequis te: MAE 541 or instruc tor approval.

544 Mechanical Design and Failure Prevention. 3 F
Modes of mechan cal fa ure, app ication of pr nc ples of e ast c ty and p ast c ty n mu t - ax a state of stress to des gn synthes s; fa - ure theor es fat gue creep mpact Prerequ - s te MAE 443

546 CAD/CAM Applications in MAE. (3) F
So ution of eng neering problems w th the a d of state of the art software too s n so d mod e ing engineer ng ana ys s and manufactur- ng se ect on of model ng parameters re ab - ity tests on software Open only to students without prev ous cred t for MAE 406 or w th n- structor approva

547 Mechanical Design and Control of Robots. (3) N
Homogeneous transformat ons 3 d mens ona k nemat cs geometry of mot on forward and nverse kinemat cs workspace and mot on tra jectories dynam'cs, contro and stat c forces

548 Mechanism Synthesis and Analysis. (3) S
A gebra c and graph ca methods for exact and approx mate synthesis of cam gear and nkage mechanisms· design opt mizat on, methods of planar motion analysis character 'stics of plane mot on, spat al k nematics

557 Mechanics of Composite Materials. (3) S
Ana ys s of compos te matena s and app ca- t ons Micromechan ca and macromechan ca behavior C ass ca lam nation theory deve - oped with nvest gation of bend ng extens on coup ng

560 Propulsion Systems. (3) N
Design of a r-breath ng gas turbine engines for aircraft propuls on m ssion ana ys s; cyc e analys s, eng'ne siz ng, component design

561 Computational Aerodynamics. (3) S
F n te d fference and f nite-vo ume techn ques for so v ng the subsonic transon c, and super- sonic flow equations The method of charac- terist cs Numer ca grid generat on tech- n'ques Prerequis te MAE 571 or nstructor approval.

562 Transonic Flow. (3) F
Transon c flow, non near sma d sturbance equat ons, and m xed f ow w th shock waves. Ana ytical and numer ca treatments for a r foi s Applicat ons to w ngs bod es and turbomachinery Prerequ s te MAE 460 or 461.

563 Unsteady Aerodynamics. (3) S
Unsteady ncompress'b e and compressib e f ow Wings and bod es n osc l atory and tran- sient motions Kerne funct on approach and pane methods Aeroe astic appl cat ons Pre- requ s tes: MAE 460 (or 461) 562

564 Advanced Aerodynamics. (3) F
Perturbat on method L near zed subson c and superson c f ows Th'n w ng/s ender body theories. Lift ng surface theory. Pane method computat on. Prerequ s te MAE 460 or 461.

565 Turbomachinery. (3) N
Des gn and performance of turbomach'nes, n c ud ng turb nes compressors, pumps, fans and b owers.

566 Rotary-Wing Aerodynamics. (3) F
ntroduct on to hel copter and propel er analy s s techn ques Momentum, blade element, and vortex methods Hover and forward f ight. Ground effect autorotat on, and copress b ty effects. Prerequ s te MAE 361

571 Fluid Mechanics. (3) F
Bas c kinemat c dynam c, and thermodynam c equations of the f u d continuum and the r ap pl cat on to basic fluid mode s

572 Inviscid Fluid Flow. (3) S
Mechan cs of f uids for f ows in wh ch the ef fects of v scos ty may be gnored. Potent al flow theory, waves, and nvisc d compressible flows Prerequ s te: MAE 571

573 Viscous Fluid Flow. (3) F
Mechan cs of flu ds for flows n wh ch the ef- fects of v scos ty are signif cant. Exact and ap prox mate solut ons of the Nav er Stokes sys tem lam nar f ow at ow and h gh Reyno ds number Prerequ's te: MAE 571

574 Viscous, Compressible Fluid Flow. (3) N
Mechan cs of f u ds for flows in which the ef- fects of compress b ty and v scosity are sig- n'f cant. Compressib e boundary layers free shear layers shock waves and nterna f ows. Prerequ site MAE 572.

575 Turbulent Shear Flows. (3) F
Homogeneous, sotropic, and wa turbulence. Experimenta results Introduct on to turbu ent f ow calcu at ons Prerequis te MAE 571

577 Turbulent Flow Modeling. (3) S
Reynolds equat ons and their closure Mode - ng of s mp e and comp ex turbu ent f ows, cal- cu at ons of 'nternal and externa flows and appl cation to eng'neering problems Prerequ - s te MAE 571

581 Thermodynamics. (3) F
Bas c concepts and laws of class ca equ b- rium thermodynamics App cations to eng neering systems

582 Statistical Thermodynamics. (3) N
Kinet c and quantum theory Stat stica me chan cs ensemble theory Structure and ther- modynam cs of non nteract ng and nteract ng particles Bo tzmann ntegro d fferent a equa t on Cross- isted as MSE 531. Prerequ's te: MAE 581.

585 Conduction Heat Transfer. (3) F
Basic equations and concepts of conduct on heat transfer. Mathemat ca formu ation and solut on (analyt ca and numerical) of steady and unsteady, one and mu t d mens onal heat conduct on and phase change prob ems. Pre requ s tes ECE 386, MAE 388.

586 Convection Heat Transfer. (3) S
Bas c concepts and govern ng equat ons Ana ys s of lam nar and turbu ent heat transfer for 'nterna and externa flows Natura and mixed convection Prerequ site MAE 388.

587 Radiation Heat Transfer. (3) F
Advanced concepts and so ut on methodo o g es for rad ation heat transfer, nclud ng ex- change of therma rad ation between surfaces rad ation n absorb ng emitting, and scatterng med a and rad ation comb ned with conduct on and convect on Prerequis te MAE 388.

588 Two-Phase Flows and Boiling Heat Transfer. (3) S
Pool and flow bo' 'ng heat transfer, condensa tion heat transfer, various mode s of vapor q u d m xture f ows, gas-so id m xture flows and exper menta measurement techn ques.

589 Heat Transfer. (3) F
Basic concepts; phys ca and mathemat ca mode s for heat transfer App icat'ons to con duct ve, convective radiat ve, and comb'ned mode heat transfer Prerequ'site: MAE 388.

594 Graduate Research Conference. 1) F, S
Top cs n contemporary research. Requ red every semester of a l departmental graduate students registered for 9 or more semester hours. Not for degree cred t

598 Special Topics. (1 3) F S
Spec a top cs courses, nc ud ng the fo owing which are regu ar y offered, are open to qua i f ed students·
(a) Boundary Layer Stab ty
(b) Po ymers and Composites
(c) Hydrodynam c Stabi ty
(d) Advanced Spacecraft Control
(e) Plast c ty
(f) Aeroelast c ty
(g) Aerospace Veh c e Gu dance and Control

Omnibus Courses: See page 44 for omn bus courses that may be offered.

Programs in Engineering Special and Interdisciplinary Studies

Daniel F. Jankowski
Director

The degree programs described in the "Programs in Engineering Special and Interdisciplinary Studies" table on page 278 are administered by the Office of the Dean of the College of Engineering and Applied Sciences

Descriptions of these majors and options, with their respective program requirements, can be found on the pages indicated in the table.

PURPOSE

The majors of Engineering Special Studies and of Engineering Interdisciplinary Studies accommodate students whose educational objectives require more intensity of concentration on a particular subject or more curricular flexibility within an engineering discipline than the traditional departmental majors generally permit. These majors are School of Engineering programs. Unlike the departmental major areas, however, there is not a separate faculty. The faculty teaching and advising in these programs are from the School of Engineering.

For many students, engineering studies form the basis of preparation for professional engineering work where proficiency in the application of science and the physical and social technologies is brought to bear on problems of a large scope. The necessary breadth that these students seek often is not obtainable in traditional engineering fields. Rather, specially designed programs of course work that merge the required principles and approaches drawn from all fields of engineering and other pertinent disciplines are desired. As an answer to this need, two types of course arrangements are available: (1) the Bachelor of Science in Engineering (B.S.E.) degree with a major in Engineering Special Studies and (2) the Bachelor of Science (B.S.) degree with a major in Engineering Interdisciplinary Studies.

Programs in Engineering Special and Interdisciplinary Studies

Degree	Major	Option	Description
B.S.E	Engineering Special Studies	Engineering Mechanics	Pages 278 279
		Manufacturing Engineering	Page 269
		Pre-medical Engineering	Pages 279 280
B.S.	Engineering Interdisciplinary Studies	Geological Engineering	Pages 280

The B S.E. in Engineering Special Studies is designed primarily for students intending to pursue engineering careers at a professional level in industry or graduate studies. The B.S. in Engineering Interdisciplinary Studies accommodates those students who desire the integrity of an engineering education but who plan to enter professions other than engineering or particularly to serve society in socially relevant activities. Both are developed beyond the general studies and the engineering core.

The curricula leading to both the B.S.E. and the B.S degrees have been accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

ENGINEERING SPECIAL STUDIES—B.S.E.

Engineering Mechanics. The curriculum of the engineering mechanics option is intended for individuals interested in pursuing a more basic and theoretical education than is provided by typical curricula in aerospace, civil, or mechanical engineering. This curriculum is particularly suited for individuals whose goals are an increased depth of understanding in the fundamentals of mechanics and the pursuit of an advanced engineering degree, with the ultimate career goal of an academic or research position. Thus, it is strongly recommended that a GPA of at least 3.00 be maintained by all engineering mechanics students.

The engineering mechanics option is based on increased course work in mathematics and the broad field of engineering mechanics, the latter of which includes three interrelated areas: dynamics, fluid mechanics, and solid mechanics. Each of these areas is related to a variety of important and challenging technological problems. Examples include vibration control in space vehicles at launch, optimal design of composite structures, crystal growing in a microgravity environment, fluid transition to turbulence on swept wings, and computer aided modeling of structures ranging from surgical implants to space satellites. The fundamental emphasis of the engineering mechanics program provides the flexibility and understanding that is required to cope with rapidly occurring changes in technology and the needs of society.

This option is administered by the Department of Mechanical and Aerospace Engineering.

Refer to page 244, engineering core section. No course may be deleted and engineering mechanics students are required to select the following electives in the engineering core:

			Semester Hours
ECE	384	Numerical Analysis for Engineers I	2
ECE	386	Partial Differential Equations for Engineers	2
MAE	305	Measurements and Microcomputers	4
PHY	361	Introductory Modern Physics[1]	3

In addition, the following courses are required:

			Semester Hours
MAE	371	Fluid Mechanics	3
MAE	372	Fluid Mechanics	4
MAE	388	Heat Transfer	3
MAE	402	Introduction to Continuum Mechanics	3
MAE	404	Finite Elements in Engineering	3
MAE	413	Spacecraft Dynamics and Control	3
MAE	415	Vibration Analysis	4
MAE	422	Mechanics of Materials	4
MAE	441	Design Theory and Techniques	3
MAE	490	Projects in Design and Development	2
MAT	342	Linear Algebra	3
MAT	371	Advanced Calculus I or MAT 460 Applied Real Analysis (3)	3
MSE	440	Mechanical Properties of Solids	3
Technical electives[2]			6–7
Total			47–48

[1] Basic science elective.

[2] Must include two courses of engineering design type content

Technical electives may be selected from one or more of the following areas. A student may, with prior approval, select a general area or a set of courses that would support a career objective not covered by the following categories.

Biomechanics. BME 411, 412, 416, 419; EEE 434; MAE 341.

Dynamics MAE 462, 505, 510, 511, 512, 515, 517, 518

Engineering Mathematics. ASE 485, 582, 586; ECE 383, 385; MAT 371, 460, 461, 462; STP 421

Fluid Mechanics MAE 435, 460, 463, 471, 571.

Solid Mechanics. MAE 426, 520, 522, 523, 524, 529.

Engineering Mechanics Program of Study Typical Last Two-Year Sequence

Junior Year

			Semester Hours
First Semester			
ECE	333	Electrical Instrumentation or ECE 334 Electronic Devices and Instrumentation (4	3
MAE	371	Fluid Mechanics	3
MAT	371	Advanced Calculus I or MAT 460 Applied Real Analysis (3	3
MSE	440	Mechanical Properties of Solids	3
PHY	361	Introductory Modern Physics	3
HU or SB elective*			3
Total			18
Second Semester			
ECE	384	Numerical Analysis for Engineers I	2
MAE	305	Measurements and Microcomputers	4
MAE	372	Fluid Mechanics	4

MAE	413	Spacecraft Dynamics and Control	3
MAE	422	Mechanics of Materials	4
Total			17

Senior Year

First Semester

MAE	388	Heat Transfer	3
MAE	402	Introduction to Continuum Mechanics	3
MAE	404	Finite Elements in Engineering	3
MAE	415	Vibration Analysis	4
MAE	441	Design Theory and Techniques	3
Total			16

Second Semester

ECE	400	Engineering Communi cations	3
MAE	490	Projects in Design and Development	2
HU or SB elective*			3
Technical electives			7
Total			15

* See pages 53 71 for the requirements and the approved list

Manufacturing Engineering. This option is administered by the Depart ment of Industrial and Management Systems Engineering (see page 269).

Pre-medical Engineering. In the past decade, the interrelation between engi neering and medicine has become vig orous and exciting Our rapidly ex panding technology dictates that engi neering will continue to become increasingly involved in all branches of medicine. As this develops, so will the need for physicians trained in the engi neering sciences medical men and women with a knowledge of computer technology, transport phenomena, bio mechanics, bioelectric phenomena, op erations research, and cybernetics. This option is of special interest to stu dents desiring entry into a medical col lege and whose medical interests lie in research, aerospace and undersea medi cine, artificial organs, prostheses, bio medical engineering, or biophysics. Since both engineering and medicine have as their goal the well being of hu mans, this program is compatible with any field of medical endeavor.

Academic Requirements. In addition to the general studies requirements, BIO 181 General Biology (basic science elective) and CHM 116 General Chem istry must be selected in the engineer ing core. Refer to page 240, engineer ing core section. Other engineering core requirements are outlined in the area of emphasis descriptions. The fol lowing courses are required in the pre medical engineering option and have been selected to meet all university and ABET accreditation requirements:

			Semester Hours
AGB/BME	435	Animal Physiology I	4
BIO	182	General Biology	4
BME	331	Transport Phenomena I. Fluids	3
BME	334	Heat and Mass Transfer	3
BME	411	Biomedical Engineering I or BME 412 Biomedical Engineering II (3	3
BME	413	Physiological Instrumen tation	3
BME	417	Biomedical Engineering Design	3
BME	423	Physiological Instrumen tation Laboratory	1
BME	490	Biomedical Engineering Projects	2
BME	496	Professional Seminar[1]	0
CHM	113	General Chemistry	4
CHM	331	General Organic Chemistry	3
CHM	332	General Organic Chemistry	3
CHM	335	General Organic Chemistry Laboratory	1
CHM	336	General Organic Chemistry Laboratory	1
Engineering technical electives[2]			13
Total			51

[1] Students must register for BME 496 each semester.

[2] To be selected from an area of emphasis and must include one course of engineer ing design type content.

Students interested in pre medical engineering may choose either com puter science or general bioengineering as an area of emphasis.

Computer Science. This emphasis is designed for students interested in the application of modern computer tech nology for medical information pro cessing and medical scientific computa tion and for the recognition, storage, re trieval, and processing of medical data. The following courses are required in the engineering core: BME 470, ECE 333, 340, and 352, and MAT 242. ECE 312 is not required in the engineering core. Technical electives must include CSE 310, one advanced computer pro gramming course selected from CSE 383 or 470, and upper-division engi neering courses of engineering science and design content.

General Bioengineering. This em phasis is designed to strengthen the student's knowledge of bioengineering It emphasizes biomedical research. The following courses are required in the engineering core: ECE 340 and 350 and MAE 305. ECE 312 is not re quired in the engineering core. The technical electives may be selected from engineering, biology, or chemistry upper division courses, but these courses must include adequate engi neering science and design content.

Pre-medical Engineering Program of Study Typical Four-Year Sequence

First Year

First Semester			*Semester Hours*
BME	496	Professional Seminar	0
CHM	113	General Chemistry	4
ECE	105	Introduction to Languages of Engineering	3
ECN	111	Macroeconomic Principles	3
ENG	101	First Year Composition	3
MAT	290	Calculus I	5
Total			18

Second Semester

BME	496	Professional Seminar	0
CHM	116	General Chemistry	4
ECE	106	Introduction to Computer Aided Engineering	3
ENG	102	First Year Composition	3
MAT	291	Calculus II	5
PHY	121	University Physics I: Mechanics	3
PHY	122	University Physics Laboratory I	1
Total			19

Second Year

First Semester

BIO	181	General Biology	4
BME	496	Professional Seminar	0
MAT	274	Elementary Differential Equations	3
PHY	131	University Physics II· Elec tricity and Magnetism	3
PHY	132	University Physics Laboratory II	1
L1 elective*			3
Total			14

Second Semester

BIO	182	General Biology	4
BME	496	Professional Seminar	0
CHM	331	General Organic Chemistry	3
CHM	335	General Organic Chemistry Laboratory	1
ECE	210	Engineering Mechanics I Statics	3
ECE	301	Electrical Networks I	4
HU or SB elective*			3
Total			18

Third Year

First Semester

BME	331	Transport Phenomena I: Fluids	3
BME	435	Animal Physiology I	4
BME	496	Professional Seminar	0
CHM	332	General Organic Chemistry	3
ECE	313	Introduction to Deformable Solids	3
ECE	340	Thermodynamics or CHM 441 General Physical Chemistry (3)	3
ECE	350	Structure and Properties of Materials or CHM 442 General Physical Chemistry (3 or ECE 351 Engineering Materials (3) or ECE 352 Properties of Electronic Materials (3	3
Total			19

Second Semester

BME	334	Heat and Mass Transfer	3
BME	496	Professional Seminar	0
CHM	336	General Organic Chemistry Laboratory	1
ECE	333	Electrical Instrumentation or ECE 334 Electronic Devices and Instrumentation(4)	3
ECE	384	Numerical Analysis for Engineers I or ECE 386 Partial Differential Equations for Engineers (2 or MAT 242 Elementary Linear Algebra (2)	2
HU or SB elective*			3
Technical elective			6
Total			18

Fourth Year

First Semester

BME	411	Biomedical Engineering I or BME 412 Biomedical Engineering II (3	3
BME	413	Physiological Instrumentation	3
BME	423	Physiological Instrumentation Laboratory	1
BME	490	Biomedical Engineering Projects	2
BME	496	Professional Seminar	0
HU or SB elective*			3
Technical elective			4
Total			16

Second Semester

BME	417	Biomedical Engineering Design	3
BME	470	Microcomputer Applications in Bioengineering	3
BME	496	Professional Seminar	0
ECE	383	Probability and Statistics for Engineers	2
ECE	400	Engineering Communications	3
HU or SB elective*			3
Technical elective			3
Total			17

Degree requirements: 133 semester hours plus English proficiency.

* See pages 53-71 for the requirements and the approved list of courses.

ENGINEERING INTERDISCIPLINARY STUDIES—B.S.

Geological Engineering. This option incorporates the joint application of engineering and geological principles to the planning, analysis, and design of engineering projects directly related to the earth, its materials, structures, and forces. The goal of the program is to investigate the physical properties of the shallow portions of the earth's crust that influence the design and construction of engineering structures such as foundations, excavations, dams, highways, and sites for waste disposal. Additionally, the geological factors associated with land use planning and with the development of water, petroleum, and mineral deposits are encompassed within the program.

Refer to page 240, engineering core section. The following courses are required as a part of the engineering core (only ECE 333 Electronic Instrumentation may be deleted).

			Semester Hours
CEE	400	Microcomputer Applications in Civil Engineering	3
ECE	210	Engineering Mechanics I Statics	3
ECE	312	Engineering Mechanics II Dynamics	3
ECE	351	Engineering Materials	3
GLG	101	Introduction to Geology I (Physical)[1]	3

In addition, the following courses are required in the major:

			Semester Hours
CEE	351	Soil Mechanics	4
CEE	452	Foundations	3
CEE	552	Geological Engineering	3
CEE	556	Seepage and Earth Dams	3
GLG	103	Introduction to Geology I Laboratory	1
GLG	310	Structural Geology	3
GLG	321	Mineralogy	3
GLG	322	Mineralogy Laboratory	2
GLG	362	Geomorphology	3
GLG	424	Petrology Petrography	4
MAE	371	Fluid Mechanics	3
Engineering technical electives[2]			20
Total			52

[1] Basic science elective

[2] Must include two courses of engineering science and three courses of engineering design type content. An approved summer engineering geology field course is also highly recommended

School of Technology

Albert L. McHenry
Director
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PURPOSE

The primary purpose of the school is to provide students the opportunity to obtain a quality education in technology and to qualify them directly for positions of leadership and responsibility in industrial, commercial, educational, and government activity.

The technology programs provide the opportunity to earn a degree that stresses theory reinforced by laboratory application a more applied approach than engineering students experience. The technology programs assist in preparing for challenging career opportunities in industry and government for the forward looking student. The technology graduate in industry becomes a member of the total engineering effort, contributing an applications orientation to complement the engineer's more theoretical concepts. The student is educated to render practical decisions with safety and economy in mind, to install and operate technical systems, to develop or improve a product, to revise systems, and to provide customer support when needed.

DEGREES

Bachelor of Science degree programs and options within each major are offered in the three departments as shown on pages 225-226. Each curriculum includes some elective courses that are reserved for the student's use to add a unique emphasis or dimension. These credits are traditionally referred to as technical electives and are normally restricted to upper division courses in technology, engineering, and computer science. In each case, the choice of

technical electives must be approved by the student's faculty advisor and department chair. Requirements for each of the majors offered are described on the following pages.

In addition to the undergraduate degrees offered in the School of Technology, the Master of Technology degree (M.Tech.) is offered by each of the three departments in technology in accordance with the details given on page 228. See the *Graduate Catalog* for complete details.

ADMISSION

See pages 31–35, 48–49, 224–225, and 230 for information regarding requirements for admission, transfer, retention, disqualification, and reinstatement.

A preprofessional category is available for applicants deficient in regular admission requirements.

Entry into a program in one of the departments of technology as a freshman student requires three years of high school math (algebra I and II and geometry). High school chemistry and physics are recommended. Students without the required math background must take appropriate deficiency courses before entry or immediately upon enrollment at ASU. Associate degree transfer students are expected to have completed college algebra and trigonometry.

Students who begin their college education at institutions other than ASU with intent to transfer to ASU should consult the given major requirements and seek equivalent courses at the transfer institution. Any transfer courses from a community college are applied only as lower division credit.

The GPA requirement for admission of transfer students into the School of Technology is 2.25 for Arizona residents and 2.50 for nonresidents. The freshman and sophomore programs of study are designed to facilitate transfer of junior and community college students or associate degree graduates.

In addition, international students are required to have a TOEFL score of 500 for admission to a technology major.

DEGREE REQUIREMENTS

All baccalaureate degree programs in the School of Technology require completion of the university English proficiency requirement, a general studies component, and a technology core component. The engineering technology programs also require completion of an engineering technology core. All programs require a minimum of 132 semester hours.

The specific course requirements for the English proficiency, general studies, technology core, and the engineering technology core are listed below. Refer to the individual majors or options for their additional required courses.

			Semester Hours
English Proficiency			
ENG	101, 102	First Year Composition[1] or ENG 105 Advanced First-Year Composition (3)	6
General Studies			
Literacy and Critical Inquiry[2]			
One L1 course			3
ETC	400	Technical Communications[1]	3
Numeracy			
ECE	106	Introduction to Computer Aided Engineering[1]	3
MAT	170	Precalculus[1]	3
Humanities and Fine Arts and Social and Behavioral Sciences[2]			
(15 semester hours minimum. At least one course must be of upper division level, two courses must be from the same department, and two or more departments must be represented in total selection			
HU course(s)			6–9
SB course(s)			3–6
ECN	111	Macroeconomic Principles[1]	3
Natural Sciences			
PHY	111	General Physics[1]	3
PHY	112	General Physics[1]	3
PHY	113	General Physics Laboratory[1]	1
PHY	114	General Physics Laboratory[1]	1
Total general studies			35

NOTE: Six semester hours taken in two of the three awareness areas[2] are required in the final list of courses offered in the student's graduation program of study. These can be included in the HU and SB course selections. See the list of acceptable courses.

[1] Graduation requirement for the baccalaureate degree.

[2] See pages 53–71 for the requirements and the approved list.

Technology Core

The following courses constitute the Technology Core and are required in all baccalaureate degree programs in the School. These courses, with the exception of ECE 105, also satisfy part of the general studies component. Refer to the individual department descriptive material for specific departmental degree requirements.

			Semester Hours
ECE	105	Introduction to Languages of Engineering	3
ECE	106	Introduction to Computer Aided Engineering	3
ECN	111	Macroeconomics Principles	3
ETC	400	Technical Communications	3
PHY	111	General Physics	3
PHY	112	General Physics	3
PHY	113	General Physics Laboratory	1
PHY	114	General Physics Laboratory	1
Total			20

Engineering Technology Core

The following courses constitute the engineering technology core and are required in all baccalaureate degree programs in the engineering technologies

			Semester Hours
CHM	101	Introductory Chemistry or CHM 113 General Chemistry (4 or CHM 114 General Chemistry for Engineers (4	4
ETC	201	Applied Electrical Science	4
ETC	211	Applied Engineering Mechanics Statics	3
ETC	340	Applied Thermodynamics and Heat Transfer	3
MAT	260	Technical Calculus I	3
MAT	261	Technical Calculus II	3
Total			20

GRADUATION REQUIREMENTS

In order to qualify for graduation from the School of Technology, a student must have an overall GPA of at least 2.00 and a GPA of at least 2.00 for the required courses in the major field.

PROFESSIONAL ACCREDITATION AND AFFILIATIONS

The undergraduate programs in Aeronautical Engineering Technology, Electronics Engineering Technology, and Manufacturing Engineering Technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology.

SPECIAL PROGRAMS

ASU 2+2 Programs. The School of Technology maintains a cooperative agreement with most community colleges within Arizona and also with selected out-of-state colleges and universities to structure courses that are directly transferable into the technology programs at ASU.

ENGINEERING TECHNOLOGY CORE

ETC 201 Applied Electrical Science. (4) F, S, SS
Principles of electricity, passive elements, and d-c and a-c circuit analysis. Laboratory exploration of circuit concepts and techniques using instrumentation and the computer as a tool. Lecture, lab. Prerequisites: ECE 105; MAT 170.

211 Applied Engineering Mechanics: Statics. (3) F, S, SS
Vectors, forces and moments, force systems, equilibrium, analysis of basic structures and structural components, friction, centroids, and moments of inertia. Cross-listed as CON 221. Prerequisites: MAT 261 or equivalent; PHY 111, 113.

340 Applied Thermodynamics and Heat Transfer. (3) F, S
Thermodynamic systems and processes, first and second laws of thermodynamics, properties of pure substances, and applications to heat engines and special systems. Fundamentals of conduction, radiation, and convection. Prerequisites: MAT 261; PHY 112, 114.

400 Technical Communications. (3) F, S, SS
Planning and preparing technical publications and oral presentations based on directed library research related to current technical topics. Prerequisites: senior standing as a CEAS major; completion of first-year English requirements; L1 course. *General studies: L2.*

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Aeronautical Technology

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PROFESSOR
GESELL

ASSOCIATE PROFESSORS
MEITZ, REED

ASSISTANT PROFESSOR
STANFORD

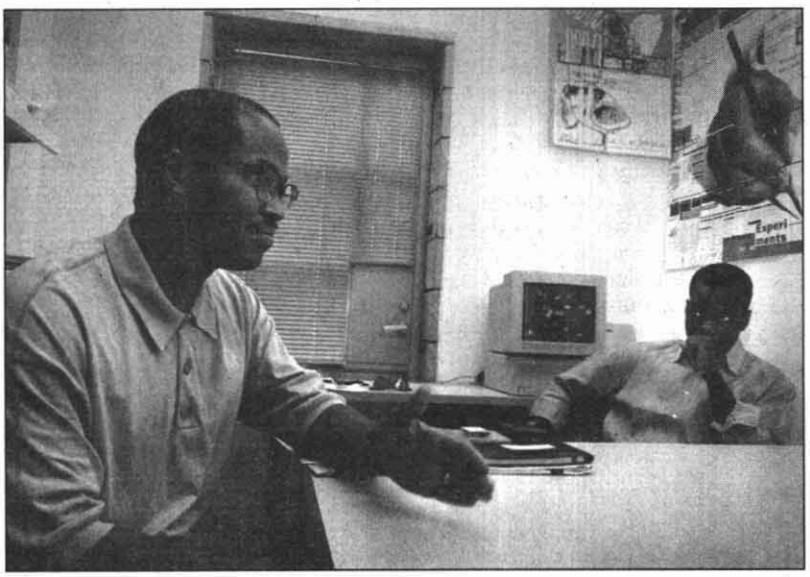
LECTURERS
ALJABARI, HOMAN, SCHLAFMAN

VISITING ASSISTANT PROFESSORS
KELLY, ROGERS

PROFESSORS EMERITI
CARLSEN, COX, MATTHEWS, PEARCE, ROPER, SALMIRS, SCHOEN, THOMASON

The Department of Aeronautical Technology offers two majors leading to a Bachelor of Science degree. The majors are Aeronautical Engineering Technology and Aeronautical Management Technology. The Aeronautical Management Technology major includes options in airway science aircraft systems management, airway science management, and *ab initio* airline pilot flight management.

Graduates are prepared for entry into the aerospace industry in productive, professional employment or, alternatively, for graduate study. The curricula emphasize the recognized principles underlying the application of technical knowledge as well as current technology, preparing the graduate to adapt to the rapid and continual changes in aerospace technology.



Admission

New and transfer students who have been admitted to the university, who meet the requirements for admission to the School of Technology, and who have selected Aeronautical Technology are admitted to Aeronautical Technology without separate application to the Department of Aeronautical Technology. Transfer credits are reviewed by department faculty advisors. To be admissible to department curricula, transfer courses must be equivalent in both content and level of offering.

Identified Lower-Division Courses

The 50 semester hours of *identified lower-division courses*, listed below, must be completed satisfactorily before any upper-division courses other than ENG 301 may be taken. Each of the *identified lower-division courses* must be completed with a grade of C or better.

Identified Lower-Division Courses

AET	182	Private Pilot Ground School	3
AET	280	Aeronautical Structures and Materials	4
AET	287	Aeronautical Powerplants	4
CHM	114	General Chemistry for Engineers	4
CSE	181	Applied Problem Solving With BASIC	3
		or CSE 183 Applied Problem Solving With FORTRAN (3)	
ECE	105	Introduction to Languages of Engineering	3
ECE	106	Introduction to Computer Aided Engineering	3
ECN	111	Macroeconomic Principles	3
ENG	101	First-Year Composition	3
ENG	102	First-Year Composition	3
MAT	170	Precalculus Algebra	3
MAT	260	Technical Calculus I	3
PGS	101	Introduction to Psychology	3
PHY	111	General Physics	3
PHY	112	General Physics	3
PHY	113	General Physics Laboratory	1
PHY	114	General Physics Laboratory	1
Total			50

AERONAUTICAL ENGINEERING TECHNOLOGY—B.S.

The Aeronautical Engineering Technology degree program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology. The curriculum is designed to prepare the graduate for professional level technical support of engineering activities throughout the aerospace field. Areas of responsibility include the application of applied engineering practice related to aircraft and aerospace vehicle design, internal combustion engines, combustion processes, turbomachinery, systems analysis, computer modeling, quality assurance and nondestructive testing, and wind tunnel applications.

Aeronautical Engineering Technology students are required to complete a minimum of 132 semester hours, including at least 50 semester hours of upper division courses. All degree requirements are shown on the student's Curriculum Check Sheet. These requirements include English proficiency, general studies, technology core, engineering technology core, and specific additional courses listed in the following section.

Degree Requirements

In addition to the required courses listed for English proficiency, general studies, technology core, and the engineering technology core (see page 223), the following additional courses are required: AET 182, 280, 287, 300, 310, 312, 320, 394, 409, 415, 417, 487, 494; CHM 114; CSE 183, EET 205; ENG 301; MAT 262; MET 230, 313, 432; STP 420; three elective hours.

Suggested Course Pattern for Freshmen

First Semester			Semester Hours
CHM	114	General Chemistry for Engineers	4
ECN	111	Macroeconomic Principles	3
ENG	101	First Year Composition	3
MAT	170	Precalculus Algebra	3
PHY	111	General Physics	3
PHY	113	General Physics Laboratory	1
Total			17
Second Semester			
AET	182	Private Pilot Ground School	3
ECE	105	Introduction to Languages of Engineering	3
ENG	102	First Year Composition	3
MAT	260	Technical Calculus I	3
PHY	112	General Physics	3
PHY	114	General Physics Laboratory	1
Total			16

AERONAUTICAL MANAGEMENT TECHNOLOGY—B.S.

The Aeronautical Management Technology curriculum is designed to provide a thorough technical background combined with an interdisciplinary general university education. The graduate is prepared to assume responsibilities in a wide area of managerial and technically related areas of aviation. The student gains a background in aircraft structures, reciprocating and turbine engines, performance, design, management skills, business principles, systems analysis, and a variety of course work specific to aircraft flight, airport operations, and air transportation systems. The degree offers three options: *ab initio* airline pilot flight management, airway science management, and airway science aircraft systems management. Airway science management and airway science aircraft systems management curricula have the approval of the Federal Aviation Administration as airway science programs and can lead to employment in that agency. The three options are described separately below.

Ab Initio Airline Pilot Flight Management Option

Flight training is certified by the Federal Aviation Administration.

Ab initio airline pilot flight management combines academic studies and flight training to prepare graduates for positions within the air transportation industry, primarily in the area of flight operations. Theoretical preparation and flight training are specifically intended to prepare the student for employment in the scheduled airline industry.

This curriculum concentrates on flying plus the technical, management, and computer-related applications necessary to operate in the high density environment of modern airspace. The program emphasizes critical thinking and cognitive, analytical, and communication skills. The career option leads to airline piloting and the development, administration, and enforcement of safety regulations including airworthiness and operational standards in civil aviation.

Ground schools and flight training in the *ab initio* airline pilot flight management option are tightly integrated and highly organized as a single, continuous training program. Each student begins actual flight training at the beginning of the flight training syllabus and complete each lesson block in sequence, throughout the training. Flight experience and certificates received before enrollment at ASU may or may not allow the individual student to progress more easily through the training, but in any case, is not used to replace training requirements in the ASU program.

While enrolled at ASU, students do not receive college credit for flight instruction received at flight schools other than schools under contract with the university for *ab initio* flight instruction.

Flight instruction costs are not included in university tuition. The estimated cost of ab initio flight training is $55,000 in addition to normal university costs.

Ab initio airline pilot flight management students are required to complete a minimum of 132 semester hours, including at least 50 semester hours of upper division courses. Students in the *ab initio* airline pilot flight management option must also successfully complete qualification screening examinations before beginning *ab initio* flight training. Qualification screening includes a first-class medical examination, psychological evaluation, and a psychomotor skills tests. Students who do not pass the qualification screening examinations but are otherwise qualified may continue in Aeronautical Engineering Technology or in Aeronautical Management Technology, in either the airway science management option or the airway science aircraft systems management option.

All degree requirements are shown on the student's curriculum check sheet. These requirements include English proficiency, general studies, the technology core, and specific additional courses listed in the following section.

Degree Requirements

In addition to the required courses listed for English proficiency, general studies, and the technology core (see page 223), the following additional courses are required: AET 182, 185, 186, 224, 285, 286, 287, 300, 308, 342, 362, 363, 364, 365, 394, 410, 487, 494, CHM 114; COM 225 or ENG 301; CSE 181 or 183 or 201; ETC 201, 211; HIS 414; IST 346, 452; MAT 260, 261; MET 230 or CET 250; PGS 101; STP 420; three elective hours.

Suggested Course Pattern for Freshmen

First Semester			Semester Hours
CHM	114	General Chemistry for Engineers	4
ECN	111	Macroeconomic Principles	3
ENG	101	First Year Composition	3
MAT	170	Precalculus Algebra	3
PHY	111	General Physics	3
PHY	113	General Physics Laboratory	1
Total			17

Second Semester			
AET	182	Private Pilot Ground School	3
ECE	105	Introduction to Languages of Engineering	3
ENG	102	First Year Composition	3
MAT	260	Technical Calculus I	3
PHY	112	General Physics	3
PHY	114	General Physics Laboratory	1
Total			16

Ab initio airline pilot flight training is available through the College of Extended Education for individuals who have completed a degree not necessarily associated with an aviation career. Individuals desiring to participate in this training must successfully complete qualification screening examinations before beginning *ab initio* flight training. Depending on individual background, it may be necessary to make up academic deficiencies before beginning the theoretical preparation courses and flight courses that make up *ab initio* airline pilot flight training. Completion of training through this method results in the award of a certificate of completion. No degree is awarded.

Airway Science Aircraft Systems Management Option

Flight training is certified by the Federal Aviation Administration.

Airway science aircraft systems management combines academic studies and flight training to prepare graduates for a wide variety of positions within the air transportation industry, primarily within the area of general aviation flight operations. Ground school and flight training are available, allowing the student to obtain private pilot, commercial pilot, and flight instructor certificates and also the instrument pilot, instrument instructor, and multiengine pilot ratings.

This curriculum concentrates on flying plus the technical, management, and computer related applications necessary to operate in the high density environment of modern airspace. This career leads to the development, administration, and enforcement of safety regulations, including airworthiness and operational standards in civil aviation. The program emphasizes critical thinking, and cognitive, analytical, and communication skills. The airway science aircraft systems management option is approved by the Federal Aviation Administration as an Airway Science Program.

While enrolled at ASU, students do not receive college credit for flight activity or instruction received at flight schools other than schools with which the university has currently contracted for such instruction. Consideration is given for flight experience received before enrollment at the university. *Flight instruction costs are not included in university tuition. The estimated cost of flight training is $30,000 in addition to normal university costs.*

Airway science flight systems management students are required to complete a minimum of 132 semester hours, including at least 50 semester hours of upper division courses. All degree requirements are shown on the student's Curriculum Check Sheet. These requirements include English proficiency, general studies, the technology core, and specific additional courses listed in the following section.

Degree Requirements

In addition to the required courses listed for English proficiency, general studies, and the technology core (see page 223), the following additional courses are required: AET 182, 183, 220, 222, 280, 287, 300, 308, 314, 342, 344, 382, 383, 385, 386, 387, 389, 391, 392, 393, 395, 408, 410, 489; CHM 114; COM 225 or ENG 301; CSE 181 or 183 or 201; ECE 105; ETC 211; HIS 414; IST 346, 452; MAT 260, 261; MET 230 or CET 250; PGS 101; STP 420, three elective hours.

Suggested Course Pattern for Freshmen

First Semester			Semester Hour
CHM	114	General Chemistry for Engineers	4
ECN	111	Macroeconomic Principles	3
ENG	101	First Year Composition	3
MAT	170	Precalculus Algebra	3
PHY	111	General Physics	3
PHY	113	General Physics Laboratory	1
Total			17

Second Semester			
AET	182	Private Pilot Ground School	3
ECE	105	Introduction to Languages of Engineering	3
ENG	102	First Year Composition	3
MAT	260	Technical Calculus I	3
PHY	112	General Physics	3
PHY	114	General Physics Laboratory	1
Total			16

Airway Science Management Option

The airway science management option is designed to prepare graduates for managerial and supervisory positions throughout the air transportation industry. A depth of technical training is included along with a broad exposure to business and management courses. This program of study, interdisciplinary in nature, prepares the aeronautical career oriented student for such positions as air traffic control specialist, air carrier manager, airport manager, and general aviation operations manager.

Airway science management students are required to complete a minimum of 132 semester hours, including at least 50 semester hours of upper division courses. All degree requirements are shown on the student's Curriculum Check Sheet. These requirements include English proficiency, general studies, the technology core, and specific additional courses listed in the following section.

Degree Requirements

In addition to the required courses listed for English proficiency, general studies, and the technology core (see page 223), the following additional courses are required. ACC 230; AET 182, 201, 280, 287, 308, 342, 344, 408, 410, 489; CHM 114; COM 225; CSE 181 or 183 or 201; ECN 112; ETC 201; HIS 414; IEE 431; IST 346 or MGT 301, 452 or MGT 311, 480 or MGT 352, 491 or MGT 423, 498 or LES 305; MAT 260; MET 230 or CET 250; PGS 101; SOC 301; STP 420; nine elective hours

Suggested Course Pattern for Freshmen

First Semester			Semester Hours
CHM	114	General Chemistry for Engineers	4
ECN	111	Macroeconomic Principles	3
ENG	101	First-Year Composition	3
MAT	170	Precalculus Algebra	3
PHY	111	General Physics	3
PHY	113	General Physics Laboratory	1
Total			17

Second Semester

AET	82	Private Pilot Ground School	3
ECE	105	Introduction to Languages of Engineering	3
ENG	102	First Year Composition	3
MAT	260	Technical Calculus I	3
PHY	112	General Physics	3
PHY	114	General Physics Laboratory	1
Total			16

STUDENT ORGANIZATIONS

The department hosts the local chapter of Alpha Eta Rho, the international professional aviation fraternity. Students also are eligible for membership in Tau Alpha Pi, the national honor society for engineering technology, American Association for Airport Executives (AAAE), and the Precision Flight Team, which competes in regional and national flying safety competitions. Department faculty also sponsor the ASU Radio Control Modelers, a student organization.

AERONAUTICAL TECHNOLOGY

Flight instruction costs are not included in university tuition.

AET 100 Primary Flight Course. (0) F, S, SS
Allows student to accrue flight time in preparation for the Private Pilot Certificate. Flight participation is required. Course may be repeated. Prereq or coreq: AET 182 or equivalent.

182 Private Pilot Ground School. (3) F, S, SS
Ground school leading to FAA Private Pilot Certificate. Student may begin flight training when concurrently enrolled in AET 100. Aerodynamics, navigation, performance, and regulations.

183 Private Pilot Certificate. (1) F, S, SS
Flight training for the FAA private pilot certificate. Satisfactory completion of FAA tests is required. Prereq: tes: AET 182; passed FAA written.

200 Interim Flight Course. 0 F, S, SS
Allows students to accrue flight time in preparation for advanced ratings and certificates. Flight participation is required. Course may be repeated. Prereq: site: Private Pilot Certificate or instructor approval.

201 Air Traffic Control. 3) S
Ground and air operations. Weather services, communications and routing. Flight plans and IFR operations. Departures and arrivals. Airport conditions and emergencies. Prereq: site: AET 182

220 Aviation Meteorology. (3) F, S
Evaluation, analysis and interpretation of atmospheric phenomena. Low and high altitude weather from the pilot's viewpoint. Nephology. Prereq: site: AET 182

222 Instrument Pilot Ground School. 3) F
Ground school leading to the FAA Instrument Pilot Rating. 10 hours ground trainer included. Prereq: site: Private Pilot Certificate. Prior or coreq: site: AET 220.

280 Aerospace Structures, Materials, and Systems. (4) F
Basic aerodynamics, aerospace vehicle structures, materials and systems. Inspection requirements and methods. Lecture, lab. Prereq: sites: PHY 111, 113

283 Instrument Pilot Rating. (1) F, S, SS
Flight training for the FAA Instrument Pilot Rating. Satisfactory completion of FAA Instrument Rating required. Not for Aeronautical Technology majors. Prerequisites: AET 222, passed FAA written

287 Aircraft Powerplants. (4) F, S
Theory and performance analysis of gas turbine and reciprocating aircraft engines. Engine accessories, systems, and environmental control. Lecture, lab. Prereq: sites: CHM 113 or 114; PHY 112, 114. Pre- or coreq: site: MAT 260

300 Aircraft Design I (3) F, S
Basic applied aerodynamics, propeller performance, and airplane performance analysis. Prereq: sites: AET 280, 287; ECE 106, MAT 260; PHY 112, 114

308 Air Transportation. (3) F
Study of the historical and international development of air transportation and its social, political and economic impact upon global interrelationships. Prerequisite: junior standing. *General studies G*

310 Instrumentation. 3) F
Measurement systems, components, system response and the characteristics of experimental data. Methods of collecting and analyzing data. Lecture, lab. Prerequisites: ETC 201, MAT 261. Pre- or coreq: site: MET 313

312 Applied Engineering Mechanics: Dynamics. (3) F, S
Masses, motion, kinematics; dynamics of machinery. Prerequisites: ETC 211; MAT 261.

314 Commercial Pilot Ground School. (3) S
Ground school leading to Commercial Pilot certification. 10 hours ground trainer included. Prereq: site: Private Pilot Certificate. Pre- or coreq: site: AET 222.

320 Applied Aerodynamics and Wind Tunnel Testing. (4) S
Introduction to viscous and inviscid flow and their relationship to aircraft lift and drag. Wind tunnel design and testing. Lecture, lab. Prerequisites: AET 300, ECE 106, MAT 262

342 Aviation Law/Regulations. (3) F
Study which encompasses the field of aviation within the context of the U.S. Common Law system. Public law, administrative rule making, sovereignty, enforcement, and case law analysis. Prereq: site: junior standing

344 Airport Management and Planning. (3) S
Career orientation into administration and management of modern public airports, to include an overview of planning, funding, and development of airport facilities. Prereq: site: AET 308 or instructor approval

360 Introduction to Helicopter Technology. 3) N
Introduction to the working functions of modern rotary wing aircraft. Rotary wing flight theory, aerodynamics, controls, flight and power requirements. Prereq: sites. PHY 111, 113 junior standing

382 Air Navigation. (3 F
Advanced DR, including theory, application of modern navigation systems, pressure pattern, and grid navigation. Prereq: site: AET 222

383 Commercial Pilot Certificate and Instrument Rating. (2 F, S, SS
Flight training for the FAA Commercial Pilot Certificate with Airplane Single Engine Land and Instrument Airplane Ratings. Satisfactory completion of FAA Certificate Rating required. Prerequisites: AET 222, 314, passed FAA written, flying time, 150 hours minimum

385 Flight Instructor Ground School. (3) F
Ground school in preparation for the FAA Flight Instructor Certificate. Pre- or coreq: site: AET 383

386 Flight Instructor Certificate. (1) F, S, SS
Flight training for FAA Flight Instructor Certificate. Certificate required for course completion. Prereq: sites: AET 385; passed FAA written

387 Multi-Engine Ground School. (1) F
Ground school preparation for the FAA Multi Engine Rating. Pre- or coreq: site: AET 383 or instructor approval

389 Multi-Engine Rating. (1 F, S, SS
Flight training for addition of an unrestricted FAA Multi Engine Rating to a commercial pilot certificate. FAA rating required for course completion. Coreq: site: AET 387

391 Multi-Engine Instructor Ground School. 2 F, S
Ground school preparation for the FAA Multi-Engine Flight Instructor Rating. Prerequisites: AET 386, 387, 389

392 Flight Instructor Instrument Ground School. (2) S
Ground school preparation for the FAA Instrument Flight Instructor Rating. Prereq: site: AET 386 or instructor approval

393 Flight Instructor Instrument Rating. (1) F, S, SS
Flight training for the FAA CFI. CFI Rating required for course completion. Prerequisites: AET 386, 392, passed FAA written

395 Multi-Engine Land, Airplane Flight Instructor Rating. (1 F, S, SS
Normal and emergency flight operations. Instruction techniques and procedures associated with flight multi engine land, airplane. CFI AME Rating required for course completion. Prereq: sites: AET 386, 389

408 National Airspace System. (2 F
Airway facilities. Operations and communications. Air route traffic control centers and flight service stations. Navigation aids, airport environment, certification, and security. Prerequisites: AET 201 or 222, 344

409 Nondestructive Testing and Quality Assurance. (3) F, S
Purpose of inspection and quality assurance. Theory and application of nondestructive inspection methods. Application of pertinent standards, specifications, and codes. Lecture, lab. Prereq: site: AET 280 or MET 230. Pre- or coreq: site: ETC 400

410 Aviation Safety. (3 F
Aviation accident prevention, human factors, life support, fire prevention, accident investigation and crash survivability. Development and analysis of aviation safety programs. Prerequisite: junior standing. Completion of 1 semester of literacy and critical inquiry (L1 requirement

415 Gasdynamics and Propulsion. (3) F
Introduct on to compress b e f ow, 'nternal and externa f ow and aerothermodynamic analy- s s of propu s on systems Prerequ s te ETC 340; MAT 262

417 Aerospace Structures. (3) F
Analys s and des gn of a rcraft and aerospace structures Shear flow Semimonocoque structures. Effects of dynam c oad'ng. Prerequi- s'tes: AET 300 312 320; MAT 262 MET 313.

487 Aircraft Design II. (3) S
Bas c aerodynamics and a rplane performance analys s methods app ed to practica des gn project Prerequ site: AET 300

489 Airline Administration. (2) S
Admin strat ve organ zat ons economics of airl ne adm n strat on, operat onal structure, and re at onsh p with federal government agenc es Prerequ s te. AET 308 or nstructor approva

490 Advanced Applied Aerodynamics. (3) S
Study of fluid motion and aerodynam cs Es sent als of incompress'b e aerodynam cs and computationa fluid dynamics. E ements of am nar and turbu ent f ows. Lecture ab Prerequ s tes: AET 312 ECE 106; MAT 262

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Electronics and Computer Technology

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PROFESSORS
MA SEL, McHENRY, MUNUKUTLA

ASSOCIATE PROFESSORS
FORDEMWALT McBRIEN, NOWLIN, WOOD

ASSISTANT PROFESSORS
MACIA, PETERSON, ZENG

VISITING ASSISTANT PROFESSOR
SADDLER

PROFESSORS EMERITI
BAXTER, EDWARDS, STRAWN

Purpose. Electronics engineering tech nology is a technological field of specialization that requires the application of scientific and engineering knowl edge and methods combined with tech nical skills in support of electrical/elec tronics engineering activities. It lies in the occupational spectrum between the craftsman and the engineer at the end of the spectrum closest to the engineer. The electronics engineering technolo gist is a member of the electrical engi neering team that consists of electrical engineers, electronics engineering tech nologists, and electronics engineering technicians.

The electronics engineering tech nologist is applications oriented, build ing upon a background of applied mathematics including the concepts and applications of calculus. Utilizing ap plied science and state of the art tech nology, the electronics technologist is able to produce practical, workable, and safe results quickly and economi cally, to install and operate technical systems, to configure hardware for unique applications from proven con cepts, to develop and produce products, to service machines and systems, to manage construction and production processes, and to provide customer sup port to technical products and systems.

Degrees. The Department of Electron ics and Computer Technology offers the Bachelor of Science degree in Elec tronics Engineering Technology (B.S./ EET). Four options are available: com puter systems, electronic systems, mi croelectronics, and telecommunica tions.

The *computer systems* option com bines applied electronics and computer hardware software concepts and appli cations It has been formulated to meet the needs of persons who wish to en gage in digital and computer systems applications as a career focus.

The *electronic systems* option is aimed at preparing persons for careers in instrumentation, control, and power systems applications. This option al lows a student to develop a broad based knowledge of electrical/electronic fundamentals with an applications perspec tive. Sixteen of the 26 specialization hours are specified and the remaining 10 hours are approved technical elec tives. The Department of Electronics and Computer Technology has had a concentration in electronic systems or instrumentation and systems control for many years. The course patterns in support of these emphasis areas have been well developed and continue to provide strong support for the elec tronic systems option under the B.S./ EET program.

The *microelectronics* (UET) option combines applied electronics, mono lithic and hybrid integrated circuit pro cessing and applications, device and component fabrication, and manufac turing. The objective of this option is to prepare persons to assume positions in the area of microelectronics manu facturing with immediately applicable knowledge as well as to develop a strong foundation of electronic funda mentals and methods. Students should be interested in the design, fabrication, and manufacture of imprinted circuitry, monolithic integrated circuits (bipolar and MOS), and hybrid thick film and thin film circuitry, components, and systems. Graduates of this program have various career opportunities in industry, particularly in semiconductor processing, fabrication, manufacturing, and device product application areas. The continuing explosion in semicon ductor and related technologies and their applications to electronic and computer related products offers unique and challenging opportunities. Graduates of this program option se cure positions in processing, manufac turing, operations, and applications ar eas in industry as members of the di verse scientific engineering team.

The *telecommunications* option has been structured to take advantage of the recent changes in the telecommunica tions industry. The program encom passes the fundamentals of information and signal processing, modern band- width efficient digital radio analysis with RF and microwave circuits and systems. Applications include tele- phone pulse code modulation, cable TV, fiber optic links, and satellite trans mission circuits and systems.

A Master of Technology degree pro gram with a concentration in electron- ics engineering technology is available for qualified B.S. graduates. The un dergraduate program options are sup ported as emphasis areas in the master's degree program. See the *Graduate Catalog* for more informa tion.

ELECTRONICS ENGINEERING TECHNOLOGY—B.S.

The departmental curriculum is orga- nized into two categories, technical studies and general studies Technical studies consist of core areas and the op tion specialty area. General studies consist of courses selected to meet the

university general studies requirement as well as the math/science requirement of TAC/ABET. A minimum of 50 upper division hours is required, including at least 24 semester hours of EET, CET, or UET upper division hours to be taken at ASU. Complete program of study guides with typical four year patterns are available from the department for each option.

The technical studies curriculum component consists of 91 semester hours of course work, which includes the engineering technology core (20 hours), electronics engineering technology core (45 hours), and an option (26 hours). The general studies portion of the B.S./EET curriculum has been carefully structured to meet the specific requirements of the university and to include the content required by TAC/ABET, the professional accrediting agency for such curricula.

DEGREE REQUIREMENTS

In addition to the courses listed for English proficiency, general studies, and the technology core, the following courses are required:

			Semester Hours
LI elective			
COM	225	Public Speaking	3
SB elective:			
ECN	112	Microeconomic Principles	3

Engineering Technology Core

The following courses are required as part of the engineering technology core:

			Semester Hours
CHM	113	General Chemistry	4
ETC	201	Applied Electrical Science	4
ETC	211	Applied Engineering Mechanics· Statics	3
ETC	340	Applied Thermodynamics and Heat Transfer	3
MAT	260	Technical Calculus I	3
MAT	261	Technical Calculus II	3
Total			20

Electronics Engineering Technology Core Requirements

			Semester Hours
CET	150	Digital Systems and Microprocessors	3
CET	350	Digital Logic Principles	4
CET	354	Microcomputer Principles	4
CET	483	Unix Utilities Using C Language	3
EET	205	Electronic Devices and Circuits	4
EET	208	Electric Circuits	3
EET	301	Electric Networks	3
EET	310	Electronic Circuits	4
EET	372	Communication Systems	4
EET	396	Professional Orientation*	1
MAT	262	Technical Calculus III	3
UET	331	Semiconductor Materials Science/Devices	3
UET	415	Electronic Manufacturing Engineering Principles	3
Total			42

* Students must take EET 396 the semester in which they are enrolled in the 87th hour of credit (ASU plus transfer hours). If this occurs in summer session, students should take EET 396 the prior spring semester

Electronics Engineering Technology Options

Computer Systems. CET 452, 456, 457, 473; 11 hours of *approved* technical electives.

Electronic Systems. EET 307, 406, 430, 460, 10 hours of *approved* technical electives.

Microelectronics. CHM 116; UET 416, 417, 418, 432; 10 hours of *approved* technical electives.

Telecommunications Systems. CET 473; EET 304, 401, 470; 11 hours of *approved* technical electives

Electronics Engineering Technology Program of Study

Typical First- and Second-Year Sequence

Freshman Year

First Semester			Semester Hours
CET	150	Digital Systems and Microprocessors	3
ENG	101	First Year Composition	3
MAT	170	Precalculus	3
PHY	111	General Physics	3
PHY	113	General Physics Lab	1
HU or SB elective			3
Total			16

Second Semester			
ECE	105	Introduction to Languages of Engineering	3
ENG	102	First Year Composition	3
ETC	201	Applied Electrical Science	4
MAT	260	Technical Calculus I	3
PHY	112	General Physics	3
PHY	114	General Physics Laboratory	1
Total			17

Sophomore Year

First Semester			
CHM	113	General Chemistry	4
ECE	106	Introduction to Computer Aided Engineering	3
EET	208	Electric Circuits	3
EET	205	Electronic Devices and Circuits	4
MAT	261	Technical Calculus II	3
Total			17

Second Semester			
COM	225	Public Speaking	3
EET	372	Communication Systems	4
ETC	211	Applied Engineering Mechanics· Statics	3
HU or SB elective			3
MAT	262	Technical Calculus III	3
Total			16

STUDENT ORGANIZATIONS

The department hosts one of the local chapters of the Institute of Electrical and Electronics Engineers (IEEE), the International Society for Hybrid Microelectronics (ISHM), and the Instrument Society of America (ISA). Students may also be elected to membership in Tau Alpha Pi, the national honor society for engineering technology.

ELECTRONICS ENGINEERING TECHNOLOGY

EET 205 Electronic Devices and Circuits. (4) F S
Active device characteristics, models and basic circuit analysis. Lecture, ab Prerequisite: ETC 201

208 Electric Circuits. (3) F S
Graphical and analytical analysis of electric circuits transient, and sinusoidal exc tation. Applications of circuit theorems and computer solutions Prerequisite. ETC 201, MAT 261.

301 Electric Networks. (3) F S
Analysis of electric networks, transients, steady state sinusoidal frequency response and transfer function using Laplace transforms and Fourier Series. Prerequisite EET 208. Pre- or corequisite MAT 262

304 Transmission Lines and Waveguides. (4) S
Theory and application of transmission lines waveguides, antennas, microwave components, and impedance matching techniques. Lecture, ab. Prerequisite EET 301.

307 Electrical Power Systems. (4) F
Electrical power systems analysis generation, transmission distribution and utilization including system protection Lecture, ab Prerequisite: EET 208

310 Electronic Circuits. (4) F S
Multi-stage amplifier, analysis and design using models and computer simulation Lecture, lab Prerequisites EET 205, 208.

372 Communication Systems. (4) F S
Systems ana ys s and des gn of AM FM PCM, and SSB commun cation systems. No se and distort on performance of communi cat on systems Lecture, ab Pre- and corequ sites EET 301, 310

396 Professional Orientation. (1) F, S
Techn ca profess ona economic and eth ca aspects of e ectron cs/computer eng neering techno ogy practice and ndustna organiza tion Lecture, projects Prerequ s te jun or stand'ng

401 Digital Filters and Applications. 3) S
Ana ysis and des gn of d g ta fi ters T me fre quency and Z transform techn ques and waveform ana ys s. Computer app cations Prerequ sites EET 301; MAT 262

406 Control System Technology. 4 S
Contro system components, analys s of feed- back contro systems, stabi ty performance, and appl cat on Lecture, ab computer simu lat ons Prerequ s tes EET 301 MAT 262.

410 Linear Filters and Applications. (3) A
Frequency response and feedback des gn of mu t stage electron c c rcu ts Active and pas sive f lter des gn Computer ana ys s. Prereq uis tes· EET 301 310

420 Operational Amplifier Theory and Application. (4) A
D fferent al and operat ona amp ifiers feed back conf gurat ons op-amp errors and com pensat on and near and non near app ica t ons Lecture lab Prerequ s tes EET 301, 310

422 Electronic Switching Circuits. (4) A
Ana ysis and des gn of e ectron c c rcuits oper ating n a sw tch ng mode Waveshap ng t m ng and og c Computer s mu ation. Lecture ab Prerequ s tes CET 350, EET 301 310

430 Instrumentation Systems. (4) F
Measurement pr nc p es and nstrumentat on, techn ques S gna and error ana ys s. Lecture lab Prerequ sites EET 301, 310.

440 Electrical Power Systems Technology. (4) S
Pnnc p es and ana ys s of rotat ng mach nes, transformers and re ated contro equ pment Lecture lab Prerequ s te EET 307.

460 Power Electronics. (4 S
Analys s of c rcu ts for contro and conversion of e ectr ca power and energy. Lecture lab Prerequ s tes EET 301 307, 310.

470 Communication Circuits. (4 S
Analys s and des gn of pass ve and act ve communicat on c rcu ts Coup ng networks, f - ters and mpedance match ng Modu at on and demodu at on techniques. Computer so u tions Lecture, ab Prerequ sites EET 372, MAT 262.

478 Digital Communication Systems. (3) S
Theory, des gn, and app cat on of d g ta , data and f ber opt cs communicat on systems Prerequ s tes EET 304 372 MAT 262.

482 Industrial Practice: Internship/Coop. (1–4) F S SS
Spec a y ass gned or approved activ ties in e ectron c ndustnes or nstitutions Report re qu red Max mum of 10 credits Prerequ s te majors on y enro ed at junior sen or evel

490 Electronics Project. (1–4) F S SS
nd vidual or sma group projects n app ed e ectron cs w th emphas s on laboratory prac t ce or hardware so ut ons to pract ca prob ems. Prerequ site: nstructor approva

501 Digital Signal Processing and Applications I. (3) F
App cat ons of d screte t me s gna s and sys tems, des gn of I R and FIR f ters us ng com puter a ded des gn techniques Prerequ s tes EET 401 or instructor approva · MAT 262.

502 Digital Signal Processing and Applications II. (3) S
Appl cat on of FFT fundamenta s of probab'l ty theory and random processes and quant - zat on effects n d gita f lters Prerequ site EET 501

506 System Dynamics and Control. (3) S
T me frequency and transform doma n ana y- s s of phys ca systems Transfer function ana ys s of feedback control systems perfor mance and stab' ty. Compensation Prerequi s tes EET 301, 501 (or MAT 262)

510 Linear Integrated Circuits and Applications. (3) F
Ana ys s, des gn, and app cat'ons of near 'n- tegrated c rcu ts and systems. Prerequ s tes. CET 350 EET 301, 310.

522 Digital Integrated Circuits and Applications. (3) S
Analys s, des gn and app ications of nte- grated c rcu ts and systems Prerequ s tes CET 350 EET 301, 310

530 Electronic Test Systems and Applications. (3) F
Analysis design and app icat on of electron'c test equ pment test systems, spec fications and documentation Prerequ s tes CET 354 EET 301, 310

540 Electrical Power Systems. (3) S
E ectr ca power system ana ys s transm s s on, d stribut on, instrumentation, protect on and related system components Prerequ s tes EET 301 307.

560 Industrial Electronics and Applications. (3) A
Ana ys s, des gn, and app cation of spec al electron c dev ces and systems to ndustrial contro power commun cat ons and pro- cesses Prerequ s tes CET 350 EET 301, 307 310

574 Microwave Amplifier-Circuits Design. (3 F
Ana ys s and des gn of m crowave amp ifier- c'rcu ts us ng s-parameter theory and com- puter aided des gn Prerequisites EET 304, 470

576 Modern Telecommunication Systems. (3) F
App ed des gn and integration of microwave and sate te commun cat on systems Prereq u s tes CET 473 and MAT 262 *or* instructor approval

578 Digital Filter Hardware Design. (3) S
Hardware des gn of FIR and IR f lters, includ ng adapt ve fi ters based on DSP chips De- velop new app cat ons using DSP m cropro- cessor systems Prerequ s tes: EET 401, CET 354

Omnibus Courses: See page 44 for omnibus courses that may be offered

COMPUTER ENGINEERING TECHNOLOGY

CET 150 Digital Systems and Microprocessors. (3) F S
Fundamenta s of digita systems and m cro- processors with Boo ean A gebra and comb nat onal og c. M croprocessor programm ng and app cations. Lecture lab Prerequ s te. freshman stand ng *General stud es· N3*

350 Digital Logic Principles. (4) F, S
Comb nat onal and sequent a og c analys s, des gn concepts and app cations Lecture ab Prerequ s te CET 250

354 Microprocessor Principles. (4) F, S
Microprocessor organ zat on, programm ng, and nterfac ng Pre or coreqU s te CET 250

452 Digital Logic Applications. (4) S
Des gn of sequent a mach nes using system des gn techn ques and complex MSI/LSI de- v ces w th ab Prerequ sites: CET 350; CSE 183

456 Assembly Language Applications. (3) F
Programm ng B OS, DOS, and h gh eve lan guage nterfaces. Device drivers and TRS rou t nes Prerequ s tes· CET 354; CSE 183 or 100.

457 Microcomputer Systems Interfacing. 4) S
App cat ons of m crocomputer hardware and software Spec'al purpose control ers, nter face design Lecture, ab Prerequisites CET 354 CSE 183; EET 310

458 Digital Computer Networks. (3) A
Network techno ogy topo og es, protoco s contro techniques re ab ity and security Prerequ site CET 354.

473 Digital/Data Communications. (4) F, S
S gna s, d stort on no se and error detect on/ correction Transm ss on and systems design nterface techn ques and standards Lecture, ab Prerequ s tes CET 354, EET 372

483 Unix Utilities Using C Language. (3) S
App cat ons of C anguage to the deve op ment of pract ca programs for the Un x oper- at ng system Prerequisite: sen or standing n techno ogy or equ va ent

485 Digital Testing Techniques. (3) A
Hardware software aspects of dig ta test ng techno ogy systems, board, and logic test ng and equ pment Lecture, lab Prerequ s tes CET 354 CSE 183· EET 310

486 Electronics Computer Aided Design. (3) F
CAD CAM for e ectron cs manufacturing Printed-circu t ayout, documentat on and schemat c plotting Prerequ s tes CET 250· CSE 183 EET 310

508 Computer Process Control Technology. (3) A
Samp e data control techn ques and app ications to process control Prerequ s tes CET 354 EET 406

552 Digital Systems Design. (3) S
Dig ta system des gn techn ques and app ca t ons Prerequ site: CET 452 or nstructor approva

556 Computer Software Technology. (3) S
Assemb y anguage programm'ng techn ques and operations operat ng system characteris- t cs, and systems software app cat ons. Pre requ s te CET 354

557 Microcomputers and Applications. (3) F
Appl cat ons of sma computer systems mini and m croçomputer hardware and software Prerequ sites CET 354 CSE 100 or 183 EET 310

Omnibus Courses: See page 44 for omn bus courses that may be offered

MICROELECTRONICS ENGINEERING TECHNOLOGY

UET 331 Electronic Materials. (3) F S
Phys ca , chemical, e ectromagnet c, and mechan ca propert es of e ectron c materials Sol d state device character st cs and the r materia propert es. Prerequ s tes CHM 113; EET 205 PHY 112, 114

415 Electronic Manufacturing Engineering Principles. 3) F, S
E ectronic equ pment des gn and fabrication pr nc p es and pract ce. Complet on of e ectron cs hardware des gn pro ect and report Lecture, ab. W th ab fee Prerequ's te: EET sen or stand ng (113 hours).

416 Monolithic Integrated Circuit Devices. (3) F
Phys cs and e ectron cs of b polar and MOS dev ces used in ntegrated c rcu ts Prerequisite: UET 331 Corequ s te: UET 417

417 Monolithic Integrated Circuit Laboratory. (2) F
Laboratory pract ce n the fabrication of nte- grated c rcu ts. Lab Prerequisite: UET 331 Corequ s te UET 416

418 Hybrid Integrated Circuit Technology. (4) S
Layout fabr cat on des'gn and manufacture of th n and th ck fi m hybrid c rcu ts. Lecture ab Prerequ s tes EET 310 UET 331.

432 Semiconductor Packaging and Heat Transfer. (3) S
Packag ng theory and techn ques hermetic and p astic assemb y therma management, electr ca character st cs and re ab l ty Prerequis tes ETC 340 and UET 331 *or* equ va- ents

437 Integrated Circuit Testing. (3) S
Princ ples techn ques and strategies em- p oyed at wafer leve and f na product testing both destructive and nondestruct ve Prerequi s te UET 416

513 Microelectronics Technology. (3) A
Spec al processes, techn ques, and advances n mono ith c and hybrid techno ogy. Emphas s on manufacturing pract ce and product app cat on for LS and VLS Sem nar Prerequisite· UET 416

516 IC Processing Technology and Integration. (3) F
Mono 'th c C process integration and fabrica t on technology. Lecture, lab Prerequis te UET 416

518 Hybrid IC Technology and Applications. (3) S
Theory process ng, fabrication and manufacturing of hybrid m croe ectronics dev ces and products App cat ons Prerequ s te UET 331 or equ va ent or nstructor approva

Omnibus Courses: See page 44 for omn bus courses that may be offered

Manufacturing and Industrial Technology

Donald W. Collins
Chair
(TC 201F) 602/965–3781

PROFESSORS
COLLINS, HILD, HOROWITZ, SCH LDGEN

ASSOCIATE PROFESSORS
DAHL, HIRATA KELLEY, MATSON, PALMGREN, PELTIER, SCHMIDT

ASSISTANT PROFESSORS
BARCH LON HUMBLE

VISITING ASSISTANT PROFESSOR
B EKERT

PROFESSORS EMERITI
AUTORE, BROWN, BURDETTE, BURK, CAVALLIERE, KEITH, KIGIN K S ELEWSKI LAWLER, MINTER, PARDINI, PRUST ROE, ROOK, SHELLER, STADMILLER WATK NS, WILCOX

Purpose. Technology is the applica tion of science, systematic methods, techniques, procedures, machines, ma terials, and devices for the develop ment, improvement, and implementa- tion of state of the art solutions to in- dustrial problems. Increased complexity and sophistication have cre ated great demand for those individuals who possess a working knowledge of the technical phases of planning, test ing, production, and fabrication of con- sumer and industrial products and equipment. Emphasis is placed on health and safety within the workplace.

The mission of the department is to prepare graduates who are able to de velop and communicate technological solutions to industrial problems, to per- form management functions in systems operations, to improve and evaluate products, to provide customer support, and to facilitate technology transfer in industry and government.

Majors and Emphases. To accom plish the mission, the department offers two majors leading to the Bachelor of Science degree, Industrial Technology and Manufacturing Engineering Tech- nology. Three emphasis areas are available under the Industrial Technol- ogy major, which is accredited by the North Central Association of Colleges and Secondary Schools (NCACSS): graphic communications, industrial management, and interactive computer graphics. Five emphasis areas are available under the Manufacturing En gineering Technology (MET) major, which is accredited by the Technology Accreditation Commission of the Ac creditation Board for Engineering and Technology: computer integrated manufacturing engineering technology, manufacturing engineering technology, mechanical engineering technology, ro botic and automation engineering tech nology, and welding engineering tech nology.

The department fosters research in disciplines of technology to support its educational programs, offers courses in support of the general education re quirements of the university, and offers Master of Technology degree pro- grams.

Admission. Those students who seek admission to the program from other programs within the College of Engi neering and Applied Sciences may be admitted with a minimum GPA of 2.25 for Arizona residents and 2.50 for non residents. Students admitted to the pro gram are required to develop an area of emphasis

DEGREE REQUIREMENTS

Manufacturing Engineering Technology—B.S.

	Semester Hours
Engineering technology core	16
General studies requirements	45
Manufacturing Engineering Technology major	50
Selected emphasis area	15
University English proficiency	6
Total	132

The following courses constitute the Manufacturing Engineering Technology major and are required of all Manufacturing Engineering Technology students. Refer to the specific emphasis areas below for additional requirements.

Manufacturing Engineering Technology Major

			Semester Hours
MET	231	Manufacturing Processes	3
MET	300	Applied Material Science	4
MET	302	Welding Survey	3
MET	303	Machine Control Systems	3
MET	313	Applied Engineering Mechanics Materials	4
MET	331	Design for Manufacturing I	3
MET	341	Manufacturing Analysis	3
MET	344	Casting and Forming Processes	3
MET	345	Advanced Manufacturing Processes	3
MET	346	Numerical Control Point to Point and Continuous Path Programming	3
MET	401	Statistical Process Control	3
MET	416	Applied Computer Integrated Manufacturing	3
MET	444	Production Tooling	3
MET	451	Introduction to Robotics	3
MET	460	Manufacturing Capstone Project I	3
MET	461	Mechanical Capstone Project II	3
Total			50

Computer-Integrated Manufacturing Engineering Technology. Computer integrated manufacturing (CIM) has proved to be a powerful tool for increasing productivity in manufacturing. This impact will be greater in the future as the full potential of computers is integrated into the manufacturing factory. Computer integrated manufacturing engineering technology is concerned with the coordination of computer information and computer implementation in manufacturing.

Required courses: MET 448, 452, 494, six hours approved technical electives.

Manufacturing Engineering Technology. This emphasis area is designed to prepare technologists with both conceptual and practical applications of processes, materials, and products related to metalworking industries. Accordingly, this concentration is intended to prepare students to meet the responsibilities in planning the processes of production, developing the tools and machines, and integrating the facilities of production or manufacturing.

Required courses: AET 409, MET 442; nine hours approved technical electives.

Mechanical Engineering Technology. The primary objective of the mechanical engineering technology emphasis area is to prepare the student for entry level work in mechanical design and testing either in engineering or manufacturing departments in product oriented industries. Major emphasis is placed on reducing the amount of time required by industry to make the graduate productive in any area of work. The student obtains a well rounded academic background with an emphasis in mechanics and thermal sciences.

Required courses: MET 434, 436, 438; six hours of approved technical electives.

Robotic and Automation Engineering Technology. The challenges to improve productivity, product quality, and reliability and to reduce costs must be addressed by integrating robots and automation in manufacturing. This emphasis area addresses the field of automating manufacturing processes.

Required courses: MET 448, 452, 453; six hours approved technical electives.

Welding Engineering Technology. This emphasis area is designed primarily to prepare individuals for technical positions in industries utilizing welding and related processes. The focus is on the application of welding technology as applied to current and near future industrial needs. The program is structured to provide the individual with a balance of theory, application, and hands on experience. The general areas covered by the courses are welding processes, materials, nondestructive testing, and weldment design. The student also has the opportunity to work with robots in robotic welding applications. Also, a laser is available for investigating the area of high energy welding processes.

Graduates of this program have the capability to function in a variety of technical positions related to welding and manufacturing. Typically, a graduate from this program may work in the areas of robotic welding, metallurgy, quality control, nondestructive evaluation, welding process evaluation, and technical sales.

Graduates may find employment in the aerospace, automotive, heavy machinery, heavy fabrication, and energy production industries.

Required courses: MET 321, 420, 421, 425, three hours of approved technical electives.

Industrial Technology—B.S.

	Semester Hours
Industrial Technology core	25
General studies requirements	39
Industrial Technology major	62
First year composition requirement	6
Total	132

The following courses constitute the Industrial Technology Core and are required of all Industrial Technology students. Refer to the specific emphasis areas for additional requirements.

Industrial Technology Core

			Semester Hours
ECE	105	Introduction to Languages of Engineering	3
ECE	106	Introduction to Computer Aided Engineering	3
ETC	201	Applied Electrical Science	4
ITC	200	Impact of Communications Technology on Society	3
ITC	202	Creative Thinking and Design	3
ITC	343	Occupational Safety	3
ITC	346	Management Dynamics	3
MET	230	Engineering Materials	3
Total			25

Graphic Communications (GRC). The purpose of the graphic communications emphasis is to prepare people for a wide variety of professional positions in the printing and graphic communications industry. This area of emphasis offers a blend of technological and managerial skills and knowledge. It has been specifically designed to pre

pare graduates to address the opportu nities and increased competitive chal lenges taking place in the industry as a result of technological change and tur bulent economic and human relations concerns.

All courses are industry responsive. The students are exposed to case histo ries and problems related to actual in dustry issues. Throughout the entire four year curriculum, students are ex posed to practical, situational analysis and effective problem solving tech niques As a prerequisite for gradua tion, students are expected to acquire job related industry experience as prac tical preparation for making an imme diate contribution to an employer's business.

To achieve its objectives, the graphic communications emphasis area requires 35 semester hours of technical GRC elective courses to be determined by advisement.

Typical career paths may include op erations management, sales and mar keting, and technology described be low:

Operations Management. Computer graphics applications, conformance re-quirements for government regulation; decision making in a manufacturing en vironment; industrial cost accounting; instrumentation for graphic arts manu facturing; manufacturing strategy; ma terials testing and performance predic tion; optimization of production sys tems; organizations and layout; planning and scheduling for manufac turing; plant design, plant information systems; printing systems maintenance; product development and management; production management, production coordination; supervisory techniques; traffic management.

Sales/Marketing. Customer education; estimating and job costing; finance, personnel and human relations; markets for printing; print and electronic media; sales management; sales service; strate gic planning; market planning.

Technology. Analytical modeling for manufacturing systems; applied elec-tronics for the graphic communications industry; creation, management and transmission of digital imaging infor mation; environmental control; evalua tion of new technologies; integrated computer graphics; printing plant engi-neering; quality management and pro cess control; scientific properties of graphic communications materials; technological planning and forecasting.

Industrial Management. The purpose of this emphasis is to prepare supervi sors and high level personnel for man agement functions in industry, manu facturing, and public service organiza tions

The industrial management emphasis is articulated with the Maricopa Com-munity College District, Pima Commu nity College, and Yavapai College. Consultation with an advisor is re quired to coordinate the course selec tion for transfer to the industrial man agement areas of emphasis. Classes are scheduled to accommodate the student who is employed in a full time posi-tion.

To achieve its objectives, the indus trial management emphasis area re quires 35 semester hours of technical IST elective courses to be determined by advisement.

Technical electives to support the area of emphasis must be chosen by the student in consultation with an advisor. Typical areas for technical electives are aeronautics, construction, electronics, fire science, graphic communications, hazardous materials and waste manage ment, interactive computer graphics, safety and health, technology, and manufacturing. Articulation agree ments are to be followed by consulting an advisor.

Interactive Computer Graphics. The purpose of the interactive computer graphics (ICG) emphasis is to prepare students for entry into the diverse field of computer graphics. The ICG em-phasis provides a strong academic foundation in the technological, mana gerial, and discipline-specific applica tions of graphics analysis, communica tion, databases, design, documentation, image generation, modeling, program-ming, and visualization.

Graduates are qualified computer graphics technologists who have ac quired extensive knowledge and techni-cal competency, thereby preparing them to advance into professional posi tions of leadership within the industry. The ICG courses are industry respon sive and provide a high level of techni cal applicability in the use of computer graphics systems, hardware, and soft-ware within a variety of discipline envi-ronments.

Typical career paths may include: applications development, applications management and supervision; business and analytical graphics; design (spe cialty areas such as electronics, adver tising/graphics design, mechanical, manufacturing, multimedia, animation, rendering and illustration, and com-puter aided design and drafting); field engineering, service and support; graphics systems and database analysis; sales and marketing; technical graphics and publication; testing, and implemen tation, training (administration and in struction).

To achieve its objectives, the interac tive computer graphics emphasis area requires 35 semester hours of technical ICG elective courses to be determined by advisement.

Technical electives to support the emphasis area must be chosen by the student in consultation with an advisor.

INDUSTRIAL TECHNOLOGY

ITC 200 Impact of Communications Tech-nology on Society. (3) F, S
Deve op ng an awareness of issues such as privacy, depersona zation and contro of n formation that have been affected by recent developments n commun cations technology Activities include research ng eva uating f nd-ngs, and present ng arguments n support of pos tions Prerequ site ENG 102 or 105 or 108 *General studies. L1.*

202 Creative Thinking and Design. (3) F S
Fundamenta methods concepts and tech-n ques of creat ve thinking des'gn and prob-em solving Also includes commun cat on, managerial cu tura , and soc eta nfluences. Lecture, ab. Prerequ s te· ECE 106 or nstruc tor approva .

343 Occupational Safety. (3) F
Acc'dent prevention, accident factors, meth-ods of record ng and reporting, ana ysis psy-cho ogical aspects, attitudes, recent legisla-t on, safety consciousness and ab lity Pre-requ site junior status

444 Industrial Organization. (3) S
Industria organization concepts Top cs re ate to ndustrial relat ons, governmenta regula tions organ zat ona structure, abor relat'ons, human factors and current ndustrial prac-tices. F e d trips Prerequisite: junior status.

Omnibus Courses: See page 44 for omn'bus courses that may be offered.

GRAPHIC COMMUNICATIONS

GRC 135 Graphic Communications. (3) F, S
Introduct on to the technologies nvolved n the design mage generation, transmiss on, and product on of mu t p e images for consumer uti zat'on. Lecture, ab, f e d trips.

136 History of Printing in the Western World. (3) N
H'storical perspect ve of technolog cal devel opments n printing and soc'a impacts on Western c'vi izat on n re ation to other forms of communication F eld trips

237 Introduction to Composition Systems. (3) F
An introduct on to trad t onal and e ectron c compos tion systems and procedures used n the graph cs communicat on 'ndustry includ'ng desktop publ sh ng. Lecture ab

331 Quality Assurance for the Reproduction Processes. (3) S
Instrumentat on and methodo og es for mater - a s testing and qua ty control n the major reproduct on processes. Field trips

332 Film Assembly and Platemaking. (3) F
Str pp ng negat ves and pos t ves ine ha f-tone duo tone, and ful co or contact ng f ats onto var ous types of mage carr ers Lecture, lab, f e d tr ps Prerequ s te GRC 135

333 Sheetweb Press Technology. (3) S
Function of the offset print ng equ pment Lithographic dynam cs of both sheetfed and sheetweb systems Lecture, ab Prerequ's te GRC 332 or instructor approva

334 Image Conversion. (3) F
Theory and product on of ine work, halftones contact work, and specia effects for the graphic arts ndustry Lecture ab

335 Printing and Finishing Techniques. (3) S
Analysis of major print ng processes of flexography screen process, and re ief; pro duct on b ndery and finishing procedures Prerequ s te GRC 135.

336 Color Separation. (3) S
Methods of produc ng separat on negat ves and posit ves Prerequis'te: GRC 334.

337 Production Management. (3) F
P ann ng and contro l ng work f ow of graph c arts products Field trips. Prerequ s te· GRC 135

339 Estimating and Cost Analysis. (3) S
Management relat onship between f nanc a product on, and sales departments n print ng ndustries· ana ysis of equ pment abor and mater al costs use of paper and standard pr c ng cata ogs Prerequisite GRC 135.

433 Production Techniques. (3) N
Systemat c product on p ann ng experience. Lecture lab Prerequ s tes GRC 333 334

435 Plant Management. (3) F
Concepts, pract ces and processes used by the commerc a printing p ant manager re ating to the operat on of the p ant Prerequ s te GRC 135 or nstructor approva

436 Gravure Technology. (3) S
In depth study of the market prof e and product on sequences related to the gravure method of pr nting Prerequisite: GRC 336

437 Advanced Color Reproduction. (3) F
Sc entific ana ysis for the eng neering of co or reproduct on systems used in the graph c arts ndustry. Fie d tr ps. Prerequ s te· GRC 336

438 Graphic Arts Techniques and Processes. (3 F, S, SS
Survey of product on sequences and prof e of the print ng and pub sh ng industry Lecture, ab. Prerequ s te jun or stand ng.

439 Electronic Publishing Systems. (3) S
The study of electronic publ sh ng systems and how text and graph'cs are ntegrated nto a pub cation us ng desktop publ shing techno og es

537 Current Issues in Quality Assurance. (3) N
Directed group study of se ected ssues re at ing to qua ty assurance n the pr nting and pub sh ng ndustry

Omnibus Courses: See page 44 for omn bus courses that may be offered

INDUSTRIAL MANAGEMENT

IST 346 Management Dynamics. (3) S
E ements of human re at ons train ng and the consequences of superv sory behav oral pat terns n effect ve y dea ng w th emp oyees.

402 Industrial Laws, Contracts, and Regulations. 3 F
Rev ew of c ty state, county and federa laws that affect ndustria and construct on operat ons matena s supp es, and acqu s tion pro cedures.

430 Ethical Issues in Technology. (3) N
Top cs n soc al respons b ty for ndustria techno ogy and eng neer ng.

445 Industrial Internship. (1 10) F, S, SS
Work exper ence ass gnment n ndustry com mensurate w th student's program Specialized nstruction by ndustry w th un'versity supervis on Prerequisites adv sor approval, jun or status, 2 50 GPA

451 Materials Control. (3 F
Act v t es of mater al hand ng nc ud ng purchas ng, receiving warehous ng traff c p ant ayout, nventory and production contro and shipp ng re ating to techn ca procedures

452 Industrial Human Resource Management. (3) F S
Concepts and practices of human resource management n a globa ndustr a env ron ment

453 Safety Management. (3) S
Development and management of safety programs educat'on and tra n ng and re at on- sh ps w thin an organ zat on. Prerequ ite ITC 343 or nstructor approva

454 Occupational Hygiene. 3) S
Offers an overv ew of occupat ona hea th haz ards the r recogn t on evaluat on and contro D scusses how industr es are regu ated and how occupat ona hea th standards are pro mu gated Prerequ sites CHM 101 or 113 or 114; MAT 118

455 Industrial Sales and Demand. (3) F
Customer and sales strateg es for ndustrial organizations, nc uding current pract ce and future planning. Prerequ s tes ECN 111 adv sor and nstructor approva jun or standing

460 Risk and Legal Aspects of Safety. (3) F
Examines the r sk management factors of n dustr a act v t es nc ud ng ega and nsur ance considerat ons

461 Production Supervision Principles. (3) F
Introduction to superv sory pr nc p es as ap pl ed to production of goods and serv ces Prerequ s te TC 444

480 Organizational Effectiveness. 3 F S
Human aspects of superv sory behav or n the ndustr'al setting and how they inf uence eff c ency mora e and organizational pract ce Prerequ s te ST 346

491 Introduction to Labor Concerns. (3) S
ntroduct on to labor re at ons organ zat on of abor un ons and federations, co lect ve bar- ga n ng, gnevances and arbitrat on and appli - cable abor eg slat on

501 Principles of Hazardous Materials and Waste Management. (3) S
Estab shes a foundat on for the rema n ng courses n the curricu um. Top cs inc ude def n t ons of toxic and hazardous substances and wastes, RCRA c ass f cat on, and OSHA cnte na. Pre or coreq u s tes· CHM 101 or 113 or 114, MAT 118

502 Regulatory Framework for Toxic and Hazardous Substances. (3) S
Prov des an n-depth exam nat on of federa , state and loca regu at ons and requ rements for hazardous materials and wastes Inc udes an overv'ew of eg s at ve h story and trends ndustry s ro e n regulatory development and ts mpact Prerequ s te ST 501

503 Principles of Toxicology. (3 S
Prov des deta led information about the nter act on of chemicals w th l v ng systems and the env ronment Top cs nclude mechanisms of tox c act on, dose response relat onsh ps, tox c ty test ng mode s, predict ve tox co ogy and ep dem o ogy Prerequ s te CHM 101 or 113 or 114

504 Technology for Storage, Treatment, and Disposal of Hazardous Materials. (3) F
A h ghly technica course wh ch d scusses current technologies state of the art technolog es and future trends for storage treatment, and d sposa of hazardous matena s and waste. Prerequ sites CHM 101 or 113 or 114, ST 501

505 Quantitative Analysis and Practical Laboratory Techniques. (3) F S
Exam nes ab techn ques for eva uat on of hazardous mater a s and discusses how to interpret data from ana yt ca processes and regulatory lab requirements ike SW 846 Lab w l be arranged off s te Prerequ s tes CHM 101 or 113 or 114, MAT 118

506 Chem'stry of Hazardous Materials. 3) F
Prov des the chemica nformat on needed for hand ng sp lled hazardous substances n cludes response needs for ox d zers, organics and norganics, and bas c tox co ogy needs Prerequ s tes: CHM 101 or 113 or 114 IST 501 MAT 118

522 Air Pollution and Toxic Chemicals. (3) F
Examines ssues n the measurement analys s and control of tox c chem cals in a r po ut on Prerequ s tes CHM 101 or 113 or 114, IST 501 MAT 118.

523 Soils and Groundwater Contamination. (3) A
Presents a deta ed d'scuss on and exam nation of theoret cal and pract ca hydrogeo ogy as t appl es to c ean ng up contam nation Invest gat ve techniques, mon tor ng, nsk assumpt ons and assessment methodo ogy w l be addressed Prerequis tes CHM 101 or 113 or 114, IST 501, 505; MAT 118

524 Emergency Preparedness, Response, and Planning for Hazardous Materials. (3) S
Techn ques for n house or on-s te emergency response cont ngency p ann ng P an and de ve op an emergency response p an, nclud'ng preemergency assessment, resources for co operat on, equ'pment requ rements, and coord nat on w th other agenc es or resources Prerequ sites CHM 101 or 113 or 114 ST 501 MAT 118

525 Risk Assessment for Hazardous Materials. (3 F
Exam nes the nsk assessment process and its app cation n var ous s tuat ons rang ng from c t ng hazardous fac ties regu at on to control of tox c substances n the env ronment Pre requisites CHM 101 or 113 or 114, IST 501; MAT 118

526 Current Issues: Radon, Asbestos. (3) S
Dea s with the atest up to-date topics n tox cs management New subjects may be added and others deleted as ssues of the day become apparent Prerequ s tes· CHM 101 or 113 or 114, ST 501; MAT 118

527 Environmental/Resources Regulations Concepts. (3) A
Covers deve opment of env ronmenta , natura resources and water aw from common aw to modern statutory requ rements Specifics on Superfund, hazardous materials and tox cs regulat ons and iab l ty contracts Prerequ - sites CHM 101 or 113 or 114, IST 501.

542 Global Management Philosophies. 3) F
Analys s and comparison of s gn f cant super v'sion ph osophies deve oped n var ous n dustrial nat ons and the'r potent a app ication n the Un ted States

549 Research Techniques and Applications. 3 F, S
Se ection of research prob ems, ana ys s of it erature, nd v dua investigat ons preparing re ports, and proposa wnt ng.

550 Industrial Training. (3) S
Tra n ng techn ques and earning processes P anning deve op'ng, and eva uat ng train ng programs n ndustry and governmenta agen c es Prerequ s te adv sor approva

570 Project Management. (3) S
P ann ng, organ z ng, coord nat ng and contro l ng staff and project groups to accomp sh the project object ve

598 Special Topics. 1 3) F S SS
Spec a top cs courses nc ud ng the fo low ng which are regular y offered, are open to qual f ed students These courses are taught Fri days Saturdays Sundays, and Mondays at ASU Research Park

(a) Pr nc p es of Hazardous Mater a s and Waste Management
(b) Regulatory Framework for Tox c and Hazardous Substances
(c) Princ p es of Tox co ogy
(d) Technologies for Storage, Treatment and Disposa of Hazardous Mater'als
e) Quantitative Analysis and Pract ca Laboratory Techn ques
(f) Occupat ona Hygiene
(g) A r Po ut on and Toxic Chem ca s
(h) So' s and Groundwater Contam nat on
( ) Emergency Preparedness, Response and P ann ng for Hazardous Materia s
(j) Risk Assessment for Hazardous Mater a s
k) Current Issues· Radon Asbestos, and USTs

Omnibus Courses: See page 44 for omn bus courses that may be offered

INTERACTIVE COMPUTER GRAPHICS

ICG 212 Design Documentation. (3) S
Using m crocomputer-based graph cs systems for product design and documentat on Geo metr c shape ana ys s and descr pt on Docu mentat on techn'ques and standards D'mens on ng Lecture ab f eld tr ps. Prerequ s te ECE 106.

310 Computer Graphics Fundamentals. (3) S
Computer mage creat on, transformat on, and man pu ation Current techn ques for database generation. Concepts of app icatrons software development Hands-on exper ence. Lecture ab fie d tr ps Prerequ s te programm ng background he pfu but not necessary. *Gen eral stud es N3*

312 Computer-Aided Design and Drafting. 3) F
Us'ng computer aided des gn and draft ng appl cat on software for advanced geometr c construct on System and workstation configu rat on and product v ty Mode ing app ications Lecture ab, f e d trips Prerequis te ICG 212 *General studies N3*

313 Technical Illustration. (3) F
Pictor a draw ng shades and shadows, and mu t media rendering techn ques Lecture ab Prerequ s te CG 212

314 Computer Graphics Database. (3) S
Preparing the product def nit on database for computer integrated manufactur ng. Docu mentation and process requ rements, sys tems and standards Prec s on dimens on ng Lecture, ab, f e d trips Prerequis te ICG 212 or nstructor approval.

412 Computer Graphics Modeling. (3) F
Estab shing and manipulat ng 3 dimens ona computer models App ication ons nc ud ng so ids model ng concepts, design ana ys s, dy nam c s mu at'on and graph c data exchange f es Lecture, ab, f e d trips Prerequis te ICG 312 *General stud es· N3.*

413 MicroCADD Applications. 3) F
Student se ected modu es, nc uding arch tectura construct on c v l uti ty, and e ectronic drawing mechan'ca manufactur ng, an ma t on, computer graph cs and others. Lecture lab f e d tr ps. Prerequ s te CG 212.

417 Graphics Systems Management. (3) S
Planning mplement ng, and manag ng com puter graph cs systems App cat ons needs assessment ana ysis of components system ergonom cs nterfac ng, ma ntenance and hu man resources management Lecture ab, fie d tr ps Prerequ s te instructor approva

461 Computer Animation. (3) F
Fundamental technology used in creat ng 2 d' mens ona and 3 dimensiona animat on through model ng, script ng, and render ng as re ated to engineering s mu at on. Lecture ab, f eld tr'ps Prerequis te ICG 310 or instructor approva

517 Graphics Systems Development. (3) S
Research and deve opment n computer graph cs systems App ed project manage ment development eva uat on, and mp e mentat on Lecture ab field tr ps. Prerequ s te CG 412 or nstructor approva .

Omnibus Courses: See page 44 for omnibus courses that may be offered

MANUFACTURING TECHNOLOGY

MET 110 Welding Survey. (3) N
Oxyacety ene, arc, brazing res stance, and gas tungsten arc we ding procedures for ferrous and nonferrous meta s. Lecture, ab

116 Aeronautical Welding. (2 F
Oxyacety ene and tungsten gas tungsten-arc weld'ng procedures and brazing techniques used for a rcraft structures Lecture ab.

230 Engineering Materials and Processing. (3 F, S SS
Materia s, their structures propert es fabrica t on character st cs, and app ication ons Mater a form ng, 'o n ng, and f n sh ng processes Au tomat on and qua ty contro Prerequ s te CHM 101 or 113 or 114

231 Manufacturing Processes. (3) F
Meta remova processes, emphas z ng dri - ng, m l ng, and athe processes inc uding too b t gr nd ng Emphas s on production speeds and feeds. Lecture ab Prerequ s tes: ECE 106, MET 230

300 Applied Material Science. (4) F
Pr nc p es of materia s science emphas zing concepts re evant to manufactur ng and use D'scuss metals po ymers, ceram cs and compos tes 3 hours ecture 1 hour lab Pre requis te MET 230 or nstructor approval

302 Welding Survey. (3) F
Theory and app cat on of 'ndustr a welding processes 'ntroductory we d ng meta urgy and we dment des gn, SMAW, GTAW, GMAW, Oxyacetylene and braz ng experi ences Lecture lab Prerequ'site: upper class stand ng

303 Machine Control Systems. (3 S
Theory and app cat on of e ectromechan ca hydrau c pneumat c, f u d c and electrica control systems for manufactunng. Lecture, lab Prerequis'tes: ETC 201 or PHY 112, MAT 260.

313 Applied Engineering Mechanics: Materials. 4 F S SS
Stress, strain re at ons between stress and strain shear, m ments, def ect ons and com b ned stresses 3 hours ecture, 1 hour ab. Prerequisite: ETC 211

321 Engineering Evaluation of Welding Processes. 3) N
Theory and app cation of the arc we d ng pro cesses and oxy fue cutting· fixtur ng proce dures, safety codes, and exper mental tech niques are covered Lecture, ab Prerequi s'tes: MET 302, PHY 112

322 Engineering Evaluation of Nontraditional Welding Processes. (3) N
Theory and appl cat ons of EBW, LBW so 'd state bond ng braz ng, and so der ng Lecture lab Prerequisites MET 302 PHY 112

325 Electrical Power Source Analysis. (4) S
Des gn and operat'ng characterist cs of e ectri ca power sources and re ated equ pment Equipment se ect n, setup and troub eshoot ng procedures covered Lecture, lab Prereq u s tes: ETC 201· MET 302 PHY 112, 114.

331 Design for Manufacturing I. (3) S
Introduct on to des gn of mach nes and struc tures with emphas s on ayout design draw ng Bas cs of gears cams fasteners, spr ngs bearing nkages, cyl ndr ca f ts f at pattern deve opment and surface f n sh requ rements emphas zed Prerequisite MET 313

341 Manufacturing Analysis. (3) S
Introduct on to the organ zat ona and func tiona requ rements for effective production Inc udes wr t ng product on operat on p ans Prerequis te MET 231.

343 Material Processes. (4) S
ndustr a process ng as app ed to ow, me d um and high vo ume manufactur ng Bas c and secondary process'ng, fastening and join- 'ng, coating and qual ty control. Lecture ab

344 Casting and Forming Processes. (3) S
Ana ys s of various forming processes to de term ne oad requirements necessary for a part cular meta forming operat on Th s infor mat on s used to se ect equ pment and des gn tool ng Meta cast ng processes and design of cast ngs ntroduct on to powder meta lurgy Prerequis tes MET 300 and 313 *or* nstructor approva

345 Advanced Manufacturing Processes. (3) S
Meta removal processes, emphas z ng mi - ng, gr nd ng, turret and tracer athe and cutter sharpen ng Appl cat on of machinabil ty theory to practice Product on feeds, speeds, and too wear measurement. Lecture, lab Prerequ s tes MET 231 and 300 *or* nstructor approval

346 Numerical Control Point to Point and Continuous Path Programming. (3) N
Methods of programm ng set up and opera tion of numer ca contro mach nes emphasiz ng athe and m' l systems Lecture, lab Prerequ s te MET 231.

354 Mechanics of Materials. (4) F
Vectors, force systems friction, equ ibr um centro ds, and moment of nertia Concepts of stress, strain and stress analys s as app ied to beams columns and combined load ng Nonmajors only Prerequ s tes MAT 118; PHY 111.

401 Statistical Process Control. (3) S
Introduct on to statist ca qua ty contro meth ods as appl ed to to erances process control, samp ng and re ab ty Prerequisite: MAT 118

407 Aerospace Materials. (2) N
Materia s used for aircraft powerp ants and a rframes, emphas s on criteria for select on n terms of mechan cal propert es and manufac tur ng processes. Prerequisite: MET 230 or equ valent

416 Applied Computer Integrated Manufacturing. (3) F
Techniques and pract ces of Computer nte grated Manufactur ng, w th an emphas s on Computer-Aided Des gn and Computer A ded Manufacturing. Prerequ site: MET 346 or n structor approva *General studies· N3*

420 Welding Metallurgy I. (4) N
Meta lurg cal principles app ied to structura and al oy stee and a um num weldments, aboratory emphas s on we d ng experiments, meta lography, and mechanical testing Lecture lab Prerequ sites MET 300, 302

421 Welding Metallurgy II. (3) N
Metal urg ca pr nc p es as appl ed to stain ess stee super a oy, t tanium, and other refractory meta we dments and braze joints Pre requ s te MET 300

425 Welding Codes. (2) N
Fam i arizat on w th and app ication of the van ous codes, standards, and spec fica ons applicab e to we dments Prerequ s te: MET 302 or equ valent

432 Applied Thermodynamics and Heat Transfer. (3) F S
Thermodynam cs of m xtures. Combustion process. Applicat ons of thermodynam'cs to power and refr gerat on cycles Heat transfer 'nc ud ng steady state conduction, convect on, and rad at on Prerequ site ETC 340

433 Thermal Power Systems. (4) N
Ana ys s of gas power, vapor power, and refrigerat on cycles Components of air cond - t on ng systems D rect energy convers on Psychrometry Analys s of nternal combustion eng nes and f uid mach nes. Lecture ab. Pre requisite: MET 432 or nstructor approva

434 Applied Fluid Mechanics. (4) N
F u d statics Basic fluid flow equations. V s cous f ow n pipes and channe s. Compress b e f ow. Appl cat ons to f u d measurement and f ow n condu ts. Prerequisite: ETC 340.

436 Turbomachinery Design. (3) N
The appl cat on of thermodynamics and f u d mechanics to the ana ysis of mach nery des gn and power cycle performance pred c- t ons Prerequ s te MET 432 or nstructor approva

438 Design for Manufacturing II. (4) F
The app cat on of mechan cs in the design of mach ne elements and structures The use of experimental stress analysis n design eva ua- t on Lecture, lab. Prerequ's tes: AET 312 and MET 231 and 331 *or* nstructor approval

442 Specialized Production Processes. (3) F
Nontrad t onal manufacturing processes, emphasiz ng EDM ECM ECG CM PM HERF, EBW and LBW. Prerequ s te MET 230.

443 N/C Computer Programming. (3) F
Theory and app 'cat on of computer a ded N/C languages with programm ng emphas s with APT and su tab e postprocessors Lecture, lab Prerequ s te MET 346 or nstructor approva

444 Production Tooling. (3) F
Fabricat on and des gn of j gs fixtures and spec a industria tool ng related to manufac turing methods. Lecture, lab Prerequ s te: MET 345

448 Expert Systems in Manufacturing. (3) F
Introduction to expert systems through con ceptual analys's, w th an emphas s on manu facturing appl cat ons Prerequ s te MET 231.

451 Introduction to Robotics. (3) F
ntroduct on to 'ndustr a robots Top cs n c uded are robot geometry, robot workspace, trajectory generation robot actuators and sensors, des gn of end effectors, and econom c justification Prerequisite MET 303 or instructor approva

452 Implementation of Robots in Manufacturing. (3) N
Robotic workcel des gn, including end effectors, parts presentors and opt mum material f ow Prerequ s te: MET 451 or nstructor approval.

453 Robotic Applications. (3) S
Lab course ut iz ng robots and other automated manufacturing equipment to produce a part Students are requ red to program robots, as we as nterface the robots with other equipment. Prerequ s te· MET 303 or 325 or instructor approva .

460 Manufacturing Capstone Project I. (3) F
Sma l group projects to des'gn evaluate and ana yze components assembl es and sys tems Lecture, ab. Prerequ site MET 303 or instructor approva

461 Manufacturing Capstone Project II. (3) S
Smal -group projects applying manufacturing techniques, with an emphasis on demonstrat- ng state of the art technology. Lecture ab Prerequ s te: MET 460 or nstructor approval

462 Capstone Project/Weldment Design. (3) S
Design of welded structures and mach ne e e ments in terms of al owable stresses, jo nt conf gurations, process capab l ties and cost analysis we d ng procedures emphas zed Prerequisites MET 302 313.

517 Applied Computer Integrated Manufacturing. (3) F
Techniques and practices of Computer Integrated Manufacturing, w th an emphasis on Computer Aided Des gn and Computer Aided Manufactur ng. Prerequ site: MET 346 or instructor approva

542 N/C Computer Programming. (3) F
Theory and app ication of computer-aided N C anguages with programm ng emphas s w th APT and suitab e postprocessors App ication case stud es are nc uded Lecture ab. Pre requ s te: MET 346 or instructor approval.

552 Introduction to Robotics. (3) F
ntroduct on to ndustrial robots Top cs n c uded are robot workspace, trajectory generat on, robot actuators and sensors, des gn of end effectors and econom c justif cat on App ication case stud es. Prerequis te. MET 303 or nstructor approval.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

College of Fine Arts

PURPOSE

The College of Fine Arts provides both preprofessional and professional education in the several arts disciplines and an opportunity for nonmajors to be come culturally literate through partici pation and involvement in the creative and performing arts.

The college, through its programs in art, dance, music, and theatre, reflects a wide range of challenges facing the art ist and scholar in the 20th century. The arts, as an integral part of the curricu lum, offer the student a rewarding edu cational experience balanced and strengthened by studies in related fine arts areas, the humanities, social sci ences, and the sciences

In addition to professional curricula offered in each department and school, the college provides courses designed to meet the specific educational needs of students pursuing majors in other colleges throughout the university. The cultural life of the university community is further enriched by study oppor tunities offered at off campus sites. The College of Fine Arts also offers community audiences many hours of cultural enjoyment through myriad con certs, art exhibitions, music and dance concerts, dramatic productions, opera, lectures, and seminars.

ORGANIZATION

The college houses the School of Art, the Department of Dance, the School of Music, and the Department of Theatre An average of 2,000 stu dents per semester enroll as majors in various degree programs offered through these units. The college also includes the University Art Museum and the Institute for Studies in the Arts.

ADMISSION

Students meeting the university re quirements for admission may matricu late in the College of Fine Arts. Sepa rate admissions procedures and approv als are required for some programs within the college. Students must con tact specific departments or schools for details.

Transfer of Community College Credits. The university standards for evaluation of transfer credit are listed on page 34. Transfer students are en couraged to contact their department or school or the Office of Student Services (GHALL 123) to ensure a smooth tran sition to the College of Fine Arts. Credits transferred from any accredited junior or community college may be accepted up to a maximum of 64 se mester hours A community college student planning to transfer at the end of his or her first or second year should plan to take community college courses that meet the requirements of the ASU curriculum selected. Students attend ing Arizona community colleges are permitted to follow the degree require ments specified in the ASU *General Catalog* in effect at the time they begin their community college work, provid ing their college attendance has been continuous.

Courses transferred from community colleges are not accepted as upper divi sion credit at ASU. Arizona students are urged to refer to the *Arizona Higher Education Course Equivalency Guide* for transferability of specific courses from Arizona community colleges. Copies of the guide are available in counselors' offices. In choosing courses at a community college, stu dents should be aware that a minimum of 50 hours of work taken at the univer sity must be upper-division credits. While attending a community college, it is suggested that students elect gen eral studies and lower division courses in the major field.

General Transfer Credit. Direct transfer of courses from other accred ited institutions to the College of Fine Arts are subject to (1) the existence of parallel and equal courses in the college's curriculum and 2) depart mental or school evaluation of studio courses with respect to performance standards. A minimum of 30 semester hours earned in resident credit courses at ASU is required of every candidate for the bachelor's degree. Transfer stu dents enrolled in the College of Fine Arts must complete a minimum of 15 semester hours of resident credit in the major as approved by the faculty

ADVISEMENT

Advisement is handled as a decen tralized activity within the college. To offer personalized attention, each aca demic unit establishes its own gradua tion advisement procedures. Students are encouraged to make appointments through the central office of their de partment or school

College of Fine Arts Degrees, Majors, and Concentrations

Major	Degree	Administered by
Baccalaureate Degrees		
Art Concentrations: art history, photographic studies, studio art	B.A.	School of Art
Art Concentrations: art education, ceramics, drawing, fibers, graphic design, intermedia, metals, painting, photography, printmaking, sculpture	B.F.A.	School of Art
Choral/General Music	B.M.	School of Music
Dance	B.A.	Department of Dance
Dance Concentrations: dance education, performance and choreography	B.F.A.	Department of Dance
Instrumental Music Concentrations: instrumental, string	B.M.	School of Music
Music	B.A.	School of Music
Music Therapy	B.M.	School of Music
Performance Concentrations: guitar, jazz, keyboard, music theatre, orchestral instrument, piano accompanying, voice	B.M.	School of Music
Theatre Emphases: acting, design/technical theatre, directing, history/theory and criticism, theatre management and production, theatre for youth	B.A.	Department of Theatre
Theatre Concentration: theatre education	B F.A.	Department of Theatre
Theory and Composition Concentrations: composition, theory	B.M.	School of Music
Graduate Degrees		
Art Concentrations: art education, art history	M.A.	School of Art
Art Concentrations: ceramics, drawing, fibers, intermedia, metals, painting, photographic studies, photography, printmaking, sculpture, wood	M.F.A.	School of Art
Choral Music Concentrations: choral music, general music	M.M.	School of Music
Choral Music	D.M.A.	School of Music
Composition	M.M.	School of Music
Creative Writing	M.F.A.*	Creative Writing Committee
Dance	M.F.A.	Department of Dance
General Music	D.M.A.	School of Music
Instrumental Music	M.M., D.M.A.	School of Music
Music History and Literature	M.A.	School of Music
Music Theory	M.A.	School of Music
Performance Concentrations: music theatre musical direction, music theatre performance, performance pedagogy, piano accompanying, solo performance (instrumental), solo performance (keyboard), solo performance (voice)	M.M.	School of Music

* This program is administered by the Graduate Co lege. See the "Graduate College" section of this catalog.

Major	Degree	Administered by
Solo Performance	D.M.A.	School of Music
Theatre	M.A.	Department of Theatre
Theatre Concentrations. acting, scenography, theatre for youth	M.F.A.	Department of Theatre
Theatre Concentration: theatre for youth	Ph.D.	Department of Theatre

* This program is administered by the Graduate College. See the "Graduate College" section of this catalog.

Baccalaureate Degrees

The three baccalaureate degrees differ in curricula with respect to the amount of specialization permitted in the major field. The Bachelor of Arts degree provides a broad, scholarly, humanistic program, while the other two programs place greater emphasis upon the major field. The university general studies curriculum plays an integral role within the educational mission of the university and as such constitutes an important component of all under graduate degrees in the College of Fine Arts. See pages 297 298 for university general studies requirements.

In cooperation with the College of Education, a K 12 endorsement for teacher certification is available in the disciplines of art, dance, music, and theatre for students preparing for a teaching career in the public schools. Students should, with the advice and counsel of their arts education advisors, fulfill the requirements for the appropriate area of specialization under the Bachelor of Fine Arts or Bachelor of Music degrees. In addition, a student wishing to be admitted to the Professional Teacher Preparation Program (PTPP) in the College of Education (leading to teaching certification) must obtain an advisor from the Office of Student Affairs in the College of Education before making application for the PTPP. Students must have completed 56 hours with a minimum GPA of 2.50 and also have passed the three Pre-Professional Skills Tests in order to be eligible for the program. Further details on admission requirements and procedures for the PTPP can be found on page 205 under the College of Education.

Graduate Degrees

Master's programs range from 30–60 semester hours, depending upon the degree chosen. Doctoral programs vary in scope and curricula. See the *Graduate Catalog* for specific requirements for the M.A., M.F.A., M.M., D M.A., Ed.D., and Ph.D. degrees.

DEGREE REQUIREMENTS

In addition to the general information given below, consult the sections of this catalog listed under School of Art, Department of Dance, School of Music, or Department of Theatre for specific degree requirements.

Bachelor of Arts (B.A.) Degree. The Bachelor of Arts degree requires 45–60 semester hours for the major. Depending on the major, 18–24 hours must be selected from upper-division courses (300 or 400 level). The semester-hour requirements in the major are distributed between a field of specialization (30–53 hours) and one or more related fields (an additional 15 hours). The exact content of the major is selected by a student in consultation with an advisor under rules and regulations of the department or school concerned.

Bachelor of Fine Arts (B.F.A.) Degree. The Bachelor of Fine Arts degree requires 65 88 semester hours for the major. At least 30 of these hours, depending on the major, must be selected from upper division courses (300 or 400 level). The curriculum for the major is designed as preprofessional study in art, dance, or theatre education Auditions and/or interviews are required for admission to the B.F.A. programs in Dance and Theatre. Consult these departments for specific information.

Bachelor of Music (B.M.) Degree. The Bachelor of Music degree requires 84 semester hours for the major. The required number of upper-division courses (300 or 400 level) is dependent upon the area of specialization. The curriculum for the major is designed to provide a broad yet concentrated preparation with a choice of specialization among the areas of music performance, music theatre, jazz, music therapy, piano accompanying, theory–composition, instrumental music, and choral general music. An entering undergraduate music student, regardless of the area of specialization, must perform an entrance audition in his or her primary performing medium (voice or instrument).

GENERAL STUDIES REQUIREMENTS

To meet the university general studies requirement, a minimum of 35 semester hours must be completed in the five core areas Six semester hours must also be completed in the awareness areas. A course may concurrently satisfy a core area requirement and an awareness area requirement. Neither courses in the major nor related field area courses may be cross listed in fulfillment of both major and general studies core requirements with the exception of concurrent listings in the numeracy (computer applications) and literacy areas, as specified by the university general studies guidelines.

Core Areas:	*Semester Hours*
L1 and L2 courses	6
N1, N2 or N3 courses	6
* HU courses	6 or 9
Fine arts majors must take at least six semester hours of fine arts course work in areas outside of the major school or department. These may be courses in art, dance, music, or theatre A student may concurrently fulfill this requirement and the humanities and fine arts general studies requirement by selecting approved courses as indicated in the *Schedule of Classes*. This requirement may also be met by taking *any* College of Fine Arts course outside of the student's major and listing it under general studies electives.	
* SB courses	6 or 9
S1 and S2 courses	8

* 15 hours total

Awareness Areas:

Six semester hours taken in two of the three awareness areas are required

G courses 3
H courses 3
C courses 3

Refer to pages 50–52 of this catalog for a description of the university general studies requirements. General studies courses are regularly reviewed by the General Studies Council and are included in the *General Catalog* (pages 53 71) and the *Schedule of Classes*.

Minors

The College of Fine Arts provides an opportunity for students majoring in other disciplines to sustain their interest in the arts through a structured program of required courses and electives leading to a minor. The minor is not intended as a substitute for professional work in the arts, but as a complement to various liberal arts and preprofessional curricula.

Minors are offered in the Department of Dance, the School of Music, and the Department of Theatre. The total number of credits required for a minor ranges from 18 to 22 hours. Students should contact the relevant academic unit for specific requirements and guidelines regarding the minor.

GRADUATION REQUIREMENTS

Several programs require additional general studies electives that may be selected from anthropology, architecture, biology, botany, chemistry, communication, economics, English (except ENG 101, 102, 105, 107, and 108), foreign languages, geography, geology, history, humanities, interdisciplinary studies in liberal arts (LIA), journalism and telecommunication, philosophy, physical education (except activity courses), physical science, physics, political science, psychology, religious studies, sociology, zoology, and any College of Fine Arts course outside the student's major to meet the minimum number required for a particular degree program. Additional electives to complete the total of 126 semester hours may be taken in any area of the university.

In addition, the student must meet the university English proficiency requirement: ENG 101 and 102 (six hours) or ENG 105 (three hours). Foreign students may satisfy this requirement by taking ENG 107 and 108

All Bachelor of Arts degrees require the equivalent of 16 semester hours in one foreign language except for the Bachelor of Arts degrees in Dance, Theatre, and Art with an emphasis in studio art, which strongly recommend but do not require foreign language study. Course work may be selected in any language and must follow the sequence of language courses 101, 102, 201, and 202. This requirement may be fulfilled at the secondary school level or by examination. If acquired in secondary school, two years of instruction in one foreign language is considered the equivalent of one year of college instruction. Transfer students are placed in language study at the level above completed work. Candidates for the B.M. degree in Performance with a concentration in piano accompanying or voice and in Theory and Composition with a concentration in theory have specific foreign language requirements, which are stated in each of the degree requirements (pages 312 313). There is no foreign language requirement for other concentrations of the B.F.A. or B.M. degrees.

The minimum graduation requirement is the completion of 126 semester hours with a minimum cumulative GPA of 2.00. Of these 126 semester hours, at least 50 must be selected from upper division courses. Many professional programs within the College of Fine Arts require additional semester hours for graduation and a higher cumulative GPA of their majors. To be acceptable as graduation credit, all course work in the major discipline must show an earned grade of "C" (2.00) or higher.

ACADEMIC STANDARDS

The terms of disqualification, reinstatement, and appeals are consistent with those set forth by the university on page 49 of this catalog, except for Theatre. For the B.F.A. in Theatre Education, a student must have a minimum GPA of 3.00 in the major to enroll in upper division courses and to remain in good standing. In addition, a student disqualified in any program is normally not eligible for reinstatement for two semesters.

SPECIAL PROGRAMS

Working closely with faculty, visiting scholars, and artists in residence, students in all fields of the College of Fine Arts participate in dynamic, innovative programs. Students receive a great deal of individual attention to their creative work and artistic development.

The School of Art is one of the largest programs of its kind in the country and offers students a wide range of specialties in media, art history, and art education. Video and computer graphics employ current technologies. In addition to a broad curriculum, the School of Art has several unique opportunities. The graphic design internship program offers the opportunity to work with leading design studios. Internships in galleries and museums throughout the Phoenix area are available. The Children's Art Workshop is an on campus program for school age children in the Phoenix metropolitan area taught by students in art education. The nationally known teaching gallery, Northlight Gallery, hosts exhibitions organized and curated by students. Visiting artists and guest lecturers enrich the basic curriculum.

Students are appointed to assist faculty in the planning and production of projects in the Print Research Facility, the Photography Collaborative Facility, and the Pyracantha Press.

Recognized as one of the top programs in the country, the Department of Dance emphasizes the choreography, performance, and theory of modern dance. Nationally prominent faculty and visiting artists create repertory for dance majors and for the Dance Arizona Repertory Theatre (DART), a student touring repertory company. An ambitious performance program offers several concerts to the public each year with additional works created and performed by graduate and undergraduate students. Students work closely with major artists and companies who visit the campus annually and with researchers in the areas of dance science, dance in relation to technology, dance music composition, labanotation, sound, and video production. ASU students and faculty have consistently taken top honors at the regional and national festivals of the American College Dance Festival Association. The department recently was selected to host the National

Festival, which produced seven concerts and more than 50 master classes in four days.

Faculty in the School of Music include a wide range of performers, teachers, conductors, composers, and scholars who are recognized both nationally and internationally. Students have the opportunity to participate in comprehensive degree programs that provide for wide and divergent opportunities in performance and course work. Student performing organizations are recognized as being some of the finest in the nation, and ASU students regularly compete successfully in national competitions. The broad scope of degree options allows students excellent choices in gaining depth and breadth in the musical field.

The Department of Theatre is inaugurating a redesigned B.A. program that allows a 54-hour concentration in acting, design/theatre technology, directing, history/theory and criticism, theatre management and production, or theatre for youth. A strong feature of the new B.A. program is the broad liberal arts education, which cultivates in the student the ability to understand human behavior and values in societies of the past and present, an essential element in the creation of and response to theatre. Special strengths of the department include internationally acclaimed programs in theatre education and theatre for youth; an outstanding playwriting area that infuses each specialization with new script work; multi-ethnic courses and programs in acting and directing; and a nationally recognized scenography area that provides for further specialization in costume, lighting, or scene design as well as theatre technology.

Production is at the core of ASU theatre and the quality of the faculty, student body, and facilities often attracts professionals to campus. The department recently premiered productions by three Pulitzer prize-winning playwrights. Annually, the *Genesis New Plays Project* (which has student actors, designers, and playwrights working with professional actors, directors, and playwrights to workshop new scripts) is coproduced with the state's LORT company, the Arizona Theatre Company. Four to six main-stage plays are produced in the 500-seat Galvin Theatre. An additional eight to 14 student-directed shows are presented as part of the Lyceum series. The theatre for youth area sponsors a biennial International Youth Arts Festival that brings many multitalented artists and thousands of students to campus.

Theatre for youth artists, students, and scholars are attracted to ASU by the opportunities to work on national K–12 theatre curricula and research projects, theatre tours to area schools, and opportunities to teach on and off campus. The Child Drama Special Collection in Hayden Library, which includes rare books, plays, and personal and national association archives, is the most complete and extensive collection of its kind in the English-speaking world and also contributes to the international recognition of the theatre for youth faculty.

Since theatre is a collaborative art form, students at the undergraduate level are required to learn and participate in all phases of theatre, but with specialization in an area of their choosing. In the theatre education and theatre for youth programs, both undergraduate and graduate students are challenged to excel in every aspect of theatrical training. Students are offered acting, directing, and other production opportunities for main-stage, studio, and touring shows, as well as research and teaching possibilities on and off campus. Students in the B.A. and M.F.A. scenography programs are actively involved in all aspects of design and technology for main-stage and studio productions and have received regional and national awards for their work. A new M.F.A. concentration in acting is based on a conservatory model in which students have intensive training in voice, movement and acting with classical, contemporary, and new scripts, augmented by study in theatre history, theory, and criticism.

A faculty playwright works closely with both undergraduate and graduate directing students to create and showcase original scripts from students and faculty. An interdisciplinary M.F.A. in Creative Writing encourages graduate students to work closely with writers of drama, fiction, and poetry and with directors and producers from the Departments of English and Theatre. Faculty in the Departments of Theatre and English offer students a unique opportunity to tailor a course of study to fit individual needs, talents, and goals.

GENERAL INFORMATION

Undergraduate Credit for Graduate Courses. To enable interested students to benefit as much as possible from their undergraduate studies, the Graduate College and the College of Fine Arts extend to seniors with a GPA of at

least 2.50 the privilege of taking 500 level graduate courses for undergradu ate credit. Application for admission to a graduate course for undergraduate credit must be completed in advance of the regular registration period The ap plication must be approved by the in structor of the class, the student's advi sor, the chair or director of the depart ment or school, and dean of the college in which the course is offered.

Preprofessional Programs. Students preparing for admission to professional graduate schools should obtain infor mation regarding admission require ments by writing directly to schools in which they may be interested.

School of Art

Julie F. Codell
Director
(ART 102) 602/965–3468

PROFESSORS
ALQUIST, BRECKENRIDGE BRITTON, CHOU, CODELL, ECKERT, ERICKSON, FRONSKE GASOWSK , GILL NGWATER JAY, KAIDA, LOVELESS MAGENTA, MEISSINGER, P LE, PIMENTEL STULER, SWEENEY, J R TAYLOR, WHITE

ASSOCIATE PROFESSORS
COCKE DeMATTIES DETRIE, DUNCAN, FAHLMAN, GULLY, HAJ CEK JENKINS, KROEGER, KRONENGOLD MAXWELL PATEL, P TTSLEY RISSEEUW SCHLE F SCHM DT SCHUTTE, SERWINT, SHARER, STOKROCK , UMBERGER, WE SER, B YOUNG, J. YOUNG

ASSISTANT PROFESSORS
ATER, COLLINS HULICK, SANFT SCHOEBEL VERSTEGEN

PROFESSORS EMERITI
BROADLEY, F NK GOO, GRIGSBY, HAHN, HALE HELLER, JACOBSON, KELLY, LINDERMAN, SCHAUMBURG, SHIPP, J.J TAYLOR WAGNER, WATSON, WOOD, WOODS

MAJOR REQUIREMENTS

For advisement purposes, all students registering in a School of Art de gree program enroll through the Col lege of Fine Arts Each degree program and area of specialization has its own check sheet, which describes the par ticulars of course sequence and special requirements. Check sheets are avail able in the School of Art office.

BACHELOR OF ARTS DEGREE

The School of Art offers three con centrations for Art majors in the Bach elor of Arts program: studio art, photo-graphic studies, and art history. These concentrations are intended to give the student a broadly based general educa tion in the field with some specialized work at the upper division level. A minimum of 54 hours of general studies course work must be completed. All courses in the major must be completed with a "C" or better. The major in Art consists of 45 to 48 semester hours and includes the following requirements for each area of concentration.

Art History

Related Subject Field. Select nine hours ART (from 111, 112, 113, 115, 201, 274) ARE, ARA, APH plus an ap proved upper-division elective. Six hours of ART are recommended

Specialization. ARS 101, 102, 480, 498 (art history), and at least one course from each of the following ar eas: ancient, baroque, medieval, mod ern, non-Western, and Renaissance art. This concentration consists of a mini mum of 45 semester hours as approved by the student's advisor. It requires 33 semester hours of art history courses and 12 semester hours in related fields. At least 18 of the 45 hours must be up per division credit. Satisfactory completion of ARS 480 Research Methods is required before the senior year Demonstrated proficiency in at least one foreign language is required, equivalent to the level obtained through the completion of two years of study at the college level. For specific courses, see the Department of Languages and Literatures section, pages 124–131.

Studio Art

Core Curriculum. ARS 101, 102; ART 111, 112, 113, 115.

Specialization. Eighteen hours of ART courses, including 12 upper divi sion hours.

Art History. Nine hours of ARS courses which must include three hours of non Western and six hours of upper division ARS courses

Photographic Studies

Art History ARS 101, 102, 450, 451, 454, 458, 494 (history of photog raphy); elective (modern).

Photography ARA 202, 494 (ad vanced photo aesthetics); ART 201, 301, 304, 409, 494 (19th century pro cesses)

This concentration consists of 48 se-mester hours as approved by the student's advisor. Demonstrated proficiency in at least one foreign language is required, equivalent to the level ob tained through the completion of two years of study at the college level. For specific courses, see the Department of Languages and Literatures section, pages 124–131.

BACHELOR OF FINE ARTS DEGREE

Art

The major in Art consists of 75 se mester hours, with a concentration in one area selected on the basis of the student's interests. The following con-centrations are available to the student: art education, ceramics, drawing, fi bers, graphic design, intermedia, met als, painting, photography, printmak ing, and sculpture.

All students in this degree program follow the same pattern of courses in art for the first two semesters: ARS 101, 102, ART 111, 112, 113, 115.

At least 30 upper division semester hours must be earned within the major, with a minimum of 12 semester hours within the concentration.

All course work counted in the major must be completed with a "C" or better. The specific requirements for each con centration are recommended by the fac ulty advisors of the area and are listed on School of Art check sheets.

Courses from other departments, when approved by the advisor and the School of Art, may be applied to the major if deemed appropriate to the student's program of study. Art courses that do not have the same title and description as ASU catalog courses must have the approval of the School of Art standards committee.

Art Education

Core Curriculum. ARS 101, 102; ART 111, 112, 113, 115.

Specialization. ARE 350, 450, 470, 482, 486, 494, 496

Area of Proficiency. Twenty one hours with a minimum of 15 hours in a specific area of studio or art history with at least 12 upper-division hours.

Art History. Six hours of ARS up per division electives with one course in art during the 20th century.

Additional Requirements. ART 201, 223; three hours from ART 231, 261, 272, 274, or 276.

The concentration in art education consists of 75 semester hours with 21 hours in art education and 21 hours in an art proficiency approved by an art education advisor. The art proficiency courses must include a minimum of 15 hours in a specific area of studio art or art history. Twelve of these hours must be upper division credits The art proficiency can be in art history, ceramics, drawing, fibers, intermedia, metals, painting, photography, printmaking, or sculpture. Teaching experience is provided in the Children's Art Workshop, which is an on campus program based in studio and art history for children ages five to 15 Participation in the workshop is part of the requirements for ARE 486. ARE 486 meets the state certification requirements for the elementary methods class, and ARE 496 meets the requirements for the secondary methods class in the subject area. Both of these courses have prerequisites.

A student pursuing a B.F.A. in Art with a concentration in art education may also choose to become certified for teaching art K 12 If certification is elected while pursuing the art education undergraduate degree, additional hours are required in the College of Education. Students must make special application to the professional education program in the College of Education at the beginning of the junior year To be considered for admission to the professional program, students must have successfully completed the Pre Professional Skills Test (PPST) during the sophomore year. In addition, as part of the certification process, students must meet the U S and Arizona constitution requirement. Certification may also be pursued after receiving an undergraduate degree in art through the postbaccalaureate program in the College of Education Interested students should contact an advisor in the College of Education and in art education for admission requirements to the postbaccalaureate program. Art education courses for this program are ARE 450, 482, 486, and 496.

The B.F.A. in Art with a concentration in art education and the postbaccalaureate program for certification in art have special art education application procedures. This procedure is separate from, and in addition to, the admission requirements of ASU. Acceptance is based on a 2.50 GPA, completion of foundations courses (ART 111, 112, 113, 115), completion of 12 semester hours of art history courses (ARS 101, 102, two upper division), and a "B" or better in ARE 450 and 460. In addition, undergraduate and postbaccalaureate students seeking K 12 certification should check requirements and deadlines for admission to the College of Education professional program.

Student teaching in art education occurs only in the spring semester. To be accepted into student teaching, a student must be recommended in writing by the art education faculty and must have completed all art education classes except for ARE 496, which should be taken concurrently with student teaching Students who are not recommended may complete the B.F.A. in Art with a concentration in art education without certification or may reapply after meeting deficiencies in knowledge and skills related to the teaching of art.

Ceramics

Core Curriculum ARS 101, 102; ART 111, 112, 113, 115.

Specialization. ART 231, 261, 360, 364, 365, 460, 463, 466.

Art History. Six hours of ARS, including three hours of a 20th century elective and three hours of non Western art.

Additional Requirements. Select three hours from ART 211, 214, 227, and 340, and six hours from ART 272, 274, and 276.

Art Electives. Fifteen hours of ARA, ARE, ARS, and ART courses.

Drawing

Core Curriculum. ARS 101, 102; ART 111, 112, 113, 115.

Specialization ART 211, 214, 223, 227, 310, 311, 314, 315; six hours of ART 411 and/or 414; three hours in printmaking.

Art History. Three hours of non Western art; six hours of upper division ARS courses.

Additional Requirements Six hours of ART 201, 231, 261, 272, 274, or 276.

Art Electives. Fifteen hours of ARA, ARE, ARS, or ART courses.

Fibers

Core Curriculum. ARS 101, 102, ART 111, 112, 113, 115.

Specialization ART 276, 376, 377. Six hours of 476 and six hours of 477.

Art History. Six hours of upper division ARS courses, including a 20th century elective.

Additional Requirements. Nine hours of ART 201, 231, 261, 272, 274, 354.

Art Electives. Twenty-one hours of ARA, ARE, ARS, and ART courses.

Graphic Design

Core Curriculum. ARS 101, 102; ART 111, 112, 113, 115.

Specialization. ART 283, 284, 286, 287, 383, 385, 386, 387, 481, 482, six hours of 494 (graphic design)

Art History. Six hours of upper division ARS courses.

Art Electives. Fifteen hours of ARA, ARE, ARS, and ART courses.

The concentration in graphic design requires a special application procedure. The application procedure for new and transfer students is separate from and in addition to the required admission to ASU. Acceptance is determined by the graphic design faculty and is based on an application, test, and portfolio. Applications must be made between February 15 and March 15 for admission for the following fall semester. Students are accepted for entry into the graphic design program only in the fall semester of each academic year. Selection of applicants is made by April 1. Due to space limitations, not all qualified applicants can be accommodated, and the admission process is necessarily selective. For application forms and further information, contact the School of Art.

Intermedia

Core Curriculum. ARS 101, 102; ART 111, 112, 113, 115.

Specialization. ART 340, 341, 440, six hours of ART 231, 261, 272, 274, 276, six hours of ART 201, 211, 214, 223, 227, 252, 351, 354, 355; six hours of ART 340, 440, 494.

Art History. Three hours of ARS (non Western), 438, 439.

Art Electives. Twenty one hours of ARA, ARE, ARS, and ART courses.

Metals

Core Curriculum. ARS 101, 102; ART 111, 112, 113, 115.

Specialization. ART 272, 372, 373, 472, 473, 494 (metals).

Art History. Six hours of upper division ARS courses including a 20th century elective

Additional Requirements. Nine hours of ART 201, 223, 231, 261, 274, 276.

Art Electives. Eighteen hours of ARA, ARE, ARS, and ART courses.

Painting

Core Curriculum. ARS 101, 102; ART 111, 112, 113, 115.

Specialization. ART 211, 214, 223, 227, 311, 323, 324 (or 327), 325, 423 (or 427); three hours of 327, 411, 423, or 425.

Art History. Nine hours of ARS courses, which must include three hours of non Western and six hours of upper-division ARS courses.

Additional Requirements. Six hours of ART 201, 231, 261, 272, 274, 276.

Art Electives. Twelve hours of ARA, ARE, ARS, and ART courses.

Photography

Core Curriculum. ARS 101, 102; ART 111, 112, 113, 115.

Specialization. ARA 202; ART 201, 301, 304; nine hours of ART 305, 401, 403, 404, 405, 406, 407, 409, 494 (photo).

Art History. ARS 450, 451; six hours of ARS courses, including a non Western elective.

Additional Requirements. ART 211, 214, 223, 227, 340; three hours of ART 231, 261, 272, 274, 276.

Art Electives. Eighteen hours of ARA, ARE, ARS, and ART courses

Printmaking

Core Curriculum. ARS 101, 102; ART 111, 112, 113, 115.

Specialization. Three hours of ART 211 or 214; ART 252, 351, 354; nine hours of ART 352, 355, 451, 452, 454, 455, 456, 457, 458, 459; six hours of ART 214, 311, 314, 315, 411.

Art History. Six hours of upper-division ARS courses.

Additional Requirements. Six hours of ART 201, 223, 227, 231, 261, 272, 274, 276.

Art Electives. Eighteen hours of ARA, ARE, ARS, and ART courses.

Sculpture

Core Curriculum. ARS 101, 102; ART 111, 112, 113, 115.

Specialization ART 223, 231, 274, 331, 332, 431; 15 hours of 333, 374, 431, 432, 436, 437, 438, 474, 494 (all repeatable except 333).

Art History. Six hours of upper division ARS courses.

Additional Requirements. Nine hours of ART 261, 272, 276.

Art Electives. Fifteen hours of ARA, ARE, ARS, and ART courses.

GRADUATE PROGRAMS

The School of Art offers programs leading to the Master of Arts degree with a major in Art, including a concentration in art education or art history, and the Master of Fine Arts degree with a concentration in ceramics, drawing, fibers, intermedia, metals, painting, photographic studies, photographic studies, photography, print making, sculpture, or wood. In cooperation with the College of Education, the degree Doctor of Education is offered with a concentration in art education. Consult the *Graduate Catalog* for requirements for all graduate degrees.

STUDIO CORE CURRICULUM

ART 111 Drawing I. (3) F, S SS
Fundamental, technical and perceptual skills using common drawing media and their application to pictorial organization. 6 hours a week.

112 Two-Dimensional Design. (3) F S SS
Fundamentals of pictorial design 6 hours a week

113 Color. (3) F S, SS
Principles of color theory as related to the visual arts 6 hours a week. Prerequisites ART 111 112

115 Three-Dimensional Design. (3) F, S, SS
Fundamentals of 3 dimensional form 6 hours a week Prerequisites ART 111, 112.

DRAWING

ART 211 Drawing II. (3) F, S, SS
Continued development of technical and perceptual skills Emphasis on materials and pictorial content 6 hours a week. Prerequisites· ART 113, 115

214 Life Drawing I. (3) F, S, SS
Development of skill and expressiveness in drawing the basic form construction, and gesture from the human figure 6 hours a week Prerequisites ART 113, 115.

310 Pictorial Composition. (3) A
Methods systems and theories of pictorial composition employed by artists working on a 2-dimensional picture plane Studio. Prerequisite· ART 111 113, or instructor approval.

311 Drawing III. (3) F S
Emphasis on composition, exploration of drawing media. 6 hours a week Prerequisites· ART 211 and 214; instructor approval

314 Life Drawing II. (3) F, S
Drawing from the model with greater reference to structural graphic, and compositional concerns 6 hours a week Prerequisite· ART 214 or instructor approval

315 Life Drawing III. (3) F, S
The human figure as the subject for drawing Emphasis on conceptual alternatives and management of materials. 6 hours a week. Prerequisite: ART 314 or instructor approval.

411 Advanced Drawing. (3) F S
Visual and intellectual concepts through problem solving and independent study Emphasis on the individual creative statement. 6 hours a week May be repeated for credit Prerequisites: ART 311 instructor approval.

414 Advanced Life Drawing. (3) F, S
Various media and techniques on an advanced level. The human figure as an expressive vehicle in various contexts 6 hours a week. May be repeated for credit. Prerequisite: ART 315 or instructor approval

415 Art Anatomy. (4) N
Study of human anatomical structures as applied to the practice of figure oriented art 3 hours lecture, 5 hours studio a week. Prerequisite: ART 214.

PAINTING

ART 223 Painting I. (3) F, S, SS
Fundamental concepts and materials of traditional and experimental painting media. Emphasis on preparation of painting supports, composition and color 6 hours a week Prerequisites ART 113, 115

227 Watercolor I. (3) F S
Fundamental concepts, materials and techniques of watercolor Emphasis on problem solving, basic skills composition, and color. 6 hours a week. Prerequisites. ART 113, 115

323 Painting II. (3) F, S
Development of competency in skills and expression. Assigned problems involve light, space, color, form and content 6 hours a week Prerequisite: ART 223 or instructor approval.

324 Painting III. (3) F, S
Continuation of ART 323 6 hours a week. Prerequisite ART 323 or instructor approval

325 Figure Painting. (3) F S
The human figure clothed and nude as the subject for painting in selected media 6 hours a week. Prerequisites: ART 314 323

327 Watercolor II. (3) A
Explorations of personal expression in watercolor. Continued development of watercolor skills using traditional and experimental materials and techniques. 6 hours a week Prerequisite ART 227.

421 Painting Materials and Techniques. (3) A
Traditional and modern materials and techniques of painting Experimental problems in tempera encaustic, casein emulsions Maroger's Medium, and synthetic medial. 6 hours a week Prerequisite: instructor approval

423 Advanced Painting. (3) F, S
Continuation of ART 324 6 hours a week May be repeated for credit Prerequisite: ART 324

425 Advanced Figure Painting. (3) F, S
Continuation of ART 325 6 hours a week May be repeated for credit Prerequisites: ART 315 324 325.

427 Advanced Watercolor. (3) F S
Cont nuation of ART 327 More advanced for ma , conceptua , and techn'ca prob ems in contemporary watercolor 6 hours a week. May be repeated for cred t Prerequ s te ART 327

INTERMEDIA

ART 340 Intermedia. (3) F S
Experimental conceptua , and nterd sc p nary stud o art w th emphas s on new media and technologies. 6 hours a week May be re peated once for cred t Prerequisites ART 113 and 115 and 6 hours additiona studio requ re ments *or* nstructor approva

341 Mixed Media. (3) A
Exp oring visua effects by combin ng tradi- t'onal and nontrad t onal methods, techniques, and concepts. 6 hours a week May be re- peated once for cred t Prerequisites: ART 113 and 115 and 6 hours add tiona stud o requ re- ments *or* instructor approva

440 New Media Concepts. (3) F, S
Continued exper'ments w th new med a and interd sc p inary concerns in art 6 hours a week May be repeated for cred t. Prerequ s te: ART 340 Corequ s te ART 441.

441 Video Art. (1 F, S
Utilizing v deo and audio equipment essentia to the production of broadcast qua ity v deo art 2 hours a week. May be repeated for credit Corequ s te ART 440

PHOTOGRAPHY

ART 201 Photography I. (3) F, S
Deve opment of sk s and techniques of b ack and white photography. Emphas s on camera work and darkroom procedures. 2 hours ec ture 3 hours lab

301 Photography II. (3) F, S
Photography as an art med um with add t onal explorat on into personal photograph c aes thetics 6 hours a week. Prerequ s tes· ART 113 and 115 and 201 *or* nstructor approva .

304 Advanced Photography. (3) F S
Interpretation and man pu ation of l ght as a too n the performance of express ve photog- raphy 6 hours a week Prerequ s te: ART 301 or nstructor approval

305 Color Photography I. (3) F, S
App cation of co or transparenc es and pr nts to photographic art 6 hours a week Prerequi- s te ART 304 or nstructor approva

401 Nonsilver Photography. (3) F S
Recognit on of the nherent characterist cs of nonsilver processes and the use of these pro- cesses n the commun cat on of deas 6 hours a week May be repeated for cred t Prerequ - s te: ART 306 or instructor approva

403 Senior Photographic Projects. (3) F, S
Technical and ph osoph ca ref nement of per- sonal aesthetic with various photograph c me d a 6 hours a week May be repeated for credit. Prerequ s te. ART 304 or instructor ap- prova

404 Portraiture Photography. (3) F S
Photograph ng peop e Cnt ca discussions and s ide ectures on issues n portraiture 6 hours a week May be repeated for cred t Prerequ s tes. ART 304 and 306 *or* instructor approva

405 Advanced Color Photography. (3) F S
ntens ve use of subtract ve co or process in photograph c print ng 6 hours a week May be repeated for credit Prerequis te ART 305 or instructor approva

406 Photo Techniques. (3) F, S
Camera and darkroom techn ques w th em phas s on creative contro of the black and white print 6 hours a week Prerequ s te ART 301 or nstructor approval.

407 View Camera. (3) F S
V ew camera and darkroom techn ques Stu d o, lab Prerequisite. ART 301 or nstructor approva

409 Photographic Exhibition. (3) A
Care of photographic prints print presenta- tion and exh bit on Pract ca exper ence in gal ery operat ons 6 hours a week May be re peated for cred t Prerequis'te ART 304 or n structor approval.

PRINTMAKING

ART 252 Lithography I. (3) F S
B ack and wh te planograph c printmak ng ut - izing stone and alum num p ate processes 6 hours a week Prerequ s tes: ART 113, 115.

351 Intaglio I. (3) F, S
ntroduct on to contemporary and trad t ona deve opmenta techniques for black and wh te prints. 6 hours a week Prerequ s te nstructor approval.

352 Lithography II. 3) F S
Continuation of ART 252. ntroduct on to color techn ques and advanced image format on processes 6 hours a week Prerequ s te ART 252 or nstructor approval

354 Screen Printing I. (3) F, S
ntroduct on to paper, d rect and photographic stenc l techniques 6 hours a week Prerequ - site ART 113

355 Photo Process for Printmaking I. (3 F
ntroduct on to photograph c principles and sk l s for photomechan ca printmaking pro- cesses nc ud ng photos kscreen photo tho and photoetch ng 6 hours a week Prerequ - site: ART 201 or equ va ent

451 Advanced Intaglio. 3 F, S
Var ous contemporary and trad t onal methods of pr nt ng to achieve co or pr nts. 6 hours a week May be repeated for credit Prerequ - site: nstructor approval.

452 Advanced Lithography. (3) F S
Cont nuat on of ART 352. 6 hours a week May be repeated for cred t. Prerequ s te. in structor approval

454 Advanced Screen Printing. (3) A
Cont nuat on of ART 354 6 hours a week May be repeated for cred t Prerequ s te: in structor approva .

455 Advanced Photo Processes for Print- making. (3) A
A cont nued study of photomechan cal tech n ques and app cations to printmak ng or pho- tograph c processes Prerequ site ART 355 or nstructor approva .

456 Fine Printing and Bookmaking I. (3 A
Letterpress print ng and typography as f ne art. Study of h story, alphabets, mechan cs of hand typesett ng presswork and various forms of pr nted matter Prerequ site· instruc tor approva .

457 Fine Printing and Bookmaking II. (3) A
Cont nuat on of ART 456 Bookb nding book des gn and pr nt ng advanced typography theory, and presswork May be repeated for cred t Prerequ s tes ART 456 nstructor ap- proval.

458 Papermaking. (3) F, S
H story, theory demonstrations sheet form- ng, co age treatments, and 3 d mens ona ap- proaches 6 hours a week May be repeated for cred t. Prerequ s te nstructor approval

459 Monoprinting. (3) F, S
The nonmu tiple printed mage using a variety of technical approaches 6 hours a week. May be repeated for credit Prerequ s tes: ART 311, 323 or any 300 evel printmak ng class; nstructor approva

551 Intaglio Projects. (3) F S
The materia s and methods of Intag io as a matrix for exp oring var ous contemporary s sues Spec fica y structured to accommodate the graduate eve draw ng w th no pr ntmak- ing background Stud o

SCULPTURE

ART 231 Sculpture I. (3) F, S, SS
Exp orat on and express on of scu ptura form through deas and concepts re ated to basic materials; stud o safety 6 hours a week. Pre requ s tes. ART 113 115

331 Sculpture II. (3) F S
Cont nuat on of ART 231 6 hours a week Prerequ s te· ART 231

332 Advanced Sculpture. (3) F, S
Sculptura prob ems related to architecture and man's environment Explorat on in al me- d a. Color re ationsh ps as appl ed to scu p- ture. 6 hours a week Prerequ site· ART 331.

333 Experimental Sculpture. (3) N
An experimental approach to form materia re at onsh p toward atmospheric k net c, aud o, e ectron c and earth works 6 hours a week Prerequisite ART 332 or instructor approva .

431 Special Problems in Sculpture. (3) F, S
Deve opment of a persona approach to scu p ture, emphas s on form, nd v dual prob ems, and related color techno ogy Profess ona practices and presentat on 6 hours a week May be repeated for credit Prerequ s tes ART 332; nstructor approval

432 New Directions in Sculpture. (3) A
Exam nation of env ronment as resource for mages and deas. Exper mentat on n nontra d t onal methods and nterre at ng d sc pl nes 6 hours a week May be repeated for cred t Prerequ s te. ART 332 or nstructor approva .

436 Architectural Sculpture. (3) N
Scu ptural concepts as re ated to architecture and other man-made environments Sca e drawing mode s, and re ief scu pture 6 hours a week May be repeated for cred t Prerequ - s te ART 332 or instructor approva

437 Non-Permanent Sculpture. (3) N
Art of a temporary nature nc ud ng sequent a and conceptual works Att tudes may be pre- sented in fi ms or other visua media 6 hours a week May be repeated for cred t Prerequi- site nstructor approval

438 Experimental Systems in Sculpture. (3) N
Systems and concepts for phase changes of materia s, temperature/pressure f'e d time compress on/extens on, and e ectron c activation of d mens ona forms. 6 hours a week May be repeated for cred t. Prerequis te n structor approval

CERAMICS

ART 260 Ceramics for Non-majors. (3) F, S, SS
Handbu lding methods wheel throw ng, glaze and decorat've processes Raku and stoneware f r ngs 6 hours a week.

261 Ceramic Survey. (3) F S, SS
Handform ng methods throwing on the whee , decorat ve processes and g aze appl cat on. 6 hours a week Prerequisites· ART 112 115

360 Ceramic Throwing. (3) F, S
Design ana ys s and product on of funct ona pottery. Emphasis on throwing techniques, surface enrichment and g aze app cation 6 hours a week May be repeated once for cred t Prerequisite ART 261

364 Ceramic Handbuilding I. (3) F
Search for form us ng handbu d ng techn'ques. K n f nng and related prob ems Prerequ s te: ART 261.

365 Ceramic Handbuilding II. (3) S
Cont nuat on of ART 364 with an additiona focus on large-scale works, surface treatments and glaze decoration w th re ated ki n f nng appl cat ons Prerequ site: ART 364 or instruc tor approva

460 Ceramic Clay. (3) A
Research into var ous c ay body formulat ons, oca natural materia s, s p g azes and engobes 6 hours a week Prerequ s tes ART 360 and 364 *or* nstructor approva

463 Ceramic Glaze. (3) A
G aze formu ation and ca cu ation using various g aze surfaces and co ors 6 hours a week Prerequisite· ART 460 or instructor approva .

466 Special Problems in Ceramics. (3) F S, SS
Emphasis on persona express on with n structure of seminars, critiques and stud o work Profess onal methods of presentation/ documentation of work. 6 hours a week May be repeated for cred t Prerequ s te ART 364 or nstructor approval.

FIBERS

ART 276 Fibers I. (3) F S
Exp oration of various mater a s and bas c techn ques n the structura use of fibers and surface des gn on fabric 6 hours a week. Prerequ s tes ART 113 and 115 *or* instructor approva .

376 Fibers: Loom Techniques. (3) A
nvest gation of loom techniques and computer pattern des gn 6 hours a week Prereq u s tes ART 113 or 115 or instructor approva

377 Surface Design. (3) F S
Surface des gn on fabric through the app ca t on of dyes and p gments Techniques inc ude pa nting print ng, airbrush ng, and the cyano type process Prerequisite. ART 276 or in structor approva

476 Fibers: Multiple Harness Weaving. (3) F, S
Advanced loom techn ques and computer pat tern des gn. Emphas s on ndiv dua des gn and oom appl cat on Prerequ s tes· ART 113 or 115 or 376 or instructor approva .

477 Printed Textiles. (3) A
Techn ques for screen print ng on fabric ex ploring pattern as a composit ona element Var ous stenc' methods inc ud ng photographic processes Stud o May be repeated for cred t Prerequ site: ART 377 or 'nstructor approva

METALS

ART 272 Jewelry I. (3) F, S
Emphas s on fabr cat on in jewe ry making Bas'c techniques of forming cutting and p erc- ng, forg ng and so dering. 6 hours a week

372 Jewelry II. (3) F, S
Fabricated approach to jewe ry making Tech n ques in stone sett ng and surface embe l sh ment 6 hours a week Prerequis'tes· ART 113 and 115 and 272 *or* nstructor approva

373 Metalworking I. (3) A
Compression d e, and stretch form ng as appl ed to hol ow form construction Hot and co d forging techn ques as app ied to sm'th ng. 6 hours a week. Prerequ s tes ART 113 and 115 and 272 *or* nstructor approva

472 Advanced Jewelry. (3) F, S
Jewe ry mak ng w th emphas s on developing persona statements and craftsmanship 6 hours a week May be repeated for cred t Prerequ s tes ART 372, instructor approva .

473 Advanced Metalworking. (3) A
Forg ng and form ng techn ques in nd v dual zed d rections 6 hours a week May be re peated for credit Prerequ s tes ART 373; in structor approval

WOOD

ART 274 Wood I. (3) F S
Fundamenta woodwork ng techn ques to produce creat ve funct ona 3-d mens ona objects 6 hours a week

374 Wood II. (3) F, S
nd v dua and d rected problems n wood re ated to the product on of un que funct onal art objects 6 hours a week Prerequ s tes: ART 113 and 115 and 274 *or* instructor approva .

378 Furniture I. (3) A
Design and bu ld ng of contemporary furn ture. Exploration in the techn que of jo nery, am nation carv ng, and f n sh'ng procedures. 6 hours a week Prerequisites ART 113 and 115 and 274 *or* nstructor approval

474 Advanced Wood. (3) F, S
Extended exper ence and advanced techn ques n the use of wood to create funct onal works of art 6 hours a week. May be repeated for cred t. Prerequisites: ART 374, nstructor approva .

478 Advanced Furniture. (3) A
Form concepts are explored in construction of nvent ve furn ture Emphasis on med a experimentation 6 hours a week. May be repeated for cred t. Prerequ s te ART 378

GRAPHIC DESIGN

ART 283 Letterform I. (3) F
Draw ng of letterforms with focus on propor t on and structure ntroduction to letterform nomenclature and c ass f cat ons. 6 hours a week. Prerequ s tes ART 113, 115 accep tance nto graph c design program Corequ s te ART 284.

284 Visual Communication I. (3) F
Theoretica and app ed stud es n shape draw ng and color 6 hours a week Prerequ s tes ART 113 115; acceptance nto graph c des gn program Corequ s te ART 283

286 Visual Communication II. (3) S
Trans t on from theoret ca to app ed prob lems Emphasis on refinement of v sua sk s 6 hours a week Prerequ s tes: ART 283 284 acceptance nto graph c des gn program Corequ s te ART 287.

287 Letterform II (3) S
Continuat on of Letterform w th an emphas s on lowercase letters bas cs of pen wnt ng and font des gn 6 hours per week. Prerequ sites ART 283 284 Corequ s te· ART 286

382 Graphic Representation. 3 F
Studio pract ce in draw ng w th an app ication towards graphic commun cation 6 hours a week. May be repeated once for cred t Prerequis'tes ART 284, nstructor approva

383 Typography I. (3) F
Theoretica exerc ses in spatial and textura qua t es of type Prob ems in tens on act va- t on, and ba ance Exerc ses in s mp e typo graph ca app 'cat ons 6 hours a week Pre requisites ART 286, 287 acceptance into graph c des gn program Corequ s te ART 386

385 Typography II. (3) S
Problems n composit on cho ce, and comb nat ons of type faces, formats, and their app - cation to a variety of des gn projects. 6 hours a week. Prerequ s tes ART 286 383 Corequ s te ART 387

386 Visual Communication III. (3) F
Prob ems n specif c design appl cat ons such as poster packag ng, pub cations. Emphas s on deve opment of concepts n v sual commun cat ons 6 hours a week Prerequ s te ART 286 Corequ site: ART 383

387 Visual Communication IV. (3 S
C ent oriented projects Prob ems are mu t faceted and the emphases are on cont nu ty of des gn n more than one med um and format 6 hours a week Prerequ s te ART 386. Corequ s te· ART 385.

481 Visual Communication V. (3) F, S
Stud o prob ems with an emphas s on ana y- sis prob em-solving and professiona portfol o preparat on 6 hours a week Prerequ s tes ART 387 nstructor approval.

482 Visual Communication VI. (3) S
Ind v dual and group projects w'th outs de c ents A l projects cu m nate n an exh b t 6 hours a week Prerequ s te. ART 481.

485 Graphic Design Workshop. (3) F, S SS
Preprofess onal c ent/des gner situat ons from concept to pr nted work Stud o workshop and nternsh ps for se ected students 6 hours a week. May be repeated once for cred t. Prerequ s'te nstructor approval.

SPECIAL STUDIO ART

ART 444 Computer Art I. (3) F, S
A study of PC hardware and software for cre at ng art Emphas s on computer graph cs h s tory, hardware software conf gurat ons DOS princ p es of 2- and 3 d mens onal graph cs. 2 hours ecture 2 hours stud o Prerequisites: ART 111, 112 (or equ va ent); 'nstructor approval. *General stud es N3.*

446 Computer Art II. (3) A
Three-d mens ona mode ng, l ght ng surface attributes and spec a effects for art app ca- tions Emphasis on expl c t commands. Stu d o Prerequ site: ART 444 or nstructor approva . *General studies N3.*

448 Computer Animation. (3) F S
Pr nc p es and app cat ons of 3 d mens ona an mat on for art and des gn using DOS- and MAC based systems Lecture discussion studio Prerequ s tes ART 113 and 115 *or* n- structor approval

530 2-Dimensional and 3-Dimensional Computer Art. (3 A
Integrat on of 2 D mens ona and 3-D mensiona computer mag'ng for art. Emphas s upon new direct ons for computer mag ng wh ch accounts for med a characteristics Stu d o.

540 Advanced Computer Art. (3) A
Study of motion for 3-d mens onal mode s, ght sources and surface effects Course as sumes students have a comprehens on of comp ex mode ng, mapping and ght ng. Stu d o. Prerequ site ART 446 or 'nstructor approva .

621 Studio Problems. (3) F, S SS
Advanced study n the fol ow ng areas
(a) Draw ng
(b) Pa nting
(c) Photography
(d) Printmak ng
(e) Sculpture
(f) Ceram cs
(g) Meta s
(h) Wood
(i) Fiber Art
(j) Stud o Art
6 hours a week each sect on May be re peated for cred t. Prerequ s te nstructor ap prova

680 Practicum: M.F.A. Exhibition. (1 15) F, S SS
Studio work in preparation for requ red M F A exh b t on. Pub ic exh bit to be approved by the student's superv sory comm ttee and accompan ed by a f na oral exam nat on Photographic documentation and wr tten statement of problem. Prerequ s te approval of the student's supervisory comm ttee.

Omnibus Courses: See page 44 for omn bus courses that may be offered

ART EDUCATION

ARE 301 Studio Art and Human Development. (3) A
The study of human deve opment in stud o art from ear y ch dhood to adu t years.

450 Studio Art: Art History I. (3) A
Art trad t ons before the 20th century as a ba- s s for stud o and art h story nstruction 2 hours ecture 2 hours stud o Pre- or corequ s te· ARE 350

460 Art Education and Design. (3) F, S
E ectronic mag ng in design design n socia cultural contexts, hypermed a in design edu cat on 2 hours lecture, 2 hours stud o. Prereq u s tes ARS 101 and 102 and ART 113 and 115 *or* nstructor approval

470 Art Criticism: Aesthetics. (3) A
Tradit ons of aesthet cs and art cnt c sm; con ceptua issues n contemporary art; educat on n the visua arts 2 hours ecture, 2 hours stu dio. Students are recommended to take ARE 482 concurrently Prerequisite. ARE 350 or n- structor approval

482 Studio Art: Art History II. (3) S
Art trad tions of the 20th century as a basis for stud o and art h story nstruction 2 hours lec ture 2 hours studio Must be taken before en rol ment n ARE 486 Students are recom mended to take ARE 470 concurrent y. Prerequ s te ARE 450.

486 Art Education: Strategies and Applications. 3) F
The mplementat on and eva uat on of art n- struct on for K–12 populat on. Inc udes teaching of Saturday c asses n the Ch dren's Art Workshop. Prerequ s te ARE 482

496 Methods and Assessment of Learning in Art. (3) A
nd v dual or group research on the assess- ment of art earn ng incorporat ng theory and pract ce Prerequ s tes: ARE 470 and 486 *or* nstructor approval

510 Art Education Colloquium. (3) F
H storical foundat ons of art education and facu ty presentation of pos t ons regard ng teach ng and research re ated to the visua arts Must be taken n the first 6 hours of study.

515 Art Foundations of Art Education. (3) A
Foundations of art educat on, with an empha s s on psycho og ca , ph osophical and h s torica frames of reference.

520 Issues in Teaching Art History. (3) A
Cnt cal exam nat on of 'ssues concern ng teach ng art history to different popu ations of students H storica and ph osoph cal founda t ons and emphas s on deve op ng inqu ry nto historica and cultura contexts of art. Recommended to be taken before ARE 525

525 Research on Teaching Art History. (3) A
Review of emp rica and h storical research, research methods learn ng theory and assessment of earning n art history. P ot studies on the effects of nstruct on upon earning. Recommended to be taken after ARE 520

530 Issues in Teaching Studio Art. (3) A
Cr tical exam nat on of ssues concern ng teach ng stud o art to d fferent populat ons of students. H stor cal and ph osophical founda t ons Emphas s on how concepts for repre sentation are developed. Recommended to be taken before ARE 535.

535 Research on Teaching Studio Art. (3) A
Review of emp r ca and histor'ca research methods earn'ng theory, and assessment of earn ng in stud o art, nc ud ng deve opmental stud es and the r m'tat ons Pi ot studies on the effects of 'nstruction upon learn ng Recommended to be taken after ARE 530

540 Teaching Art in Cultural Contexts. (3) A
Re ationsh p of mu t cu tural perspect ves to teach ng/learn ng art cnt c sm, aesthetics stu- d o art and art h story

550 Aesthetic Inquiry. (3) A
Literature on aesthet cs methods of inquiry, and imp cat ons for art education

570 Analyzing Works of Art. (3) N
The cnt cal exam nat on of art or statements about art and the deve opment of ways for guiding th s exam nation

610 Issues and Trends in Art Education. (3) N
Doctora - eve nvest gation of h storica and contemporary ssues re ated to teaching and research n art educat on.

611 Curriculum Development in Art Education. (3) N
Doctoral eve inqu ry 'nto the ph losophica psycho og ca , and soc o og ca foundat ons of curricu um deve opment.

Omnibus Courses: See page 44 for omn bus courses that may be offered

ART HISTORY

ARS 100 Introduction to Art. (3) F S, SS
Deve opment of understanding and enjoyment of art and its relat onship to everyday fe through the study of pa nting, scu pture, arch - tecture and des gn May not be taken for cred t by student who has comp eted ARS 300 nor used as art h story cred t by Art majors *General studies· HU.*

101 Art of the Western World I. (3) F, S
H story of Western art from the Pa eo thic pe- nod through the M dd e Ages *General studies· HU H.*

102 Art of the Western World II. (3) F, S
History of Western art from the Rena ssance to the present *General stud es HU.*

201 Art of Asia. (3) A
H'story of the art of the Asian cu tures with emphas s on Ch'na, Japan, and ndia Meets non-Western art history requ rement. *General studies HU, G H*

202 Art of Africa, Oceania, and the Americas. (3) A
H story of art of Africa, Ocean a and the New World Meets non-Western art history requ re ment *General stud es HU G*

300 Introduction to Art. (3) F S
Course content same as ARS 100 but re- qu res a h gher leve of accompl shment and comprehension May not be taken for cred t by student who has comp eted ARS 100 nor used as art h story credit by Art majors. *Gen eral studies: HU.*

340 Art in America. (3) A
American art from co on a t mes through the Second Wor d War Not ava ab e to students who have had ARS 444, 542 or 543. Prereq uis tes: ARS 101 and 102 *or* nstructor ap proval. *General studies. HU*

350 19th-Century Photography. (3) F
H story of photography from the med um's preh story to 1914: personal ties processes mages, and 'deas. *General studies: HU*

351 20th-Century Photography. (3) S
Persona t'es processes, images, and ideas n photography from 1914 to present. Prerequi s tes ARS 101 and 102 *or* instructor approval *General studies. HU*

400 History of Printmaking. (3) A
History of the print as an art form and ts re a tion to other modes and forms of art stic ex- pression Prerequ s tes. ARS 101 and 102 *or* instructor approva *General stud es· HU, H*

402 Art of Ancient Egypt. (3) N
Aesthet c ph osoph ca and cultura bas s of Egypt an art from pre-Dynastic period through New K ngdom Emphas s on scu pture and ar ch tectura monuments Prerequ s tes: ARS 101 and 102 *or* nstructor approva *General stud es HU H.*

404 Greek Art. (3) A
H story of art, architecture of Aegean civ za tions (Cyc ad c M noan, Mycenaean) and of Greece to end of He en stic per od Prerequ s tes ARS 101 and 102 *or* nstructor approval *General stud es HU, H*

406 Roman Art. (3) A
Art and arch tecture of Etrur a, the Roman Repub c and the Roman Emp re. Prerequ s tes ARS 101 and 102 *or* nstructor approva *Gen era stud es HU H*

410 Early Christian and Byzantine Art. (3) A
Art and arch tecture of the early church and the Byzant ne Emp re from the 4th to the 15th century Prerequis tes ARS 101 and 102 *or* nstructo approval *General stud es HU*

412 Early Medieval Art. (3) N
Pa nt ng sculpture, architecture and the m' nor arts from M grat on Carol ng an, and Otton an periods cons'dered w thin re gious soc a and econom c contexts. Prerequisites ARS 101 and 102 *or* nstructor approva . *Gen eral studies HU H*

414 Romanesque Art. (3) A
Scu pture, pa nt ng, arch tecture, and m nor arts in western Europe ca 1030–1200, con s dered w thin rel g ous economic and soc al contexts Prerequ s tes ARS 101 and 102 *or* nstructor approval. *General studies HU, H*

416 Gothic Art. 3 A
Pa nt ng scu pture, and architecture in western Europe dur ng the Goth c per od Prerequ s tes ARS 101 and 102 *or* instructor approva *General studies. HU*

418 Renaissance Art in Northern Europe. 3 A
Graph cs pa nting scu pture, and architecture ca 1450–1550 Reformat on themes and Re na ssance style cons dered with n re g ous, pol tical, soc a and econom c contexts. Pre requ s tes ARS 101 and 102 *or* instructor ap prova . *General studies HU*

420 Early Renaissance Art in Italy. (3) N
Pa nt ng scu pture and architecture in ta y from 1300 to 1500 Prerequ s tes ARS 101 and 102 *or* nstructor approva *General stud ies HU H*

422 Italian High Renaissance Art and Mannerism. (3) A
H story of Ita an art dur ng the 16th century nc ud ng the ach evements and nf uence of Leonardo da Vinc Raphae and Michel ange o Prerequis tes ARS 101 and 102 *or* in structor approva *General studies: HU.*

424 Italian Baroque Art. (3) A
ta an pa nting sculpture, and arch tecture of the 17th century Prerequisites ARS 101 and 102 *or* nstructor approva *General studies HU, H*

426 Art of the 17th Century in Northern Europe. 3) A
Baroque pa nt ng, scu pture and arch'tecture n F anders the Netherlands France and En g and Prerequ sites ARS 101 and 102 *or* n structor approva *General stud es HU H*

428 Art of the 18th Century. (3) A
H story of pa nt ng sculpture, arch tecture graph c arts and the decorat ve arts from 1700 to the French Revo ut on (1789) Prereq u s tes ARS 101 and 102 *or* nstructor approva *General studies HU, H*

430 Art of Spain and Its Colonies. (3) A
Arch tecture pa nt ng, and scu pture from 1500 to 1800. Colonial focus on centra Mexico and the Amer can Southwest. Prereq uisite ARS 102 or nstructor approva *Gen eral studies HU H*

432 Art and Revolution: European Art 1770–1850. (3) A
mpact of Amer can and the French revolu t ons and Napo eonic epoch on the v sua arts Focus on neoc ass c and romant c movements Prerequ s tes ARS 101 and 102 *or* instructor approva . *General studies: HU, H.*

434 Realism and Impressionism: European Art 1840–1880. (3) N
Social, po it ca , aesthet c forces affect ng art. Concentrat on on Courbet Daum er Manet, Monet Degas, and tens ons between avant garde and Academ c art Prerequ s tes ARS 101 and 102 *or* nstructor approval *General stud es. HU.*

436 Art at the Turn-of-the-Century: 1885–1914. (3) A
History of European avant garde movements. Concentration on post mpress on sm symbo ism, express onism, and cub sm. Prerequ sites ARS 101 and 102 *or* nstructor approva *General stud es. HU.*

438 Art of the 20th Century I. 3) A
Deve opments and d rections n art between 1900 and World War I Prerequ s tes ARS 101 and 102 *or* nstructor approval. *General stud es. HU, H*

439 Art of the 20th Century II. (3) A
Art s nce Wor d War I w th cons deration of new concepts and exper mentat on w th media *and modes of presentat on Prerequ sites* ARS 101 and 102 and 438 *or* instructor ap proval *General studies: HU H.*

442 American Art I. (3) A
Art n the Un ted States from European sett e ment to 1850 Prerequisites ARS 101 and 102 *or* 'nstructor approva *General studies HU*

443 American Art II. (3) A
Art in the Un ted States from 1850 to 1892. Prerequisites ARS 101 and 102 *or* nstructor approva . *General studies: HU.*

444 Modern American Art, 1900–1945. (3) A
American pa nt ng scu pture, photography and architecture 1900–1945 Covers major monuments nc ud ng the eight, modern sm prec s onism regiona sm, and the WPA Pre requ s tes ARS 101 and 102 *or* nstructor ap proval. *General stud es. HU*

449 Gender and Representation in Photography. (3) N
*An exam nat on of gender ssues 'n photogra*phy Lecture, d scussion Prerequisites ARS 101 and 102 or instructor approva .

452 Facets of Modernism. (3) A
The or g ns of modern art photography be tween 1915–1920 and the nfluence of these deas on contemporary magemakers. Lec ture d scuss on, papers. Prerequ s tes ARS 350 351

453 Issues in Contemporary Photography. (3) A
A d scuss on sem nar identify ng, defining and research ng the ssues and deas that inf u ence the appearance and crit c sm of contem porary images Seminars lectures presentations, papers. Prerequ s tes. ARS 350 351

454 Research and Writing in Photography. (3) A
Pr nciples and pract ce of research and wnt ng n the h story and criticism of photography. Papers required Prerequ sites: ARS 450 and 451 *or* nstructor approva , ENG 101 and 102 *or* equivalents

455 Photo Studies. (3) A
A sem nar compris ng ectures presentat ons, and discussions on issues in educat on, history ga ery management, wr t ng crit c sm, and the med um's future Sem nar ectures, presentat ons, papers.

457 History of Art Criticism. (3) N
Theories of crit c sm of the v sual arts from late 18th century to present Prerequisites ARS 101 and 102 *or* nstructor approva . *Gen eral studies. HU, H*

458 Critical Theories in the Visual Arts. (3) N
Exam nes current critica theor es through the r app cation to a l visua arts May include new h stonc sm, Marx sm, deconstruct on, post structura ism sem otics, Lacanian psy choana ys s, fem n sm postmodernism Lec ture, discussion student presentations Pre requis tes ARS 101 and 102 *or* instructor ap prova *General studies· HU.*

459 Writing Art Criticism. (3) N
Traditiona and contemporary approaches to the crit c sm of art. Students w l wnte cnt ca essays The atter ha f of the semester w l stress the cr tic sm of contemporary art n van ous media Prerequisite ARS 458 or instruc tor approval

462 Precolumbian Art I. (3) A
Arch tecture scu pture ceram cs, pa nting and other arts of Mesoamer ca before European contact Sat sf es non Western art h story requirement Prerequ s tes: ARS 101 and 102 *or* nstructor approval. *General stud es HU, H.*

463 Precolumbian Art II. (3) A
Arch tecture, scu pture ceramics textiles and other art of South America prior to European contact w th focus on the Central Andes. Sat sfies non Western art history requ rement Prerequisites· ARS 101 and 102 *or* instructor approval. *General studies. HU, H*

465 Native North American Art. (3) A
Native American art forms of the Un ted States and Canada from preh stonc t'mes to the present Prerequisites ARS 101 and 102 *or* nstructor approval. Meets non Western art history requ'rement. *General studies HU, H*

466 Native American Art of the Southwest. (3 A
American ndian art n the southwestern states from ts or gins to the present day. Meets non-Western art h story requirement Prerequ s tes ARS 101 and 102 *or* instructor approval. *General studies. HU C H.*

468 Art of the Arctic and Northwest Coast. (3) N
Art assoc ated with ceremony, shaman sm, and da ly rfe in the Arct c and on the North west Coast Meets non Western art h story requirement Prerequisites: ARS 101 and 102 *or* nstructor approva . *General studies· HU*

469 Mexican Art. (3) A
Art of Mexico and re ated Centra American cu tures from the prehistoric to the contemporary schoo s. Meets non Western art h story requ rement. Prerequ s tes ARS 101 and 102 *or* nstructor approval *General studies HU, H*

472 Art of China. (3) A
Study of major forms n Chinese art· ritua bronze scu pture, ceramic ca igraphy pa nting, and arch tecture Sat sf es non Western art h story requ rement Prerequ s tes ARS 101 and 102 *or* 'nstructor approval *General studies HU, G.*

473 Art of Japan. 3) A
Japanese art from the Jom0an per od to the present Satisf es non-Western art h story re qu rement Prerequ s tes ARS 101 and 102 *or* nstructor approval *General stud es: HU*

475 Chinese Painting. (3) A
From Ku K'a -ch n to Ch i Pa shih Major art sts, styles and movements n Chinese pa nting Satisf es non Western art h story requ re ment Prerequ s tes: ARS 101 and 102 *or* n structor approval *General studies. HU.*

480 Research Methods. (3) F S
Methodology and resource matena for art h storical research. Techniques of scholarly and critical writing and eva uation of b bl ographic sources Prerequ s tes: ARS 101 and 102 *or* nstructor approval *General studies: L2.*

485 Women in the Visual Arts. (3) S
H storical study of art by women n various med a; re ated soc a po t cal, educationa s sues; representat on of women in art Lecture d scuss on Prerequ s te ARS 101 or 102 or nstructor approva *General studies· L2.*

498 Pro-Seminar. (3–6) A
Undergraduate sem nar n topics selected from the fo lowing Problems or criticism in
(a) Ch nese Art
(b) Ancient Art
(c) Med eval Art
(d) Renaissance Art
(e) Baroque Art
(f) Modern Art
(g) American nd an Art
(h) Pre Columb an Art
( ) Photograph'c H story
(j American Art
Prerequ'site· nstructor approval.

501 Methodologies and Art History. (3) A
The h story of the d sc p ne and an exp ora t on of various methodo ogies and crit cal b bl ograph es used by art h storians Sem nar

502 Critical Studies in Egyptian Art. (3) N
Egyptian art from pre Dynast c to New King dom periods. Focus on aesthet c, ph losoph cal, and cu tural context. Research paper and read ngs requ red

504 Critical Approaches to Greek Art. (3) A
Art and arch'tecture of Aegean c v izat ons (Cyc ad c, M noan Mycenaean) and of Greece to end of He len'st c period Research paper and read ngs requ red

506 Critical Studies in Roman Art. (3) A
Art and architecture of Etruria the Roman Repub ic and the Roman Empire Research pa per and/or supp ementa read ngs requ red

514 Critical Approaches to Romanesque Art. (3) N
Sculpture, pa nting, architecture and the m nor arts n western Europe, ca. 1030–1200, cons dered with n re g'ous, economic, and social contexts. Research paper required.

516 Critical Approaches to Gothic Art. (3) N
Arch tecture, sculpture pa nting, and the m nor arts in western Europe, ca 1150–1350, cons dered with n re igious, soc al, and econom c contexts. Research paper required.

522 Sixteenth Century Italian Art. (3) A
Critica study of pa nting, sculpture and arch tecture n 16th century Italy n its re gious and h storical context.

528 Eighteenth Century Art in Europe. (3) A
Critica study of European art from the ate Baroque to the early years of Neoc assic sm

530 Art of Spain and New Spain. (3) A
Cr tical study of architecture, painting, and sculpture from 1500 to 1800 Lecture, confer ence

532 Art, Politics, and Patronage 1770–1850. (3) F
Critical analyses of pol tical events n Europe. ssues of patronage, art as propaganda exam ined. Impact of war and revolut on on visua arts

534 Studies in Modern European Art, 1850–1914. (3) A
Critical study of visua arts using primary source matena from mid-19th century to WWI with n ph losoph cal, soc o/econom c contexts. Lecture tutoria Prerequisite nstructor approva

542 American Art I. (3) A
Exp ores themes and ssues n American art with a critical study of American pa nting from the 18th century to 1848 Prerequisite: nstruc tor approval

543 American Art II. (3) A
Explores themes and 'ssues in American art w th a crit'ca study of American paint ng from 1848 to 1900 Prerequ site instructor approval.

544 American Modernism and Realism, 1900–1945. (3) A
Cnt ca study of the soc a , po t cal, and artis t c changes in American art dur ng the f'rst half of the twentieth century. Prerequ s tes ARS 101 and 102 *or* 340.

549 Gender and Representation in Photography. (3) N
An exam nat on of gender ssues in photography. Research paper Lecture d scuss on Prerequisites ARS 101 and 102 or nstructor approval

562 Art of Ancient Mesoamerica. (3) F
Critical study of art and architecture of Mex co and Maya area before Span'sh contact Lec ture, conference.

565 Native Art of North America. (3) A
A cr tical exam nation of Native Amer can art with n cu ture, preh story to the present. Pre requ'sites ARS 101 and 102 *or* nstructor ap prova .

574 Studies in Japanese Art. (3) A
A critical exam nation of the nature and h story of Japanese art, its nch heritage and its n debtedness to foreign sources Lecture d scussion Prerequisites ARS 101 and 102 *or* instructor approval

575 Approaches to Chinese Painting. (3) F
A crit ca history of Ch nese pa nt ng from Eastern Chou to 1911 Emphas s on masters reg'onal developments and conceptual underpinnings. Lecture, discussion Prerequ s tes ARS 101 and 102 *or* instructor approval.

591 Seminar. (3–6) A
Graduate sem nar n top cs se ected from the fo owing. Problems or criticism n:
(a) Ch nese Art
(b) Anc ent Art
(c) Med eva Art
(d) Rena ssance Art
(e) Baroque Art
(f) Modern Art
(g) American Ind an Art
(h) Pre-Co umb an Art
(i) Photograph c History
(j) American Art
Prerequ s te. 'nstructor approva

Omnibus Courses: See page 44 for omnibus courses that may be offered

ART AUXILIARY COURSES

ARA 202 Introduction to Photo Aesthetics. (3) F, S
S de lecture course n understand ng photography as a fine art form.

303 Art Appreciation and Human Development. (3) F
Foundations of art for ch ldren and young adults. Emphas s on earn ng, development, and understanding art n h stonca and cu tural contexts 1 hour ecture 4 hours stud o. Pre requ s te ARS 101 and 102 and ART 113 and 115 *or* nstructor approval *General studies HU*

345 Design Rhetoric. (3) F, S
Development of crit ca th nking and expres s on of deas n concise and persuas ve writ ten and spoken form. Prerequis tes· ENG 101 102. *General Studies: L2*

460 Gallery Exhibitions. (3) F S
Pract cal exper ence n a l phases of department gal ery operat ons and preparat on of ga lery publ cat ons. May be repeated for credit. Prerequ s te instructor approva

488 Understanding Art. (3) F, S
Understand ng art as an emergent cultura phenomenon with an emphasis on a crit ca exam nation of conceptua ssues n art Writ ing requ red Prerequisites ARS 101 and 102 *or* nstructor approva . *General studies· L2, HU.*

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Dance

Elizabeth C. Lessard
Chair
(PEBE 107B) 602/965-5029

PROFESSORS
CHLISTOWA, JONES, KEUTER
LESSARD, LUDWIG

ASSOCIATE PROFESSOR
KAPLAN

ASSISTANT PROFESSORS
BALCENA, MATT,
MOONEY V SS CARO

PROFESSOR EMERITUS
G SOLO

LECTURERS EMERITI
DESJARDIN, NAGRIN

INSTRUCTIONAL PROFESSIONAL EMERITUS
ROSEN

DEPARTMENTAL MAJOR REQUIREMENTS

For advisement purposes, all stu dents registering in a Dance degree pro gram enroll through the College of Fine Arts. Each degree program and area of specialization has its own check sheet, which describes the particulars of course sequence and special require ments These check sheets are avail able in the Department of Dance office

Placement Examinations

All students who enroll in an under graduate Dance degree program are re quired to take part in a placement audi tion to determine their evels of techni cal proficiency in modern dance and ballet. Official dates for auditions are set for the orientation periods that pre cede the fall and spring semesters of each academic year. Transfer students who have completed music theory for dance, dance production, or choreogra phy courses at another institution are also required to take placement exami nations in these areas before enrolling in intermediate or advanced levels of course work.

BACHELOR OF ARTS DEGREE

The Dance major consists of a mini mum of 60 semester hours in dance, of which the following are required: DAH 190, 201, 401, 402, 495 496; DAN 121, 122, 134, 135, 164, 171, 172, 173, 174, 210, 228, 234, 235, 264, 265, 334, 340, 341. Fifteen additional hours ap proved by an advisor must be in no more than two related fields. Addi tional requirements are listed on the de partmental check sheet.

At least 50 semester hours, including 18 in the major, must be upper division Grades in classes required for the major must be "C" or better. First semester students should take DAH 190, DAN 121, 134, and 135, ENG 101, one gen eral studies requirement, and one elec tive.

BACHELOR OF FINE ARTS DEGREE

The Dance major consists of 80 to 90 semester hours with a concentration in either performance and choreography or dance education. The following core courses are required: DAH 190, 201, 401, 402, DAN 121, 122, 134, 135, 164, 171, 172, 173, 210, 211, 228, 234, 235, 264 265, 334, 340, 341, 464, 465, 480. The following additional require ments are included for the concentra tion in performance and choreography: DAN 321, 328, 335, 371, 434; MUS 347 (or 355 or 356); THP 101; one ARS or ART elective. For the concen tration in dance education, DAN 350, 351, 357 and 359, and one hour of Jazz Dance must be completed as well as all state secondary certification require ments Other requirements for each op tion are listed on the departmental check sheet.

At least 50 semester hours, including 30 in the major, must be upper division hours. Grades in classes required for the major must be "C" or better. First semester students should take DAH 190, DAN 121, 134, and 135, ENG 101, one general studies requirement, and one elective

MINOR

The Department of Dance offers a minor consisting of 18 semester hours of course work, including 12 upper di vision hours. A minimum grade of "C" is required in the following areas: stu dio (eight hours), theory (five hours), production (choice of two zero hour courses), and electives (five hours). In terested students should contact the De partment of Dance for specific require ments and admission procedures.

DEPARTMENTAL GRADUATE PROGRAM

The faculty in the Department of Dance offer a program leading to the Master of Fine Arts degree with a ma jor in Dance. The program is designed to train professionals in the technique, performance, choreography, and theo retical bases of modern dance Consult the *Graduate Catalog* for requirements

DANCE HISTORY

DAH 100 Introduction to Dance. 3) F S
Or entat on to the f e d of dance focusing on h story sty es, cu tura and theatrica aspects of the art form *General stud es. HU.*

190 Introduction to the Dance Profession. (1) F
Or entation to the dance profess on ntroduc- ing career options and un vers ty department resources. Des gned for Dance majors

201 Dance in World Cultures. (3) S
Explores the role of dance n var ous cultures aro nd the world

300 Introduction to Dance. (3 F S
Course content same as DAH 100 but re- qu res a h gher eve of accomp shment and comprehens on. May not be taken for credit by student who has completed DAH 100 *Gen eral studies. HU.*

301 Philosophy and Criticism of Dance. (3) F S
Ph losoph cal ssues n dance and dance cnt cism with emphas s on written analys s and nterpretat on. Prerequ s te 1 semester of F rst-Year Compos tion *General studies. L2 HU*

401 Dance History I. (3) F
Cu tural and theatr ca development of dance from preh story through the 19th-century Ro- mantic per od, ncluding the ear y h story of ba et *General stud es HU*

402 Dance History II. 3) S
Cultura and theatrica deve opment of dance from 19th century Romant c period through Contemporary times nc udes ba let, modern and mus ca theatre dance *General studies. HU.*

495 Dance Research Sources. (2) F
The invest gat on of various resources and methods for conduct ng research n dance Sem nar. Prerequ s te instructor approval

496 Senior Thesis Project. (2) S
A cu m nat ng research project which inte- grates dance and a re ated f e d of nterest Prerequ s te. DAH 495

501 Philosophy of Dance. (3) S
Ana yt ca and cr t cal study of the mp cations of trad t ona and contemporary ph losoph es of dance regard ng meaning dent ty form, content genre, and sty e

502 Cultural Concepts of Dance. (3) S
Cu tura concepts, trends econom c po tica , and geograph ca forces in major eras of dance h story

Omnibus Courses: See page 44 for omn bus courses that may be offered.

DANCE

DAN 121 Rhythmic Theory for Dance I. (2) F
Elements of music mus c structures, and the r re ationsh p to dance Emphasis on rhythmic ana ys s and dance accompaniment

122 Rhythmic Theory for Dance II. (2 S
Cont nuat on of DAN 121 with an emphas s on notat on p tch, me ody harmony, and h ston cal perspect ves Prerequ's te: DAN 121.

130 Dance. (1) F, S, SS
Ba et mprov sat on, jazz modern, west Afn can, Afro Caribbean, Ba et Folk onco F a- menco Lat n ba room fo k, Tai Ch May be repeated for cred t

134 Technique and Theory of Modern Dance. (3) F S
E ementary concepts of modern dance tech n que Deve opment of movement qua ty and performance sk s. 6 hours weekly May be repeated for credit. P acement aud tion re- qu red Prerequ site: Dance major

135 Technique and Theory of Ballet. (2) F, S
E ementary ba et techn que w th emphas s on a gnment contro , and deve opment of the feet w th proper awareness of sty e and phras- ng 4 hours week y. May be repeated for cred t. P acement and aud t ons requ red

164 Improvisation. (1) F S
mpr v sat on techn ques emp oy ng the bas c e ements of space time, and energy. Stud o.

171 Dance Production Lab: Costume. (0) F, S
Part c pation n concert dance product on 'n the area of costum ng Requ red of a l Dance majors Lab.

172 Dance Production Lab: Technical Theatre. (0) F S
Partic pat on n concert dance production in the area of techn ca theatre. Requ'red of a Dance majors Lab

173 Dance Production Lab: Management. 0) F, S
Partic'pat on 'n concert dance product on n the area of product on management. Required of a l Dance majors Lab

210 Dance Production I. (2) F
Theory of l ght ng, scenery, and sound as re ated to dance.

211 Dance Production II. (2) S
Theory and pract ce of publ c ty makeup cos tuming house and stage management as re- ated to dance production Prerequ s te DAN 210 or nstructor approva

228 Dance Notation I. (3) F
Survey of systems of dance notat on Intro- duct on to effort shape ana ysis of movement Emphas s on earning e ementary labanotation Prerequis tes DAN 121 MUS 100.

230 Dance. (1) F, S
ntermed ate evels Continuat on of DAN 130 2 5 hours a week May be repeated for cred t

234 Technique and Theory of Modern Dance. (3) F, S
Intermediate concepts of modern dance tech nique Development of movement qua ty and performance sk ls 6 hours week y May be repeated for cred t P acement audit on re qu'red Prerequ s te Dance major

235 Technique and Theory of Ballet. (2) F, S
The advanced study of e ementary ba et tech n que through the trad t na exerc ses with proper awareness of sty e and phras ng 4 hours week y May be repeated for cred t. P acement aud t on requ red

237 Beginning Pointe. (1) F, S
The study of elementary po nte techn que through the trad tiona exerc ses 2 hours week y. May be repeated fof cred't. Prerequ s tes basic ba et tra n ng; instructor approval.

264 Fundamentals of Choreography I. (2) F S
ntroduction to and appl cat on of bas c cho reographic pr nc p es with emphas s on impro visat on movement invention and develop- ment of eva uat ve sk s. Prerequ s tes. DAN 164, nstructor approval

265 Fundamentals of Choreography II. (2) F S
Intermediate app cation of bas c choreo graphic princ ples with emphas s on mprovi sat on form content, and eva uative sk l s. Prerequ s tes DAN 164, 264

318 Dance and Video. (2) N
Fundamenta s of dance v deo product on n c ud ng camera operation scr pt ng and n camera ed ting Prerequisites jun or stand g; nstructor approva .

321 Music Literature for Dance. (3) F
H stor cal survey of mus c re at ve to dance Emphasis on deve op ng isten ng ski s and knowledge of mus cal versus choreograph c forms Prerequis te: DAN 121 or nstructor ap prova .

328 Dance Notation II. (2) S
Intermed ate study of abanotat on. Emphas's on score read ng Prerequ s te DAN 228 or equivalent.

330 Dance. (1) F S
Advanced eve s Cont nuat on of DAN 230 2 hours weekly. May be repeated for cred t

334 Technique and Theory of Modern Dance. (3) F S
Advanced concepts of modern dance tech n que Deve opment of movement qua ty and performance ski s 6 hours week y. May be repeated for credit P acement aud t on re- qu red

335 Technique and Theory of Ballet. (2) F S
ntermed ate bal et technique w th emphas s on strength, dynam cs, rhythm ca impu ses and transit ons with awareness of proper sty e and phras ng 4 hours weekly May be re peated for credit P acement aud tion required.

336 Classic Jazz Dance. (2) F
Study of 150 years of azz dance n America through the learn ng of period dances, read ng, creat ve work, and performance May be repeated for cred t Studio Prerequis te: n structor approva

337 Intermediate Pointe. (1) F, S
Study of ntermed ate and advanced po nte technique through the trad tional exerc ses 2 hours weekly May be repeated for credit Pre requ s te DAN 237 or nstructor approva

340 Dance Kinesiology I. (3) F
K nesio og cal principles applied to dance techn'que ncluding ana ys s of muscular pat- terns in dance movement and the pathomechan cs of dance njury Prerequ's te· ZOL 201 or nstructor approva

341 Dance Kinesiology II. (3) S
Continuation of DAN 340 Prerequ site DAN 340

342 Ideokinesis. 2 F
A study of posture us ng the v sua zat on of mage goa s to fac tate mproved al gnment and movement eff c ency May be repeated for cred t Lecture stud o

350 Methods of Teaching Modern Dance in Secondary Education. (3) F
Ana ysis and acqu s t on of teach ng mater a s for the techn que, mprov sat'on and choreog raphy of modern dance Lecture, stud o Pre or corequisite DAN 334 or equ va ent

351 Methods of Teaching Ballet, Jazz, and Multicultural Dance in Secondary Education. (2) S
Ana ysis and acqu's t on of teach ng tech n ques and materials for bal et jazz, and mu t cu tural dance forms Lecture, stud o Pre or corequis'te: DAN 334 or equ va ent

357 Children's Dance. (3) F SS
Theory and pract ce of teaching creat ve dance to ch dren Des gned for Dance majors and related curricula but open to a students

359 Dance Education Theory. (3) S
App cat on of pr nc p es of mot vat on, earn 'ng, and eva uat on to the teaching of dance. Pre- or corequ s te DAN 334 or equ va ent

371 Dance Theatre Performance/Production. 1 3) F S
Performance or techn ca theatre work n des- gnated dance pr duct ons 3 hours a week per semester hour May be repeated for cred t. Prerequ s te instructor approva .

434 Technique and Theory of Modern Dance. (3) F S
Preparat on in the performance and compre hens on of profess ona evel modern dance techn que 6 hours weekly May be repeated for credit P acement aud tion required

435 Technique and Theory of Ballet. (2) F, S
The study of profess ona advanced ba let techn que w'th emphasis on preparat on for performance. 4 hours week y May be re peated for cred t P acement audit on requ red

437 Partnering. 2) S
Fundamenta techn que, theory and pract ce of partner ng app cab e to al dance forms. Var ations from ba et on po nte and off . May be repeated for credit Prerequis te instructor approva

464 Choreography and Accompaniment. (3) F
Function of accompan ment for dance, expen ence in the use of percuss on vo ce records, p ano and selected nstruments in re at on to the r use n choreography Stud o Prerequ - s tes DAN 264 and 265 *or* equ valent

465 Advanced Choreography. 3) S
nvest gation and pract ce of contemporary sty es of choreography Stud o Prerequ s tes DAN 264 and 265 *or* equ va ent.

480 Senior Performance in Dance. (2) F
Or g na choreography for group performance w th analysis and cr t que of prob ems encoun tered n product on. Must be repeated for a to- tal of 4 cred ts Prerequ s tes DAN 464, 465

510 Dance Stagecraft and Production. (3) N
Theory of ghting costum ng makeup scen ery and sound as re ated to dance perfor- mance. May be repeated once for cred t Lec ture, studio Prerequ site DAN 211 or equ va- lent.

518 Dance and Video Production. (2) N
Dance v deo product on and ana ys s of cur- rent research in the f e d. Spec a projects in c ud ng thes s documentat on are d scussed Lecture stud o

528 Dance Notation III. (3) N
Advanced study of labanotat on. Expenences n notat ng and reconstruct on of abanotat on dance scores. Lecture stud o Prerequ s te: DAN 328 or equ valent.

534 Technique and Theory of Modern Dance. (2 F, S
Preparat on n the performance and compre hens on of profess ona evel modern dance for first year graduate students 6 hours weekly May be repeated for credit. P acement aud tion required.

535 Technique and Theory of Ballet. (1) F S
Graduate- evel study of professiona advanced ba et techn que with emphas s on preparat on for performance 4 hours week y May be repeated for cred t Placement aud - tion requ'red.

536 Classic Jazz Dance. (2) F
Study of 150 years of jazz dance in Americа earning per od dance, read ng, and choreo graph c ass'gnments May be repeated for cred t. Stud o Prerequ's'te· nstructor approva

537 Partnering. (2) S
Fundamenta techn que, theory, and practice of partnering app icab e to a l dance forms Variat ons from bal et (on po nte and off). May be repeated for cred t Prerequ site: nstructor approval.

542 Ideokinesis. (2) F
A theoret'ca examination of ideok netic meth ods of fac itating postural change and movement eff c ency

550 Graduate Dance Pedagogy: Modern. (3) S
Advanced ana ys s of teaching techniques for modern dance

551 Graduate Dance Pedagogy: Ballet. (3) F
Advanced analysis of teach ng techn ques for ba let Prerequ s te. nstructor approval

561 Choreographer/Composer Workshop. (3) N
Analys s of, experimentation with, and pract ce n work'ng with composers of mus c for chore ography. Open to experienced choreographers and composers. Lecture, stud o. Prerequ s te instructor approva .

563 Solo and Group Choreography. (3) F
Or g na choreography created for solo and group performance May be repeated once for cred t. Prerequ s tes DAN 464 and 465 *or* equ va ent.

571 Dance Theatre. (1 3) F, S
Performance n spec a y choreographed dance product ons 3 hours a week May be repeated for cred t Prerequisite: instructor ap proval.

591 Seminar. (0–3) F, S
Sem nar focus ng on enrichment top cs, product on aspects of thes s projects teaching concerns spec a ectures, f ms, or cr t ques

634 Technique and Theory of Modern Dance. (2) F, S
Preparat on in the performance and compre hens on of professiona evel modern dance for second year graduate students. 6 hours weekly. May be repeated for credit. Placement audit on required.

640 Advanced Problems in Analysis of Dance Technique. (3) S
Theor es and princ p es of human anatomy k nes o ogy and the psychology of learn ng ap- pl ed to ana ys s of dance movement. Prerequ s tes: DAN 340 and 342 *or* instructor approval

693 MFA Performance. (1–9) F S
Studio work n preparation for requ red M F A concert Publ c performance to be approved by the student's superv sory committee and to be fo lowed by a f nal oral exam'nat on. A writ ten bound document as we l as video docu mentat on must be eft with the department. Prerequ s te. instructor approva

Omnibus Courses: See page 44 for omnibus courses that may be offered

School of Music

George E. Umberson
Director
(MUSIC 185) 602/965–3371

REGENTS' PROFESSORS
HICKMAN, UNG

PROFESSORS
ATSUMI, BOSWELL, D. BRITTON, M. BRITTON, CLARK, DEBENPORT, DOAN, FLEMING, HACKBARTH, HAMILTON, HARRIS, HOFFER, HOOVER, HUMPHREYS, KLIEWER BRITTON, KOONCE, LOCKWOOD, LYNE, MAGERS, MAROHNIC, METZ, OLDANI, PAGANO, PERANTONI, E. SELLHEIM, SHINN, SKOLDBERG, SPINOSA, SPR NG, STOCKER, STRANGE, SWAIM, UMBERSON, WELLS, WYTKO

ASSOCIATE PROFESSORS
BARROLL-ASCHAFFENBURG, COSAND, CROWE, DeMARS, FERRIS, HAEFER, HOLBROOK, MEYER, RAUSCH, RAVE REBER, REYNOLDS, ROGERS, J. SELLHEIM, , SUNKETT, W LLIAMSON, WILSON

ASSISTANT PROFESSORS
BACON, CARPENTER, HOOKER, MONTGOMERY, J. SMITH, SOLIS, STAUFFER

PROFESSORS EMERITI
ANDRESS, BOWERS, D'ANDREA, DRESSKELL, ENGLISH, FLETCHER, HANNA, HINES, LAMM, LOMBARDI, McEWEN, RICKEL, ROBINSON, ROSEN, SCOULAR, SEIPP, M. SMITH, STALZER

The School of Music is a member of the National Association of Schools of Music, and the requirements for en trance and graduation set forth in this catalog are in accordance with the pub lished regulations of the association. The following statement of basic musi cianship is endorsed by the School of Music:

All musicians, whether performers, com posers, scholars or teachers, share common professional needs. Every musician must to some extent be a performer, a listener, a his torian, a composer, a theorist, and a teacher For this reason, certain subject matter areas and learning processes are common to all baccalaureate degrees in music.

Basic musicianship is developed in stud ies which prepare the student to function in a variety of musical roles which are support ive of his/her major concentration. All un dergraduate curricula, therefore, provide the following:

1. A conceptual understanding of such musical properties as *sound, rhythm, melody, harmony, texture* and *form* and opportunities for developing a comprehensive grasp of their interre lationships as they form the cognitive affective basis for listening, compos ing and performing.
2. Repeated opportunities for enacting in a variety of ways the roles of listener (analysis), performer (interpretation), composer (creation), scholar (re search), and teacher.
3. A repertory for study that embraces all cultures and historical periods.

MAJOR REQUIREMENTS

For advisement purposes, all stu dents registering in a School of Music major program enroll through the College of Fine Arts. All music degree programs require a minimum of 126 hours for graduation. In addition to the major requirements listed below, general studies and other academic require ments are listed on pages 50–72 of this catalog.

Placement Examination. All students who enroll in an undergraduate music degree program are required to perform an entrance audition in their primary performing medium (instrument or voice). Audition forms and specific au dition requirements for each instrument or voice may be obtained upon request by writing the School of Music. Offi cial dates for these auditions are set for each academic year. Students may re quest to audition on other dates if nec essary or may send a tape recording if distance prohibits coming to the cam- pus. Entering students must also take a placement test in piano at the time they enter the university including transfer students who have completed four se mesters of piano at another institution. These transfer students are required to reach a minimum level of achievement indicated on the Piano Placement Exam. All Choral–General and Instru mental music majors, including transfer

and postbaccalaureate students, must perform an additional audition before being admitted to the teacher education program. Normally, this audition oc curs during the sophomore year

BACHELOR OF ARTS DEGREE

The Music major consists of 50 se mester hours. The fol owing courses are required:

Music Theory. MTC 125, 221, 222, 223, 320 (or 321), 327, 422.

Music History. MHL 341, 342.

Major Performing Medium. Eight semester hours of MUP 111 or 311.

Class Piano. MUP 131, 132, 231, 232 (unless waived by proficiency ex amination .

Recital Attendance Six semesters of MUP 100.

The remaining hours in music are se lected by the student in consultation with an advisor. Areas of study may include music history, ethnomusi cology, and music theory. At least 23 semester hours, 12 in the field of spe cialization, must be in the upper divi sion. At least 54 hours of general stud ies course work must be completed, which may include courses taken to meet the foreign language requirements listed on page 298 of this catalog. Suf ficient elective courses must be se lected by the student in consultation with his or her advisor to complete the total of 126 semester hours required for graduation.

BACHELOR OF MUSIC DEGREE

This curriculum consists of 84 se mester hours and offers majors in Cho ral–General Music, Instrumental Mu sic, Music Therapy, Performance, and Theory and Composition. Choral General Music and Instrumental Music majors are provided for students wish ing to meet certification requirements for teaching in the public schools. The following requirements are included in each major

Choral–General Music Major

This degree program may include a teaching minor in instrumental music.

Music Theory MTC 125, 221, 222, 223, 327

Music History MHL 341, 342.

Conducting. MUP 209, 339.

Music Education. MUE 313, 315, 480.

Major Performing Medium Eight semester hours of MUP 111 and eight semester hours of MUP 311 to obtain a proficiency level necessary to meet the graduation recital requirement. MUP 495 completes the requirement.

Minor Performing Medium. A profi ciency equal to six semesters of study in keyboard or voice (whichever is not the major performing medium). Stu dents wishing to extend their profi ciency beyond this level may continue to study in MUP 321.

Ensemble. Eight different semesters of participation, including at least six semesters of MUP 352 and/or MUP 353, four of which must be at ASU

Recital Attendance. Six semesters of MUP 100.

Instrumental Music Major, Instrumental Concentration

It is strongly recommended that this degree program include a minor in Choral Music or a minor in Jazz Educa tion.

Music Theory. MTC 125, 221, 222, 223, 327.

Music History. MHL 341, 342.

Conducting. MUP 210, 340.

Music Education MUE 315, 317, 318, 327, 328, 336, 337, 338, 481, 482.

Class Piano. MUP 131, 132, 231, 232 (unless waived by proficiency ex amination).

Major Performing Medium. Eight semester hours of MUP 111 and eight semester hours of MUP 311 to obtain a proficiency level necessary to meet the graduation recital requirement. MUP 495 completes the requirement.

Ensemble. Eight different semesters of participation, four of which must be at ASU. For wind and percussion play ers, two of the four ASU semesters must be in marching band. String play ers must have a minimum of six semes ters of MUP 345. Wind and percussion players must have a minimum of six se mesters of MUP 361.

Recital Attendance Six semesters of MUP 100.

Instrumental Music Major, String Concentration

Music Theory. MTC 125, 221, 222, 223, 327.

Music History. MHL 341, 342.

Conducting. MUP 210, 340.

Music Education. MUE 315, 317 (or 318, whichever does not include the major instrument), 329, 335, 336, 339, 482, 485; MUP 121 (three hours, a string instrument in the area other than the major instrument), MUP 121 (one hour, a third string instrument), MUP 121 (one hour, a fourth string instru ment).

Class Piano. MUP 131, 132, 231, 232 (unless waived by proficiency exam).

Major Performing Medium. Eight semester hours of MUP 111 and eight semester hours of MUP 311 to obtain a proficiency level necessary to meet the graduation recital requirement. MUP 495 completes the requirement.

Ensemble. Eight different semesters of participation, four of which must be at ASU. A minimum of six semesters of MUP 345.

Recital Attendance. Six semesters of MUP 100.

Recommended Electives. MUE 313.

Performance Major, Guitar Concentration

Music Theory. MTC 125, 221, 222, 223, 320 or 321, 327.

Music History. MHL 341, 342, 447.

Repertoire and Pedagogy. MUP 451, 481.

Conducting. MUP 210.

Major Performing Medium. Sixteen semester hours of MUP 127 and 16 hours of MUP 327 to attain a profi ciency level necessary to meet the graduation recital requirements. A half recital (MUP 495) and a full recital (MUP 496) are required.

Class Piano. MUP 131, 132, 231, 232 (unless waived by proficiency ex amination).

Ensemble. Eight semester hours of ensemble within a minimum of six dif ferent semesters. Four of the eight hours must be MUP 379 Chamber Mu sic Ensemble–Guitar.

Recital Attendance. Six semesters of MUP 100.

Performance Major, Jazz Concentration

Music Theory MTC 125, 221, 222, 223, 315, 316, 320 or 321, 327, 440, 441.

Music History. MHL 152, 341, 342, 352.

Conducting. MUP 210.

Major Performing Medium. Eight semester hours of MUP 111 and eight semester hours of MUP 311 to obtain a proficiency level necessary to meet the graduation recital requirements. Two half recitals (MUP 495) are required, with one in the jazz idiom.

Class Piano. MUP 131, 132, 231, 232, 235, 236, 294

Improvisation. MUP 141, 142, 217, 218, 417, 418.

Workshops. MUP 319, 320.

Ensemble. Eight semesters including two semesters of MUP 386 and six semesters of MUP 379 Chamber Music Ensembles.

Recital Attendance. Six semesters of MUP 100.

Performance Major, Keyboard Concentration

Music Theory. MTC 125, 221, 222, 223, 320 (or 321), 327, 425 (or 428).

Music History MHL 341, 342, 447.

Repertoire and Pedagogy. MUP 451 (or 452), 481 (or 482).

Conducting. MUP 209 or 210.

Harpsichord. One credit of harpsichord required.

Major Performing Medium. Sixteen semester hours of MUP 127 and 16 hours of MUP 327 to attain a proficiency level necessary to meet the graduation recital requirements A half recital (MUP 495) and a full recital (MUP 496) are required.

Ensemble. Eight semester hours within a minimum of six different semesters, including two semesters of accompanying and two semesters of chamber music.

Recital Attendance. Six semesters of MUP 100.

Performance Major, Music Theatre Concentration

Music Theory. MTC 125, 221, 222, 223, 327.

Music History. MHL 341, 342, 447, three elective hours.

Conducting. MUP 209 or 210.

Major Performing Medium. Eight semester hours of MUP 111 and eight semester hours of MUP 311 to attain a proficiency level necessary to meet the graduation requirement of a public performance of two roles, one of which must be of major proportion.

Class Piano. MUP 131, 132, 231, 232 (unless waived by proficiency examination).

Ensemble. Five semesters of MUP 370, three semesters of MUP 371, and eight semesters of MUP 373.

Recital Attendance. Six semesters of MUP 100.

Additional Requirements. A minimum of six semester hours each in theatre and dance.

Performance Major, Orchestral Instrument Concentration

Music Theory. MTC 125, 221, 222, 223, 320 or 321, 327, 425.

Music History. MHL 341, 342, 447.

Repertoire and Pedagogy. MUP 451 or 481

Conducting. MUP 210, 340.

Major Performing Medium. Sixteen semester hours of MUP 127 and 16 hours of MUP 327 to attain a proficiency level necessary to meet the graduation recital requirements. A half recital (MUP 495) and a full recital (MUP 496) are required.

Class Piano. MUP 131, 132, 231, 232 (unless waived by proficiency examination).

Ensemble Eight semester hours of large ensembles within a minimum of six different semesters plus four semester hours of small ensembles within a minimum of four different semesters.

Recital Attendance. Six semesters of MUP 100.

Performance Major, Piano Accompanying Concentration

Music Theory. MTC 125, 221, 222, 223, 320 or 321, 327, 428.

Music History. MHL 341, 342, 447.

Diction and Repertoire. MUP 250 (two semesters), 451, 453, 454.

Conducting. MUP 209 or 210.

Major Performing Medium. Sixteen semester hours of MUP 127, eight semester hours of MUP 311, and eight semester hours of MUP 337. In addition, each student accompanies two half recitals (MUP 495), one for a singer and one for an instrumentalist, during his or her junior year. (A half solo recital may be substituted for either of the above) During the senior year, the student accompanies two full recitals (MUP 496), one vocal and one instrumental.

Ensemble. Two semesters of MUP 379 (chamber music), one semester of MUP 379 (two piano ensemble), one semester of MUP 487 (piano accompanying), four semesters of MUP 388, and two semesters of ensemble elective (minimum of six different semesters).

Recital Attendance. Six semesters of MUP 100.

Language Eight hours of one foreign language: French, Italian, or German.

Performance Major, Voice Concentration

Music Theory. MTC 125, 221, 222, 223, 320 or 321, 327, 425.

Music History. MHL 341, 342, 447.

Repertoire and Pedagogy. MUP 451, 481; two semester hours selected from MUP 453 or 454 or a repeated enrollment of MUP 451.

Diction. MUP 250; three semester hours of diction for singers—Italian, German, French.

Conducting. MUP 209.

Major Performing Medium. Sixteen semester hours of MUP 127 and 16 hours of MUP 327 to attain a proficiency level necessary to meet the graduation recital requirements. A half recital (MUP 495) and a full recital (MUP 496) are required.

Class Piano. MUP 131, 132, 231, 232 (unless waived by proficiency examination).

Ensemble. Four different semesters of large ensembles plus five semester hours of ensembles within five different semesters to be selected from large and/or small ensembles.

Recital Attendance. Six semesters of MUP 100.

Additional Requirements. Sixteen semester hours in more than one foreign language, chosen from French, German, and Italian. A student may elect one year of one language and either one or two semesters of the other(s), chosen in conference with the advisor.

Music Therapy Major

Students must apply to the National Association for Music Therapy for registration as a music therapist on completion of the requirements for graduation.

Music Theory MTC 125, 221, 222, 223, 327, 422.

Music History. MHL 341, 342.

Conducting. MUP 209 or 210.

Music Education. MUE 211, 313, 335, 336, 398.

Music Therapy. MUE 161, 261, 361, 362, 381, 384, 385, 386, 387, 388, 441, 475, 476.

Major Performing Medium. Six to eight semesters, which must include at least four hours of MUP 311.

Piano. Proficiency equal to four semesters of study.

Voice. Two semesters of study.

Ensembles. Six semesters of participation with at least four semesters in large groups.

Recital Attendance. Six semesters of MUP 100.

Additional Requirements. Four semester hours of functional dance and specified courses in science and social and behavioral sciences.

Theory and Composition Major, Theory Concentration

Music Theory. MTC 125, 221, 222, 223, 320, 321, 323, 327, 422, 425, 428, 496, 10 hours electives in MTC courses 300 or above, to be chosen in consultation with advisor.

Music History. MHL 341, 342, 447, and three upper division elective hours.

Conducting. MUP 209 and 339 *or* MUP 210 and 340.

Applied Music. Twelve semester hours of study, eight of which must be MUP 111.

Class Piano. MUP 131, 132, 231, 232 (unless waived by proficiency examination).

Ensemble. Eight semesters of participation.

Final Project. MTC 496.

Recital Attendance. Six semesters of MUP 100.

Language. The equivalent of 16 semester hours of credit in one foreign language; the choice of language subject to approval of advisor.

Theory and Composition Major, Composition Concentration

Music Theory. MTC 125, 221, 222, 223, 320, 321, 323 (four semesters), 327, 422, 425, 428, 429, 430, 432, 433.

Music History. MHL 341, 342, 447, and three upper-division elective semester hours.

Conducting. MUP 209 and 339 *or* MUP 210 and 340.

Applied Music. Twelve semester hours of study, eight of which must be MUP 111.

Class Piano. MUP 131, 132, 231, 232 (unless waived by proficiency examination).

Ensemble. Eight semesters of participation.

Final Project. MTC 495.

Recital Attendance. Six semesters of MUP 100.

GRADUATE PROGRAMS

The School of Music offers the following graduate programs: the Master of Arts degree with majors in Music History and Literature and in Music Theory; the Master of Music degree with majors in Choral Music (choral music, general music), Composition, Instrumental Music, and Performance [music theatre musical direction, music theatre performance, performance pedagogy, piano accompanying, solo performance (instrumental), solo performance (keyboard), solo performance (voice)]; and the Doctor of Musical Arts degree with majors in Choral Music, General Music, Instrumental Music, and Solo Performance. The Doctor of Education degree in Secondary Education (music education) is offered in cooperation with the College of Education. Consult the *Graduate Catalog*. A document on graduate degree programs in music may be obtained by writing to the School of Music.

MUSIC

MUS 100 Fundamentals of Music Notation. (3) F, S SS
Provides non-Music majors with sufficient symbolic literacy to begin work in the field of musical learning. Credit not applicable toward any Music degree.

107 Introduction to Music. (2) F, S SS
Correlation of music with literature science, and art. A nontechnical course in the humanities for non-Music majors Credit not applicable toward any Music degree. *General studies HU.*

340 Survey of Music History. (3) F, S, SS
Major periods composers and compositions in the history of music. *General studies: HU, H*

347 Jazz in America. (3) F S, SS
Current practices employed by contemporary jazz musicians; the historical development of jazz techniques. Credit not applicable toward any Music degree. *General studies. HU*

353 Survey of Afro-American Music. (3) A
Afro-American music traced from its origins in Africa to the present with emphasis on spiritual, blues, jazz gospel and classical styles. Credit not applicable toward any Music degree *General studies· HU.*

354 Popular Music. (3) A
Emphasis on historical, cultural, and performance patterns in a variety of popular idioms such as but not limited to, rock folk jazz, and Afro-American music May be repeated for credit Credit not applicable toward any Music degree. *General studies. HU.*

355 Survey of American Music. (3) F, S SS
Growth and development of American music Credit not applicable toward any Music degree *General studies. HU H*

356 Survey of the Musical Theatre. (3) N
Music's place in the theatre viewed in terms of historical importance and relative function. Credit not applicable toward any Music degree. *General studies. HU.*

357 Aesthetic Perception in Music Performance. (3) F, S SS
Introduces the non-Music major to the aesthetics of performance by stressing their physical and emotional involvement in the direction, motion, intensity, and color spectrum of music. Credit not applicable toward any Music degree. *General studies HU*

363 Survey of Russian Music. (3) F '95
Examines music and musicians in Russia and the Soviet Union from the Middle Ages to the present. Lecture, discussion.

Omnibus Courses: See page 44 for omnibus courses that may be offered

MUSIC EDUCATION

MUE 110 Introduction to Music Education. (1) S
Overview of music education Orientation to student characteristics teacher roles and foundations of philosophy and history. School observations required

161 Introduction to Music Therapy. (2) F
Overview of music therapy Orientation to mental health special education, and related therapies Required on-site visits.

211 Music in Recreation. (2) F
Materials, methods, and organizational structures appropriate for recreational music

261 Music Therapy as a Behavioral Science. (2) F
Orientation to preclinical experience with an emphasis on observation skills, assessment goal setting, and professional ethics Required off-campus observations Prerequisite MUE 161.

310 Music in Early Childhood Education. (3) S
Identifying and understanding musical needs of young children Methods and materials for program development for classroom teachers.

311 Music for the Classroom Teacher. (3) F, S
Development of the classroom music program in the elementary school No previous music experience or course work required Not for Music majors or minors

313 Elementary Music Methods. (3) F
Methods of instruction, organization and presentation of appropriate content in music Prerequisite: Music major

315 Music in the Junior High School. (2) A
Student characteristics curriculum and teaching strategies for choral and general music. Prerequisite Music major.

317 Educational Methods for Violin and Viola. (1) F S
Teaching and playing skills for music teachers 3 hours per week

318 Educational Methods for Cello and String Bass. (1) F, S
Teaching and playing skills for music teachers 3 hours per week.

327 Educational Methods for Trumpet and Horn. (1) F S
Teaching and playing skills for music teachers. 3 hours per week

328 Educational Methods for Trombone, Euphonium, and Tuba. (1) F S
Teaching and playing skills for music teachers. 3 hours per week.

335 Educational Methods for Guitar. (1) F S
Teaching and playing skills for music teachers 3 hours per week

336 Educational Methods for Percussion. (1) F S
Teaching and playing skills for music teachers 3 hours per week.

337 Educational Methods for Flute, Clarinet, and Saxophone. (1) F, S
Teach ng and p ay ng ski s for mus c teach ers 3 hours per week.

338 Educational Methods for Double Reed Instruments. (1) F, S
Teaching and play ng ski ls for music teach ers 3 hours per week.

361 Music Therapy Theory and Practice in Psychopathology. (3) F
nf uence of mus c on behavior; princ p es and practices of mus c therapy and psych atnc c i-ents Prerequ s tes MUE 261; Mus c Therapy major

362 Music Therapy Techniques. (3) S
Organizat on, administration and use of mus c in rehab itation with various c ient popular ons Prerequ s tes MUE 361, Music Therapy ma jor.

381 Music Therapy Research. (3) S
Statist cs and research des gn appropriate for nvestigations n mus c therapy *General stud ies: L2*

384 Therapy Preclinical I. (1) F S
Paired students wi provide music therapy for sma groups at a commun ty agency for men ta ly retarded geriatrics, or physically d sabled c ents for a m n mum of 10 clock hours. Pre requ s tes MUE 211, 261

385 Therapy Preclinical II. (1) F, S
See MUE 384

386 Therapy Preclinical III. 1) F S
See MUE 384

387 Therapy Preclinical IV. (1) F, S
See MUE 384

388 Therapy Preclinical V. (1) F S
See MUE 384

389 Repertoire for Music Therapy. (3) S
Music skil s reperto re for music therapy in cluding units on brass str ngs, woodw nds electron c nstruments computer mus c, and mprov sation techn ques Lab Prerequ s te Mus c Therapy major

441 Psychology of Music. (3) S
Psycholog cal and phys o og ca aspects of mus c emphasiz ng musica behavior func tion percept on, and learn ng Prerequisites Mus c Therapy major or nstructor approva jun or stand ng

475 Group Process and Music Therapy. (1) F
Princip es of group process verba counse ng, profess onal writing as re ated to mus c therapy practice Prerequisites MUE 362 Mu s c Therapy major

476 Internship in Music Therapy. (1) F, S
A 6-month residency n an approved cl n ca institut on

480 Choral Methods. (3) S
Methods of nstruct on, organ'zat on, and pre sentation of appropriate content n chora mu sic classes. Prerequisite Secondary Educa-t on major.

481 Instrumental Practicum/Methods. (5) F
nstrumental music as a means of developing music sk l s, understand ngs and att tudes n elementary and secondary schoo students Prerequ s te Secondary Education major.

482 Instrumental Practicum/Methods. (5) S
See MUE 481 Prerequ s tes. Secondary Edu cat on major and MUE 481 (or 485)

485 String Practicum/Methods. (2) F
For students prepar ng to administer a string program and teach strings at the e ementary eve Lecture, ab

548 Introduction to Research in Music Education. (3 F SS
Survey of research methods and terature n music educat on Focus on nterpretat on and evaluation

549 Foundations of Music Education. (3) A
A treatment of h storical perspectives, ph oso-phy-aesthet cs identif ed w th mus c educat'on and earn ng theories app ed to mus c teach ng/learn ng Bas c research and wr t ng ski s appropr ate to graduate stud es n mus c edu-cat on.

550 Studies in Music Curricula. (3) A
Scope and sequence of mus ca experiences Deve opment of criteria for the eva uat on of mus c curricula

551 Advanced Studies in Elementary School Music. (3) A
For experienced teachers organ zat on and content of the genera mus c c asses in k ndergarten and the first 6 grades of e ementary school. Emphas s on teaching mus c reading and ear train ng to young ch ldren

552 General Music, Music Theory, and Music History Classes in the Junior and Senior High School. (3) N
Organ zat on and content of school music c asses wh ch are not performance or ented.

553 Contemporary Elementary Music. (3) F
Ident f cat on and deve opment of mater a s and techn ques for teaching spec a un ts of mus c study to elementary (K–8) ch ldren

564 Instrumental Music, Advanced Rehearsal Techniques. (3) A
An in depth ana ys s of nstrumenta tech-n ques n preparat'on for a thorough d scus-s on of band tuning prob ems and so ut ons. D scuss on of product ve conduct ng and re-hearsa techn ques for school mus c teachers

566 Instrumental Literature for Schools. (3) N
Comprehens ve study and ana ysis of a l types of nstrumenta mus c

568 Choral Music, Advanced Rehearsal Techniques. (3) A
Musica and voca techn ques necessary for presentation of chora terature Analys s and experimentat on w th psycho ogica acousti cal, and other prob ems of rehearsal and per formance

570 Choral Literature for Schools. 3) A
Comprehens ve study and ana ys s of choral mus c for the high school w th spec a empha s s on octavo terature

579 Psychology of Music. 3) N
The nature of mus cal ty and its evaluation A rev ew of recent research

585 Vocal Acoustics and Production. (3) A
An in-depth approach to the psycho ogica physiolog ca work ngs of the voca mecha n sm

733 Contemporary Issues and Research in Music Education. (3) S
Emphas s upon recent research re at ng to music nstruct'on at a evels current and h s torica ssues n chora genera , and instru-menta mus c.

744 Higher Education Instruction. 3) F
Ph osoph ca and psycho og ca pr nc'ples of co lege un vers ty teach ng Patterns of music teacher educat on and a project on of course out nes

755 Philosophy and Aesthetics in Music Education. (3 SS
Ph osophy and aesthet cs as they inf uence curricu um content and teach ng procedures.

Omnibus Courses: See page 44 for omn bus courses that may be offered

MUSIC HISTORY/LITERATURE

MHL 142 Music Listening. 1) N
Aural perception of a variety of music trad t ons genres forms, and techn ques Prereq u's te· Mus c major

152 Jazz L'stening. (1) N
An ntroduct on to jazz forms d oms, and ma jor innovators

201 MacLiteracy for Musicians. (3) F S, SS
nstruct on in basic Mac ntosh computer l t eracy nc ud ng generic app ications and mu-s c spec f c programs w th hands-on experi-ence. Ab ty to read mus c notat on required Lecture ab. *Genera stud es N3*

341 Mus'c History. (3 F S
Western mus c from the Greeks to the present day Need not be taken n sequence with MHL 342 Prerequ s te MTC 221

342 Music History. (3 F, S
See MHL 341 Prerequ s te MTC 221

344 Music in World Cultures. 3 F S
Exam nat on of the re at ons among mus c dance theatre rel g on, and soc al status n As a Afr ca Oceania Europe, and the United States *General studies· G*

352 The Evolution of Jazz. (3) F '94
Or g n development and styles of jazz music and its exponents. Prerequis te MTC 223 *General studies. H*

438 Music in the Classic Era. (3) F '94
Deve opment of the c assic sty e of the 18th century major works of Haydn Mozart and Beethoven. Prerequisites· MHL 341, 342, MTC 327. *Genera stud es H*

439 Music in the 19th Century. 3) F '95
European art mus'c after Beethoven Prereq u s tes: MHL 341 342, MTC 327 *General studies. L2 H.*

441 Music of the Baroque Era. (3) F '95
Works of major composers and styl stic ten denc es of the period Prerequ s tes· MHL 341, 342 MTC 327 *Genera stud es· L2 H.*

447 Music Since 1900. 3 F SS
Survey of the works by major composers and sty st c trends Prerequ s tes MHL 341, 342; MTC 327 *Genera stud es L2, H*

456 History of Opera. (3) S '95
The development of opera from its creation c 1600 to present Emphasis p aced on major styl st c deve opments and representat ve works Prerequ sites MHL 341, 342, MTC 222

466 North American Indian Music. (3) S 95
Various sty es of nd an mus c n the United States, Canada and Mex co Open to Music majors and nonmajors *Genera studies L2 HU C*

532 Music Bibliography. (3) F
Major historica and analytical wnt ngs systematic and historica collections of music. Read ng know edge of a foreign anguage rec ommended.

535 Medieval Music. (3) S '95
Music of Europe n the M dd e Ages, Gregorian chant rel g ous, and secular monophony and polyphony to 1400

536 Music of the Renaissance. (3) S 96
Music n Europe with emphasis on sty stic concepts and changes c. 1400–1580

544 World Music I. (3) F '95
Music of tradit ona and fo k cu tures of Afr ca, Europe, and the Americas

545 World Music II. (3) F 94
Trad tional, fo k, and art music of the Pacific Near East and As a

547 Topics in American Music. (3) S 95
Selected top cs in the history of music. Com posers work ng in the Americas with emphas s upon music s nce 1900.

557 Topics in Symphonic Literature. (3) S 96
An exam nation of the evolution of the symphony and symphon c poem from the early c assic era through the 19th century, with em phasis on the analys s of selected works.

564 History of Music Instruments. (3) F '94
A survey of the history and development of mus c instruments n trad tional, fo k, and art cultures.

566 Area Studies in Ethnomusicology. (3) S 96
Study of the mus c of a particular cu ture, country or area (e g. mus c of Mex co, Latin America, Ch na, Africa). May be repeated for credit.

568 Introduction to Ethnomusicology. (3) F '95
Introduction to the theory and methodo ogy of the d sc p ine inc ud ng bibl ography f e dwork, transcript on, analys s, and organo ogy.

575 History of Choral Music. (3) F
Major chora works

644 Notation of Polyphonic Music. (3) S '96
Mus c notation from the 15th through 17th centuries nc ud ng prob ems of transcription into modern notat on

Omnibus Courses: See page 44 for omnibus courses that may be offered

MUSIC THEORY AND COMPOSITION

MTC 125 Basic Music Theory. (3) F S
For mus c majors Designed to deve op aural and notational sk ls Meets daily

221 Music Theory: 18th Century. (3) F S
Music from the 18th century with a v ew toward developing students' ab it es to analyze, theorize, perform, and create examples w th n the sty e. Development of related aural, visua and keyboard sk ls Prerequisite: MTC 125

222 Music Theory: 19th Century. (3) F, S
Musical composit ons chosen from the ate 18th and 19th centuries. Harmon c progress ons melod c construction and rhythmic developments development of re ated aural, visual, and keyboard ski s Prerequ s te MTC 221

223 Music Theory: 20th Century. (3) F S
Representative 20th-century compositions with part cu ar emphas s on those elements of melodic, harmon c and rhythm c treatment which break w th past convent ons. Deve opment of re ated aural visua , and keyboard sk l s. Prerequ s te: MTC 222

315 Modern Arranging. (2) F
Techn ques in arranging for the contemporary jazz radio, telev s on and stud o orchestra Prerequ s te MTC 223

316 Modern Arranging. (2) S
Cont nuat on of MTC 315. Prerequ s te MTC 315

320 Modal Counterpoint. (2) F
Counterpoint based on 16th-century vocal polyphonic sty e. Prerequ s te: MTC 221

321 Tonal Counterpoint. (2) S
Counterpoint based on 18th-century po y phon c style Prerequisite: MTC 221.

323 Composition. (2 3) F, S
Writing music composit ons w th emphasis on basic techniques and smal er structures May be repeated for cred t. Prerequ s te: nstructor approva

327 Form and Analysis I. (3) F, S
Organ z ng elements n the most important contrapunta and homophon c musical forms from the Renaissance through the 19th century Prerequisite MTC 222

422 Musical Acoustics. (3) N
Propert es of sound and tone. Harmon c se nes, instruments, the ear, auditorium acous t cs and the reproduction of sound. A thorough knowledge of mus cal notation intervals, scales and harmony or 2 years of mus c theory s assumed

425 Studies in 20th-Century Theory. (3) F
Continued development of analyt cal tech niques and aura sk ll, w th an examinat on of theoret ca systems appl cab e to 20th-century mus c Prerequ site MTC 223

428 Form and Analysis II. (3) S
Organiz ng princ ples of the large forms of mu sical compos tion n the 19th and 20th centuries Prerequ s te: MTC 327.

429 Canon and Fugue. (2) F 95
Writing of canons and fugues n tona sty e. Prerequ s te MTC 321

430 20th-Century Counterpoint. (2) S 96
Counterpoint studies uti izing 20th-century idi oms Prerequ site MTC 223.

432 Instrumentation. (2) F '94
Study of the characteristics and performance techniques of nd v dua orchestral nstru ments Prerequ s te MTC 223

433 Orchestration. (2) S '95
Theoret ca and pract cal study of scoring mus c for orchestra Prerequisite MTC 432

436 Electronic Studio Techniques I. (2) F
Princip es of ana og e ectronic mus c systems and the r app cation in the compos tion of e ectronic music A thorough knowledge of mus c notation and ntervals is assumed.

437 Electronic Studio Techniques II. (2) S
Pr nc p es of digita e ectron c mus c systems and their app ications in the composition of e ectron c mus c. Prerequ s te MTC 436.

440 Jazz Theory and Ear Training. (2) F
Advanced study of jazz harmon c systems Dai y oral dri s Prerequ s te MTC 223.

441 Jazz Composition. (2) F
Creative writ ng in the sma ler forms and n the d om of jazz Prerequ s te MTC 321.

495 Final Project. (0) F S
A ha f rec ta of compos t ons or approval of a large sca e composit on or a research paper

496 Theory Project. (3) F, S, SS
Supervised nd v dual wr ting project dea ng w th mus c theory

501 Ear Training Review. (2) SS
Me od c and harmon c dictat on. Cred t cannot be appl ed toward the graduate theory requ rement

516 Baroque Music. (3) S '96
Deta led ana ys s of selected examp es from the Baroque period

517 Classic Music. (3) S '95
Deta led analys s of selected examp es of mus c from the C ass c period.

518 Romantic Music. (3) F 94
Deta led analys s of selected examp es of mus c from the Romant c period

519 Late 19th-/Early 20th-Century Music. (3) F '95
Deta ed analys s of se ected examp es of mus c from the ate 19th and early 20th centuries.

520 Analytical Techniques. (3) S SS
Ana ytical techniques systemat ca y app ed to mus c Concentrat on on structural and compos tional procedures

523 Advanced Composition. (2) F, S
Advanced mus c composit on, nc ud ng com p ex techn ques and arger structure May be repeated for credit Prerequ s te instructor approva

525 Pedagogy of Theory. (3) F 94
Pract ces and princ p es of teach ng mus c theory Emphas zes most desirab e and pract ca offer ngs poss b e Comparat ve stud es of ex sting pract ces

527 History of Music Theory. (3) F S
Theory from Pythagoras to the present. Need not be taken n sequence w th MTC 528.

528 History of Music Theory. (3) F S
Theory from Pythagoras to the present. Need not be taken n sequence w th MTC 527

555 Computer Music Notation. (2) N
Instruction n preparing score and parts of music compos t ons us ng various mus c notation software packages Cred t cannot be app ed toward the graduate theory requ rement. Lecture ab. Prerequ s te instructor approval.

647 Directions in New Music. (3) F, S
Stud es n contemporary d oms and aesthet cs drawn from recent works of visiting composers nvo ves ana yt cal d scourse, critical writing and applied concepts n composit on Lecture, discussion exercise Prerequ site instructor approval

723 Advanced Composition. (3) F S
Special prob ems in writing in complex forms and textures. May be repeated for credit Stu d o

755 Music Composition Technology. (3) N
Advanced study n d gita samp ing, synthes s, sequenc ng computer-generated sound and computer performer interfaces. May be re peated for cred t. Lecture ab. Prerequ s tes: MTC 436 and 437 or equiva ent

Omnibus Courses: See page 44 for omnibus courses that may be offered

MUSIC PERFORMANCE

MUP 100 Concert Attendance. (0) F S
Requ red of al mus c majors for 6 semesters n each degree program w th a m n mum of 7 concerts attended each semester

111 Studio Instruction. 2) F, S
For majors n Mus c degree program Bas soon ce lo c arnet, contrabass cornet eu phon um f ute, gu tar, harp harps chord, horn, oboe, organ percuss on, p ano saxophone trombone trumpet tuba v o a, viol'n, vo ce Min mum contact of 1 hour p us stud o c ass week y May be repeated for credit May not be taken for aud t Prerequ s tes p acement exam nat on and aud t on

121 Studio Instruction. (1) F S, SS
For secondary or m nor instrument nstruct on and nonmajors n the un vers ty Bassoon, cel o, clar net, contrabass cornet, euphonium flute, gu tar harp, harps chord horn, oboe or gan, percuss on p ano saxophone trombone, trumpet tuba v o a v o in vo ce. M n mum contact of 1 2 hour per week May be re peated for cred t May not be taken for audit Prerequ s tes· placement exam nat on and au d tion

127 Studio Instruction. (4) F S
For Performance majors n Bachelor of and Master of Mus c degree programs on y Bas s on ce o, c ar net contrabass cornet, euphon um f ute, gu tar, harp harps chord, horn ob e organ percuss on, piano, saxophone, trombone trumpet tuba viola, v o in vo ce M n mum contact of 1 hour p us stud o c ass week y May be repeated for cred t. May not be taken for audit. Prerequ s tes p acement exam nat on and audit on.

130 Beginning Group Piano. (1) F, S
Prov des a bas c introduct on to playing piano through mus c read ng chords, rhythm c, and written act v t es Non-Mus'c majors on y

131 Class Piano. (1) F S
A four-semester sequence with MUP 132 231 and 232) designed for those lack ng p ano experience and those who need piano as a c assroom too Emphasis on keyboard tech n que, sight read ng s mp e accompaniments and improvisat on 2 hours per week May not be taken for aud t

132 Class Piano. (1) S
See MUP 131

133 Class Voice. (1) F, S
A four semester sequence (MUP 134 233, and 234) open to a l students 2 hours per week. May not be taken for aud t

134 Class Voice. (1) F, S
See MUP 133 Prerequ's'te MUP 133 or in structor approva

141 Jazz Fundamentals. (1) F
Princ ples methods and theory of jazz performance espec a ly des gned for the sma jazz ensemb e. 2 hours per week

142 Jazz Fundamentals. (1 S
Cont'nuation of MUP 141 2 hours per week.

209 Beginning Choral Conducting. (1) F S
Essent a s of choral conduct ng techn ques 2 hours per week

210 Beginning Instrumental Conducting. (1) S
Essentia s of instrumenta conduct ng tech n ques 2 hours per week

217 Improvisation Workshop. 2) F, S
Emphas's on bas c jazz terature chord sym bo read ng, melod c patterns ear tra n ng, me od c concepts, and analysis of 'mprov sed solos Must be taken in sequence with MUP 218 May not be taken for aud t Prerequ's tes: MTC 125; MUP 111 (1 semester

218 Improvisation Workshop. (2) F S
Continuation of MUP 217 Prerequ s te: MUP 217

231 Class Piano. (1) F
See MUP 131

232 Class Piano. (1) S
See MUP 131

233 Class Voice. (1 F, S
See MUP 133 Prerequ s te MUP 134 or in structor approva

234 Class Voice. (1) F S
See MUP 133 Prerequisite: MUP 233 or n structor approva

235 Jazz Piano. (1) F
A 2 semester sequence (w th MUP 236 de s gned for jazz keyboard experience Empha s s s on chord symbo read ng s mp e mpro v sat on and vo c ng. 2 hours per week Pre requis te MUP 132

236 Jazz Piano. (1) S
See MUP 235 Prerequisite MUP 132

250 Diction for Singers. (1) F, S
Use of phonet cs n the study of song and op era terature Language emphas s d ffers each semester May be repeated for cred t.

301 Advanced Class Piano. (1) F
Requ red for Chora Genera mus c majors Open to other music majors who have com pleted MUP 232 Emphas s on accompan ments ensemble p ay ng score read ng, ad vanced harmon zat ons reperto re techn que and mprov sation. 2 hours per week May not be taken for audit Prerequ s tes· MUP 232 or prof c ency, p acement exam nat on

302 Advanced Class Piano. (1) S
Requ red for Choral-Genera majors. Open to other mus c majors who have comp eted MUP 301 A sequent al cont nuat on of MUP 301 sk l s that nc ude both group and studio n struction 2 hours per week. May not be taken for audit Prerequ s tes· MUP 301 or prof c ency, p acement exam nation

311 Studio Instruction. (2) F, S
See MUP 111

319 Recording Studio Techniques. (2) S
Study of both ana og and dig ta record ng methods Lab t me on record ng conso e and tape mach nes is nc uded. Lab.

320 Midi Workshop. (2) F
Presentat on of hardware and software app cations for sequencing and mus c printing Lab

321 Studio Instruction. (1 F S SS
See MUP 121

327 Studio Instruction. (4) F S
See MUP 127

337 Studio Instruction-Piano Accompanying. (2) S
Lessons for Performance ma'ors w th a con centration in p ano accompanying on y Rep erto re to be se ected from voca and nstru mental terature 1 hour lesson per week. May be repeated for cred t Prerequ s te p acement exam nation

339 Choral Conducting. 2 F S
E ements of chora conduct ng techn que and nterpretat on. 3 hours per week Prerequisite· MUP 209

340 Instrumental Conducting. (2) F
Fundamenta s of score reading and interpreta t on of nstrumenta mus c 3 hours per week Prerequ s te MUP 210

344 Chamber Orchestra. (1) F S
mportant masterp eces from al periods of mus c are performed throughout the year Membership by aud t on May be repeated for credit.

345 Symphony Orchestra. 1 F S
Open to al students who can qua ify on the basis of aud tions with the d rector Over a 4 year period the student s ntroduced to the masterpieces of symphony orchestra itera ture 3 t mes per week May be repeated for cred t

350 Choral Union. (1) F, S
Open to a students n the un versity and to n terested s ngers in the community by aud t on Preparation and performance of the larger chora w rks 2 hours per week May be repeated for cred t

352 Concert Choir. (1) F, S
4 hours per week May be repeated for cred t Prerequ s te. nstructor approva

353 University Choir. (1) F, S
4 hours per week May be repeated for cred t. Prerequ s te nstructor approval

355 Men's Chorus. (1) F, S
Open to al male students n the un vers ty who can qual fy on the bas s of audit ons Re hearsa and performance of mus c for ma e vo ces 2 hours per week May be repeated for credit. Prerequ s te nstructor approval.

357 Women's Chorus. (1 F, S
2 hours per week. May be repeated for cred t Prerequ s te nstructor approval

361 Marching and Concert Bands. (1) F, S
Open to a students who can qua ify on the basis of aud tions w th the d rector Stag ng of format'ons and dri s for footba l games and other events (fa l) masterp'eces of symphon c band terature (spring). Meets da ly May be repeated for credit.

370 Music Theatre: Techniques. (1) F, S
Exercises and mprovisat ons for the s nger actor emphasiz ng body awareness bas c mu s c theater performance ski s and freedom of the vocal and breath mechan sms Sect on 1 (Movement for Singers Sect on 2 (Expres s on) Sect on 3 Interpretation), Section 4 (Advanced Express on) Section 5 Advanced nterpretat on) Sect ons 2 through 5 must be taken in sequence Each sect'on: 3 hours per week May be repeated for cred t

371 Mus'c Theatre: Workshops. (1) F S
Development of spec f c ski is for musica -dra mat'c nterpretat on Sect on 1 (Ana Prepara tion), Sect on 2 Broadway), Section 3 (Broadway I) Each sect on· 1 hour ecture, demonstrat on 1 lab per week May be re peated for cred t

372 Music Theatre: Orchestras. (1 F, S
Open to a students who can qua fy on the bas s of aud t ons w th the instructor Part c pat on n Lync Opera Theatre productions Sect on 1 (Orchestra) Sect on 2 Chamber Orchestra , Section 3 (Chamber Ensemb e) May be repeated for cred t Prerequ s te· n structor approva

373 Music Theatre: Performance. (1) F S
Open to a l students who can qual fy on the bas s of audit ons with the nstructor Partici pat on n Lyric Opera Theatre product ons Sect on 1 (Pr nc pa Roles) Sect on 2 (Chorus). May be repeated for credit Prerequ s te 'nstructor approval

374 Music Theatre: Production. 1) F, S
Part c pat on n Lyr c Opera Theatre produc t ons Sect on 1 (Voca Performance), Sect on 2 (Techn'ca Mus c Theatre); Sect on 3 (Probems n Product on) to be taken concurrently w th MUP 373, Section 2 May be repeated for credit

379 Chamber Music Ensembles. (1) F S
String brass, woodw nd percuss on key board voca and mixed ensemb es 2 hours per week May be repeated for cred t Prereq u site nstructor approva

382 Collegium Musicum. (1) F S
Singers and nstrumental sts spec a z ng n the performance of early and unusua mus c 2 hours per week May be repeated for cred t Prerequ s te nstructor approva

383 New Music Ensemble. (1) F S
Rehearsa and performance of mus c wr tten in the ast 20 years. May be repeated for credit. Prerequ s te nstructor approval

384 Brass Choir. (1) F S
Spec a zing n pub c performance of mus c wr tten for brass nstruments 3 hours per week. May be repeated for cred t. Prerequ s te instructor approval

385 Percussion Ensemble. (1) F S
Rehearsa and performance of standard and orig na repertoire for the percuss on ensemb e and re ated instruments 2 hours per week May be repeated for cred t Prerequ - s te instructor approval

386 Stage Band. (1) F S
Rehearsa and performance of terature for the stage band 4 hours per week May be re peated for credit Prerequ site nstructor approva

387 Ethnomusicology Ensembles. (1 F, S
Performance learn ng experience for the mus c of various cu tures of the wor d May be re peated for credit Prerequ s te know edge of 'nstrument or instructor approva

388 Piano Accompanying. (1 F S
Accompany ng majors others at the d scret on of nstructor . P ano accompaniments found n voca and nstrumenta terature d scuss on of styles and performance practices· experience n publ c performance 2 hours per week. May be repeated for cred t

417 Advanced Improvisation. (2) F S
Emphas s on ana ys s and performance of ad vanced jazz l terature compos t on n contem porary sty es. Must be taken in sequence w th MUP 418. May not be taken for aud t Prereq u site MUP 218.

418 Advanced Improvisation. (2) F S
Cont nuat on of MUP 417 Prerequ s te MUP 417.

440 Keyboard Harmony. (1 F
Performance-or ented c ass emphas z ng chord progress ons harmon zat on, f gured bass rea izat on sty st c mprov sat on trans pos tion open score read ng, and sight reading Prerequisite. Performance major w th a concentrat on in keyboard or nstructor ap prova

451 Repertoire. (2 F, S
L terature avai ab e for performance n a per forming med a May be repeated for cred t Prerequ s te jun or stand ng n major perfor mance f e d

452 Piano Repertoire II. (2) S
Continuation of MUP 451 (P ano). Romant c and contemporary keyboard literature Prerequ sites junior stand ng as Performance major w th a concentration n p ano accompany ng, instructor approva

453 Song Literature. (2) A
Amer can Russ an, Span sh, Scand navian and contemporary song

454 Song Literature. 2) A
Ear y ta an, Engl sh German, and French art s ng

481 Performance Pedagogy and Materials. (2) F S
Pr nc'p es and methods of performance tech n ques for each performance f e d. May be re peated for cred t. Prerequ s te senior stand ng or nstructor approval

482 Piano Pedagogy II. (2) N
Cont'nuation of MUP 481 Piano) Prob ems and techniques of teach ng ntermed ate to advanced p ano students Prerequ s tes. jun or stand ng as P ano major instructor approva

487 Piano Accompanying. (1) F
Keyboard majors. P ano accompan ments found n voca and nstrumenta terature d scuss on of sty es and performance pract ces experience n pub c performance 2 hours per week May be repeated for cred t May not be taken for aud t.

495 Solo Performance. (0) F S
For cand dates of a Bache or of Mus'c degree n Performance in wh ch 1 2 rec'ta s a gradu ation requ rement.

496 Solo Performance. (0) F S
For cand dates f a Bache or of Mus c degree n Performance n wh ch a ful rec ta s a graduat on requ'rement. Prerequ s te: MUP 495

507 Group Piano Practicum. (2) F
Curricu a, materia s and teach ng techn ques for group teach ng at the un vers ty and com mun ty col ege evels Observat on superv sed teach ng n group piano

508 Studio Observation. (1) F S
Week y observat on of studio teach ng by var ous p ano faculty. Paper as final requ rement Prerequ site M.M performance pedagogy pi- ano student

511 Studio Instruction. (2) F, S
For majors in Mus c degree program Bas soon ce o c ar net contrabass, cornet euphonium, f ute gu tar harp harps chord horn oboe organ, percuss on p ano saxophone trombone trumpet, tuba v ola v o n vo ce M nimum contact of 1 hour plus stud o c ass weekly May be repeated for cred t May not be taken for aud t Prerequ sites Placement exam nat on and audition.

521 Studio Instruction. (1 F S, SS
For secondary or m'nor 'nstrument nstruct on and non majors in the un vers ty Bassoon ce o, c annet contrabass cornet euphon um flute, guitar harp, harps'chord horn oboe organ percuss on, p ano saxophone, trombone, trumpet tuba v o a v o n vo ce M n mum contact of 1 2 hour per week May be re peated for credit May not be taken for audit Prerequ s tes P acement exam nat on and au d t on

527 Studio Instruction. (2 or 4) F S
For Performance ma ors in Master of Mus c degree program on y. Bassoon cel o, clarinet contrabass cornet euphon um flute gu tar harp, harps chord horn oboe organ, percus s on, p ano saxophone trombone, trumpet, tuba, vio a, vio n, vo ce M n mum contact of 1 2 hour per week. May be repeated for cred t May not be taken for aud t Prerequ s tes P acement exam nat on and aud tion

540 Advanced Conducting. (3) F
Score preparat on and conduct ng techn ques for nstrumenta mus c Concentrat on on study of h stor ca sty es Requ red of D M A students n nstrumental Mus c

541 The Art Song. (3) N
So o song from ts beginn ng to the present day

544 Chamber Orchestra. (1) F, S
Important masterp eces from al periods of music w l be performed throughout the year May be repeated for cred t. Prerequis te n- structor approva

545 Symphony Orchestra. (1) F, S
Open on the bas's of aud t on w th the d rector Masterpieces of symphony orchestra lterature Three t mes per week. May be repeated for cred t

550 Choral Un on. (1) F S
Open to a students n the university and to 'n terested s ngers n the commun ty by aud tion Preparat'on and performance of the arger chora works 2 hours per week May be re peated for cred t

551 Repertoire. (2) N
L terature avai ab e for performance n a l per forming med a May be repeated for cred t

552 Concert Choir. (1) F, S
4 hours per week May be repeated for credit Prerequ s te nstructor approva

553 University Choir. (1) F S
4 hours per week. May be repeated for credit Prerequ s te nstructor approva .

555 Men's Chorus. (1 F, S
Open to ma e students 'n the un vers ty who can qua fy on the bas s of aud t on. Rehearsa and performance of mus c for ma e vo ces 2 hours per week May be repeated for cred t Prerequ s te nstructor approva

557 Women's Chorus. (1) F, S
2 hours per week. May be repeated for cred t. Prerequ s te nstructor approval

561 Marching and Concert Bands. (1) F, S
Open by aud tion only Staging of format ons and dr s for footba games and other events (fa l) masterpieces of symphon c band tera ture (spr ng) Meets da ly May be repeated for cred t

570 Music Theatre: Techniques. (1) F, S
Exerc ses and mprov'sations for the s ng ng actor emphas zing body awareness so a- t ons and freedom of the voca and breath mechan sms Section 1 nterpretat on) Sec- t on 2 (Express on Section 3 Movement for Singers) Each Section 3 hours per week May be repeated for cred t

571 Music Theatre: Workshops. (1 F S
Deve opment of specif c sk ls for the mus ca - dramat c interpretat on. Sect on 1 (Ro e Preparat on Sect on 2 (Sty es), Section 3 Opera Scenes), Sect on 4 (Mus'ca Comedy)· Sect on 5 (Revue Ensembles Each sect on 1 hour ecture demonstration 1 ab per week May be repeated for cred t

572 Music Theatre: Orchestras. (1) F S
Open to al students who can qualify on the bas s of audit ons w th the instructor Part c - pat'on n Lync Opera Theatre productions Sect on 1 (Orchestra) Sect on 2 (Chamber Orchestra) Section 3 (Chamber Ensemb e). May be repeated for credit Prerequ site n- structor approval

573 Music Theatre: Performance. (1) F S
Open to al students who can qualify on the bas s of auditions w th the instructor Part c - pat on n Lync Opera Theatre productions Section 1 (Princ pal Roles), Section 2 (Chorus). May be repeated for credit. Prerequ s te nstructor approval

574 Music Theatre: Production. (1) F, S
Part c pat on in Lync Opera Theatre produc tions Sect on 1 (Vocal Performance), Section 2 (Techn ca Music Theatre)· Sect on 3 (Problems n Production) to be taken concurrently w th MUP 373, Sect on 2 May be repeated for credit

579 Chamber Music Ensembles. (1) F S
Str ng, brass, woodwind percuss on keyboard, voca , and m xed ensemb es 2 hours per week May be repeated for cred t Prereq- u s te: 'nstructor approva

581 Performance Pedagogy and Materials. (2) N
Princ p es and methods of performance tech niques for each performance f e d. May be repeated for cred t

582 Collegium Musicum. (1) F, S
S ngers and instrumental sts spec a z ng in the performance of early and unusua music 2 hours per week. May be repeated for credit. Prerequ s te nstructor approval.

583 New Music Ensemble. (1) F, S
Rehearsal and performance of music written n the last 20 years. May be repeated for cred t Prerequisite: instructor approval

584 Brass Choir. (1) F, S
Pub c performance of mus c written for brass nstruments. 2 hours per week May be repeated for cred t. Prerequis'te. nstructor ap prova

585 Percussion Ensemble. (1) F, S
Rehearsa and performance of standard and or g na repertoire for the percuss on ensemble and re ated instruments. 2 hours per week May be repeated for credit. Prerequ - s te nstructor approva .

586 Stage Band. (1) F, S
Rehearsal and performance of iterature for the stage band 4 hours per week. May be repeated for cred t. Prerequ s te instructor approva

587 Ethnomusicology Ensembles. (1) F S
Performance learning experience for the mu sic of various cultures of the world May be re peated for credit Prerequisite know edge of nstrument or nstructor approval

588 Piano Accompanying. (1) F S
Performance majors with a concentration in p ano accompanying (others at the d scret on of the instructor) Piano accompaniments found in voca and instrumenta iterature d s cussion of sty es and performance pract ces, exper ence n pub ic performance 2 hours per week May be repeated for cred t.

595 Solo Performance. (1) F, S
For Master of Music candidates in appl ed mu s c on y. May be fu l rec ta , major operat c role, so o performance w th orchestra, ensemb e, or lecture rec ta .

596 Solo Performance. (1) F S
See MUP 595

727 Studio Instruction. (2 or 4) F S
For D.M.A. cand dates on y M n mum contact of 1 hour per week. May be repeated for credit

796 Solo Performance. (1–5) F, S
For D M A candidates only May be repeated for credit.

Omnibus Courses: See page 44 for omn bus courses that may be offered

Theatre

M. Lin Wright
Chair
(GHALL 232) 602/965–5359

PROFESSORS
AKINS, BARTZ, BEDARD SALDANA THOMSON, WRIGHT

ASSOCIATE PROFESSORS
BARKER, EDWARDS, ENGEL, KNAPP, LEONARD, RISKE, VINING, WHITEHEAD

ASSISTANT PROFESSORS
ACKER, HOOD

PROFESSORS EMERITI
DOYLE, YEATER

DEPARTMENTAL MAJOR REQUIREMENTS

The Department of Theatre is a mem ber of the National Association of Schools of Theatre, and the requirements set forth in this catalog are in ac cordance with the published regulations of the association. For advisement purposes, all students registering in a The atre degree program enroll through the College of Fine Arts. Special advise ment check sheets, providing complete information regarding requirements and suggested electives, are available in the Department of Theatre office for each degree program and area of concentra tion.

BACHELOR OF ARTS DEGREE

Theatre. The B.A. in Theatre requires 54 hours of university general studies courses, providing a broad base of gen eral knowledge and scholarship, and 54 hours in theatre. The following core of courses is required of all B A. candi dates: THE 104, 225, 320, 321, 322; THP 102, 200 (three semesters), 213, 315; two courses from THP 330, 340, 345, two semester hours in THP 301, chosen from different production op tions. Within the major (including re lated area studies considered part of the major), only courses with a grade of "C" or higher may be applied toward graduation. Students must complete 24 hours in an emphasis chosen from the following: acting, design and theatre technology; directing; history/theory and criticism; theatre management and production; and theatre for youth. Ad ditional elective courses in general studies and theatre are selected with an advisor to meet the total 126 semester hours required for the degree.

Freshmen and sophomores who meet university and departmental standards are admitted to the B.A. degree program. Junior and senior transfer stu dents are required to interview or audi tion in order to be admitted to one of the areas of emphasis.

General Studies. In addition to meeting all requirements for general studies as established by the university, the Bachelor of Arts degree in Theatre also requires 15 hours of courses designed to further develop the student's artistic and cultural literacy This requirement may be met in one of two ways: (1) completion of a foreign language at the intermediate level (202 or equivalent) or completion of a foreign language course at the 300 level or above taught in the foreign language or (2) comple tion of a 15 hour block of general stud ies courses chosen to augment the the atre emphasis and approved by the ma jor advisor. Courses used to fulfill other university general studies require ments may not be counted in complet ing this option.

General Studies Electives. After sat isfying all other requirements, remain ing electives to total a minimum of 54 hours may be chosen from any of the approved university general studies core courses or any courses in the Col lege of Fine Arts. Lower division courses in a foreign language may also be used as electives. See pages 297 298 for approved areas of study and distribution of hours as required by the College of Fine Arts

The Areas of Emphasis. The require ments for each area follow.

Acting. Admission is by audition at the end of the sophomore year. Stu dents intending to apply for the acting emphasis must audition for majors only sections of the lower division acting

courses (THP 102 and 110). The following courses are required: THP 110, 270, 275, 310, 370, 410, 471, 476. Students admitted to the acting emphasis are required to audition for all main stage productions.

Design and Theatre Technology. Admission is by portfolio at the end of the sophomore year. The following courses are required: the introductory design course not selected as part of the core (THP 330 or 340 or 345); two additional semester hours of THP 301; THP 442; two semester hours of THP 498 Design Project. Also required are 14 semester hours selected from the following courses: THE 494 Costume History; THP 331, 350, 401, 406, 430, 431, 435, 440, 441, 444, 445. Assignments for mainstage and Lyceum productions in such areas as carpentry, costume construction, electrics, properties, set dressings, technical direction, scenic art, costume crafts, and such positions as assistant designer and master electrician provide practical training. Students who demonstrate consistent interest and abilities are typically awarded a final design or technical direction project of a fully mounted Lyceum production.

Directing. Admission is by interview and a grade of "B" or better in THP 315 (or its equivalent). The following courses are required: THP 110, 270, 275, 310, 317, 415, and 419 and the introductory design course not selected as part of the core (THP 330 or 340 or 345). Advisor approval is required for general studies and literacy block courses. Students are encouraged to apply for directing assignments in the Lyceum Series.

History/Theory and Criticism. Admission is by interview and written critical or historical essay at the end of the sophomore year. The following courses are required: six semester hours of upper division theatre history (THE 420 or 421 or 425); six semester hours of upper division dramatic literature in theatre, English, or a foreign language; three semester hours of playwriting (THP 294 or 460); six semester hours of directing or film studies (ENG 360, 361, 362; THE 401; THP 415, 419); and THP 498 Senior Project.

Theatre Management and Production. Admission is by interview at the end of the sophomore year. The following courses are required. COM 259; THP 317, 450; and three additional semester hours of THP 301 (a one hour and a two hour assignment). Also required are 12 semester hours selected with advisor approval from the following: THE 424; THP 110, 401, 415, 419, 484; the introductory design course not selected as part of the core (THP 330 or 340 or 345), and three semester hours of THP 498 Senior Project.

Theatre for Youth. Admission is by interview and two letters of recommendation. The following courses are required: THE 424; THP 311, 312, 411. Also required are 12 semester hours selected from the following: THP 110, 415, 417, 484, 498 Theatre for Youth Tour, 498 Senior Project.

BACHELOR OF FINE ARTS DEGREE

Theatre Education

For those seeking secondary school certification by the State of Arizona, the B.F.A. degree offers a teacher certification track. This track certifies a teacher for the instruction of theatre to students in grades 7–12 in the Arizona public schools with an endorsement for grades K–6. Although the B.F.A. theatre education student is officially enrolled in the College of Fine Arts, all professional education courses and recommendation for certification are provided by the College of Education's Professional Teacher Preparation Program (PTPP).

A minor teaching field of 24–30 hours in such areas as English or communication is not required for the theatre education concentration but is highly recommended. The minor teaching field's department specifies which courses can be applied toward the minor teaching field. The Arizona Department of Education mandates the minimum number of hours required for major areas, approved areas, and endorsements in certification.

The following theatre courses are required: THE 104, 225, 320, 321; THP 102, 213, 301 (two hours), 315, 330, 340, 345.

In addition to the established theatre core, the following theatre education courses are required for the theatre education concentration: THE 325 Play Reading (Plays for High School Production), 480; THP 311, 411, 481.

Twelve hours in related theatre production courses are also required: THP 110, 270, 275, 415. The PTPP, in cooperation with the theatre education coordinator, establishes professional education course work.

Application and Admission. After being formally accepted into the Department of Theatre, a student must meet with the theatre education coordinator to discuss application procedures for the B.F.A. degree in Theatre with a concentration in theatre education.

Acceptance into the program is by interview only. The student must meet with the theatre education faculty to discuss career goals and interests in teaching. The student should also provide a letter of intent and at least two letters of recommendation from ASU Department of Theatre faculty or other former teachers or employers. If distance prohibits coming to campus, the student may be admitted into the program upon submission of three letters of recommendation and a letter of interest to the theatre education faculty.

Application is normally made at the beginning of the sophomore year; applications for early admission of ASU freshmen are accepted toward the end of the second semester of full time study. Strict deadlines are set for state mandated testing and application to the College of Education's Professional Teacher Preparation Program (PTPP). Students who express an interest in the theatre education concentration are advised to apply no later than the beginning of the sophomore year. The student is also required to meet admission standards mandated by the PTPP and the Arizona Department of Education for teacher certification (see page 205).

Although the Department of Theatre may admit a student into the program, the College of Education may reject a student's application for admission into the PTPP. Appeal and reapplication procedures are established by the PTPP.

For retention in the program, a GPA of 3.00 in the major and an overall GPA of 2.50 are required. Retention standards established by the College of Education's PTPP must also be maintained for students in the teacher certification track.

DEPARTMENTAL MINOR

The Department of Theatre offers a minor in Theatre consisting of 22 se mester hours of course work. The fol lowing courses are required: THE 100; two courses from THE 320, 321, 322; THP 101, 213, 301 (one hour), and two three-hour courses in the same area of emphasis (see department for area op tions and course requirements).

Courses ordinarily limited to majors only are available to minors on a sec ond priority basis (minors may not pre register for these courses, but are allowed to register after all majors' needs have been met). All prerequisites for the minor courses must be met (see course listings).

DEPARTMENTAL MINOR TEACHING FIELD REQUIREMENTS

Elementary Education. Students pursuing the Bachelor of Arts in Education degree in Elementary Education may select theatre as a minor teaching field. The minor teaching field consists of 30 semester hours including the following courses: THE 100, 424; THP 101, 113, 213, 275, 311, 312, 315, 330, 411.

Secondary Education. Students pur suing the Bachelor of Arts in Education degree in Secondary Education may se lect theatre as a minor teaching field. The minor teaching field consists of 30 semester hours including the following courses: THE 104, 325 Play Reading: Plays for High School Production, 480; THP 101, 213, 301, 311, 315, 481; two from THP 330, 340, and 345.

DEPARTMENT GRADUATE PROGRAMS

The Department of Theatre offers programs leading to the degree of Mas ter of Arts in Theatre, the Master of Fine Arts in Theatre with concentra tions in acting, scenography and theatre for youth, and the Doctor of Philosophy in theatre with a concentration in the atre for youth. Consult the *Graduate Catalog* for details.

THEATRE

THE 100 Introduction to Theatre. (3) F, S
E ements and princip es of the theatre Lec ture, d scussion Nonmajors on y *General studies HU*

104 Principles of Dramatic Analysis. (3) F S
Ana ys s, interpretat on, and eva uat on of dra mat c 'terature for theatr ca production. Se ected read ngs of c ass c, modern, and contemporary plays. Prerequ s te: Theatre major *General studies: L1.*

225 Orientation to Theatre. (1) F
Orientat on to univers ty and department re sources and procedures Career plann ng and gu dance Research and wnt ng related to theatre production Requ'red for B.A Theatre majors.

300 Film: The Creative Process. (3) F S SS
E ements of the theatrical fi m c nematography, sound, ed ting, direct ng, act ng scriptwriting producing and crit c sm. 3 hours ecture, 2 hours ab *General studies. HU.*

320 History of the Theatre. (3) F
Traces major developments n theatre produc t on from ts beg nn ng to the 17th century. *General stud es· HU, H*

321 History of the Theatre. (3) S
Traces major deve opments n theatre produc t on from the 17th century to modern times *General studies: HU, H*

322 History of Theatre. (3) F
Traces major deve opments n theatre produc t on in the 20th century.

325 Play Reading. (1) F S, SS
Ass gned ndependent read ng programs of p ays most frequently included in the modern repertory Areas of emphas s:
(a) Modern European
(b) Modern Eng ish and rish
(c) Modern American
(d) Plays for H gh Schoo Production. Prerequ site theatre educat'on opt on
May be repeated for cred t n d fferent sec t ons Prerequ site Theatre major

400 Focus on Film. (3) N
Spec a ized study of prom nent f m art'sts, techn ques, and genres Emphasis s on the creat ve process May be repeated for cred t Prerequ s te: ENG 101 or 105

401 Focus on Multiethnic Film. (3) F S SS
Specia 'zed study of major ethn c f lms and prom nent f m artists Emphas s s on the cre at ve process. Lecture f m v ew ng papers. Prerequ site: ENG 101 *General studies. HU, C.*

420 History of the American Theatre. (3) F
H'story of the p ays, art sts and events in the deve opment of American theatre from co o nial to modern times *General studies· HU, H.*

421 History of the English Theatre. (3) S
H story of the p ays, art sts and events n the development of the theatre n Eng and s nce the Restoration *General studies L2 HU*

424 Trends in Theatre for Youth. (3) N
A survey of the h story, l terature, and contemporary pract ces n theatre for youth

425 History of the Oriental Theatre. (3) N
History and product on techn ques of theatre forms in Ind a Ch na, and Japan Prerequ s te· 6 hours of theatre h story or instructor approva *General studies· HU.*

480 Methods of Teaching Theatre. (4) F
Methods of theatre nstruction at the secondary school leve

500 Research Methods. 1 3) F
ntroduct on to graduate study n theatre.

504 Studies in Dramatic Theory and Criticism. (3) F
Dramat c theory criticism and aesthet cs from the class ca period to the 19th century Related read ngs n dramat c l terature. Prerequ s te Theatre major

505 Studies in Dramatic Theory and Criticism. (3) S
Dramat c theory cnt c sm, and aesthet cs from the 19th century to the present Re ated read ngs n dramat c terature. Prerequ s te The atre major.

510 Studies in Literature. (1) F S
Ass gned 'ndividua read ng programs n stan dard sources and masterp eces in theatre l t erature. Top cs may be selected from the fo owing
(a) Act ng–D rect ng
(b) Design Techn ca
(c) H story
(d) Crit c sm
May be repeated for cred t n d fferent sec t ons.

520 Theatre History and Literature. (3) F
A survey of histor ca periods, dramat c genres and theatre terature through the 17th century.

521 Theatre History and Literature. (3) S
A survey of historica per ods, dramat c genres and theatre iterature from the 17th century to present.

524 Advanced Studies in Theatre for Youth. (3) F
An in-depth study of the history, l terature, and contemporary practice of theatre for youth Prerequ'site: 'nstructor approva

591 Seminar. (3) A
Se ected topics in ch'ld drama, community theatre, and theatre h story Prerequ s te. wnt ten nstructor approva

700 Advanced Research Methods. (3) F
Critical rev ew of research, development and des gn of research in theatre and theatre for youth

791 Seminar. (3) N
Se ected topics offered on a revo v ng basis May be repeated for cred t when top c changes

Omnibus Courses: See page 44 for omn bus courses that may be offered.

THEATRE PERFORMANCE AND PRODUCTION

THP 101 Introduction to the Art of Acting. (3) F S SS
mprov sat ons, termino ogy exerc ses and projects n act'ng. Nonmajors only

102 Beginning Acting and Makeup. (3) F S
Actor awareness (persona and group) nter na act ng techn ques, scene study w'th partners, monologue preparat on, stage makeup techn ques projects in a areas Lecture, lab stud o Prerequ s te: Theatre major

110 Acting: Beginning Scene Study. (3) F, S
Rehearsal and performance of modern p ays with emphasis on rea stic act ng sty es Spec a sections for majors. Prerequ sites: THE 104 and THP 102 *or* instructor approval.

113 Techniques of Theatrical Makeup. (3) N
Techn ques of theatrica makeup. 1 hour ecture, 2 hours ab. Lab fee requ red

200 Theatre Workshop. (0) F S
Attendance at a variety of guest ectures, performances and demonstrat ons
(a) Act ng. Ind v dua projects Requ red of a B.F A acting emphases for 3 semesters
(b) B A sect on. Requ red of a l B.A majors for 3 semesters.

210 Acting: TV/Film. (3) N
Spec a technica aspects of acting before a camera Prerequis tes: THP 110 wr tten n structor approval.

213 Introduction to Technical Theatre. (3 F S
Procedures of techn ca theatre production and demonstrat on Top cs nc ude des gn and construct on of scenery, ight ng, and properties. 2 hours lecture, 3 hours ab

270 Introduction to Stage Speech. (3) F, S
Exerc ses and techniques to free the vo ce and mprove project on, resonance, and articulat on Internat ona Phonetic A phabet and Standard Stage Speech covered. Prerequ s tes THE 104 with a grade of "C" or better and THP 101 (or 102) and 275 *or* instructor approva .

275 Introduction to Stage Movement. (3) F, S
Movement vocabu ary and phys cal tra n ng in re axation a gnment condit on ng rhythm and po se Prerequisites: THP 101 nstructor approval

301 Theatre Production. (1–4) F, S, SS
Part c pation n Univers ty Theatre productions. May be repeated for credit Prerequisite written nstructor approva

307 Acting: The Inner Process. (3) F
An advanced c ass for 'ndividua zed work on concentration personal zat on self aware ness, v'sua izat'on subst tut on, creat ng nner and outer characters. Exerc ses mono ogues, and scenes Prerequ site: B F A act ng emphasis or written nstructor approva

308 Multiethnic Workshop. (3) F, S
Project-oriented workshop; prov des the ethn c student and others the opportun ty to develop and present works orig nating from America s ethn c cultures Lecture ab

310 Acting: Advanced Scene Study. (3) S
Script ana ysis and performance of modern c assics. 6 hours a week Prerequ's tes THE 104 with a grade of "C" or better THP 307 *or* acting emphas s and 'nstructor approva .

311 Improvisation with Youth. (3) F, S
Theories, procedures and materia s special app icat on for ch dren and youth. Re ated drama act vit es—storytel ng movement, and ora interpretat on. Not open to freshmen

312 Puppetry With Children. (3) A
Construct on and man pu ation of puppets, pract ce in performance sk l s. Emphas s on educationa and recreat ona uses of puppetry by and with children Lab fee requ red Prerequ site. jun'or stand ng or above requ red

315 Fundamentals of Directing. (3) F, S
Bas c too s of the director cast ng, floor p ans, block ng, rehearsing D'rector's approach to text and articulat on of deas emphas zed Prerequisites THE 104 with a grade of "C" or better; THP 101 (or 102) 213

316 Introduction to Video Production. (3) N
Video production techniques in writ'ng d recting techn cal production and edit ng. Group and individual creat ve projects requ red Lec ture, stud o, ab Prerequ s te nstructor approval.

317 Stage Management. (3) F
Readings in stage management and participa tion as a stage manager n a Un vers ty The atre product on. Prerequ s te THE 104 with a grade of "C" or better written nstructor approva

330 Introduction to Costuming. (3 F, S
Survey of costume h story bas c principles of costume des gn, and costume construct on Costume design project and laboratory experi ence n construct on of costumes 3 hours lec ture 2 hours lab Prerequ site THE 104 w th a grade of "C" or better

331 Costume Construction. (3) N
Uses of mater a s and techn ques for stage costumes w th actual construct on of period apparel. Prerequ s te THP 330 or instructor approval.

340 Scene Design. (3) F S
Studio projects n des gn ng rea stic scenery for the contemporary proscenium stage Prerequ site THE 104 w th a grade of "C" or better THP 213 or instructor approval

345 Lighting Design. (3) F, S
Princ p es of modern stage ght ng. 2 hours lecture, 2 hours ab Prerequ s te: THE 104 with a grade of "C" or better THP 213 or n structor approva

350 Sound Design. (3) F
Introduction to the process, equipment, and record ng techn ques used in sound des gn for the theatre. Lecture stud o Prerequisite THE 104 w th a grade of "C" or better

370 Beginning Voice and Movement for the Stage. (3) F
Concentrat on on deve op ng strong and ex press ve voca and phys ca instruments for the stage Prerequisites. THE 104 w th a grade of "C" or better; THP 270 and 275 *or* written nstructor approva , act ng emphasis

371 Intermediate Voice for the Stage. (3) S
Deve opment of ncreased voca power and variety for the actor, mastery of phonetic alphabet and standard speech and dict on. Pre requ sites: THP 370 B F A act ng emphasis or instructor approva

376 Intermediate Movement for the Stage. (3) S
Tra n ng for a strong, wel al gned f exib e, expressive body Tumbl ng, m me jugg ng combat, and characterizat on. Prerequ s tes THP 370, B F A act ng emphasis or nstructor approval.

401 Theatre Practicum. (1 3) F S, SS
Performance and product'on assignments for advanced students of acting techn ca pro duct on, and des gn. May be repeated for credit. Prerequ s te: 'nstructor approval

406 Scenography. (3) N
Concepts of tota des gn direct on Product on ana ys s and design ncorporating al major vi sua elements nc ud ng scenery ight ng, cos tumes, and makeup Prerequis tes THP 330 340 345 senior stand ng nstructor approva .

410 Acting: Classical Styles. (3) A
Rehearsa and performance of period c assi cal, and nonrea istic p ays Emphas s on de iv ery of poet c language Prerequis tes THP 310 acting emphas s *or* written nstructor approva

411 Advanced Studies in Improvisation with Youth. (3) S
App ication of theories, techn ques, and mate ria s Regular part c pat on w th ch ldren. Prerequisite: THP 311 or instructor approval

415 Directing Workshop. (3) A
Periods and styles exp ored from Class ca Greek to contemporary American Realism and theatre for youth Rehearsal and presentat on of scenes and short plays Prerequ site. THP 315

419 Pre-production Workshop: Director/ Designer Collaboration. (3) A
Study and pract ce of the co aborat ve process necessary for develop ng a production concept Various sty es (real sm, nonrea sm theatre for youth). Cannot be enrol ed concur rent y with THP 406 or 506. Prerequ s te: THP 415 or written nstructor approval.

430 Costume Design. (3) N
Princ p es of costume des'gn w th projects in both modern and period sty es Prerequ s te THP 330

431 Advanced Costume Construction. (3) A
Spec a zed train ng n costume construct on prob ems and crafts w th projects in ta loring, m l nery and period accessor es Prerequ s tes. THP 330 and 331 *or* 'nstructor approva

435 Advanced Technical Theatre. (3) A
Se ect on of materia s draft ng of work ng draw ngs, too operat on, and construct on techn ques 2 hours ecture, 2 hours lab Pre requ s tes THP 340 and 345 *or* nstructor ap prova .

440 Advanced Scene Design. (3) A
Advanced stud o projects n des gn ng nonre a ist c scenery for a variety of stage forms. Prerequ's te· THP 340 or nstructor approval

441 Scene Painting. (3) N
Stud o projects n pa nt ng stage scenery Pre requ'site: THP 340 or nstructor approva

442 Drawing. (3) N
Techn ques n draw ng and rendering for sce nic, costume, and ght ng des gn Prerequ - site. nstructor approval.

444 Drafting for the Stage. (3) S
Fundamenta s of and pract ce n graphic tech n ques for the stage. 2 hours ecture, 3 hours stud o Prerequ sites THP 213; instructor approva

445 Advanced Lighting Design. (3 N
Specia zed techn ques 'n stage ighting 2 hours lecture, 2 hours ab Prerequisite: THP 345 or nstructor approval

450 Theatre Organization and Management. (3) N
Box off ce, pub ic ty, production budget ng, and house management procedures Prereq uisite: THE 104 w th a grade of "C or better

460 Playwrights Workshop. (3) F, S
Pract ce and study of creat ng characters, d a ogue scenes, plays, and mono ogues for the stage May be repeated for cred t. Studio lec ture Prerequisite: written nstructor approval.

461 Scripts-In-Progress. (3) F, S
Stud o work w th the instructor centered on rev s ons of origina p ays Preparing the scr pt for product ons, and rewnt ng wh le n produc t on. May be repeated for credit. Stud o. Pre requis te: THP 460 or written nstructor approva

471 Advanced Voice for the Stage. (3) F
Exercises to deve op vocal flex bi ty and power mastery of e evated American dict on and language ski s app ed to c ass ca and nonrea st c drama Prerequisites. THP 370 act ng emphas s or nstructor approva .

476 Advanced Movement for the Stage. (3) S
Movement techniques for the c ass ca and nonreal st c theatre. Prerequ s tes THP 370, act ng emphas s or instructor approva

481 Secondary School Play Production. 3 F
Methods of d rect ng design ng and c ord nating p ay product on experiences at the sec ondary schoo Off campus pract cum Prereq u sites THP 315 and acceptance to the Pro fess ona Teacher Preparat on Program *or* wr tten nstructor approva

494 Special Topics. (1–4) A
Top cs may be se ected from the fo ow ng.
a Advanced Act ng Techn ques
(b) Curncu um and Superv s on of Theatre n the Schoo K 12
(c Puppetry n Performance
d Storytel ng
(e) Advanced Scene Pa nt ng
(f Techn ca Theatre II
(g) Propert'es and Dressings Des gn and Construct on
h V deo and Industr a Scene Des gn

498 Pro-Seminar. 1–6) A
Top cs may be se ected from the fo low ng
a) Pro ects
Scenery Des gn
L ght ng Des gn
Costume Des gn
Properties Des gn
Techn ca D rect on
(b D rect ng
(c Stage Management
(d Theatre n Educat on
(e) Theatre for Youth Tour
Prerequ site wr tten nstructor approva .

501 Acting I. (3) A
Deve opment of fundamental techn ques of concentrat on, sten ng, act on imag nat on and emot'ona preparat on. Stud o. Prerequ s te admiss on to M.F A Act ng program or n structor approva

502 Acting II. 3) A
Scr pt ana ys s and performance techn ques for 19th and 20th century rea sm and natu ra ism Studio Prerequ s te THP 501 or n structor approva

503 Acting III. (3) A
Scr pt'analys s and performance techn ques for sty e Greek Shakespearean and Resto rat on Stud o Prerequ s te. THP 502 or n structor approva

504 Acting IV. 3) A
Performance techn ques for the latest devel opments n the fie d new scripts new the atres performance art and new vaudev e Stud o Prerequ site THP 503 or nstructor ap pr va

506 Scenography. 3) N
Concepts of tota des gn d rect on Product on ana ys s and des gn incorporat ng a major v sua elements nc ud ng scenery ight ng, costume, and makeup. Prerequ s te: theatre graduate stand ng or nstructor approva .

507 Speech I. 2) A
Deve opment of prec s on for nte g'b' ty' phonet c stud es introduced as bas s for stan dard speech, c ass ca texts and d a ects Stu d o Prerequ s'te' Adm ss on to M F.A Act ng program or nstructor approva

508 Multiethnic Workshop. (3 F S
Advanced workshop for development and pre sentat on of works originat ng out of American ethn c cu tures Lecture ab

509 Singing for Actors. (1) N
ntroduct on of the bas cs of s ng ng te hn que Breath contr res nance, art cu ation exp o rat on, and expans on of s ng ng range. May be repeated for cred t Stud o Prerequ s te adm ss on to M F A. Act ng program or n structor approva

510 Speech II. 2 A
Text analys s Introduct on t verse drama through study of Shakespearean texts nclud ng work on scans on mean ng and structure of verse Stud o Prerequ s te THP 507 or n structor approva

511 Improvisation with Youth Workshop. (3 A
Read ngs n textua mater a s for creat ve drama a ternat ve methods and mater als for drama w th ch dren and spec al popu at ons Pract cum c uded Prerequ s tes THP 311 *or* graduate stand ng and nstructor appr va

512 Puppetry Workshop. 3 A
Survey of puppetry n educat on puppetry as an art form n des gn and performance Lab fee requ red

515 Problems in Directing. 3 A
Ana ys s of common d rect ng problems Top cs nc ude creat ng the ensemb e conceptual unity, metaphor non tera strateg es, and or gan zat ona respons b t es of the d rector Prerequ s te nstructor approva

517 Stage Management Practicum. 3 F
Read ngs and research n stage management and partic pat on as a stage manager n a Uni vers ty Theatre product on Prerequ s te wr t ten nstructor approva

519 Directing: Works in Progress. (3 F
Advanced projects n d rect ng concentrat ng on a c aborat ve process between d rector p aywr ght actors and des gners Focus s part cu ar y on new scripts or adaptat' ns of it erature. May be repeated for cred t Stud o on-s te pract cum Prerequ s tes graduate stand ng wr tten nstructor approva

530 Advanced Costume Design. 3) N
Advanced stud o projects n c stume de gn for a var ety of product n forms Prerequ site nstructor approva

540 Scene Design Applications. (3 N
Conceptua and pract ca app cat on of the de s gn process nc ud ng graph c and scu ptura projects. Pract ca des gn prob ems nvest gated n laboratory Lab fee Prerequ s te n structor approva

545 Lighting Des'gn Applications. (3) N
Advanced stud o projects n stage ghting de s gn. Prereq s te' nstructor approva

570 Movement I. 2 A
Deve opment of a re axed neutral nstrument and an exerc se program to ncrea e strength, stamina and flex b ty Stud o Prerequ s te adm ss on to M F A Act ng program r n structor approva

571 Movement II. (2 A
Deve opment of the organ c connect on be tween the body and other primary actor too s vo ce mag nat on emot ons and ntel ect. Stud o Prerequ s te THP 570 or nstructor ap prova

572 Movement III. 3) A
Deve opment of phys ca sk ls necessary to perform ro es from various periods inc ud ng Greek commed a de 'arte Shakespeare, Restorat on and Edward an Stud o. Prerequ s te THP 571 or nstructor approva .

573 Movement IV. (3) A
Deve opment of spec a phys ca sk s such as m me, masks combat tumbl ng, pratfa s and jugg ng Stud o Prerequ site THP 572 or n structor approva

575 Voice I. (2) A
Deve opment of a c ear resonant voice free of dia ect/reg ona sm through body a gnment breath ng voca p acement deve op'ng reso nance and project on Stud o Prerequ s te ad m ss on to M F A Act ng program or nstructor approva

576 Voice II. 3 A
ntroduct on of voca extens on techn ques Text work n nonreal st'c styles nc ud ng Greek Restorat on and Brit sh 18th century comedy Stud o. Prerequ s te THP 575 or n structor approva

584 Internship. 1 3) A
F eld research and on-s te tra n ng n theatre for youth commun ty theatre, and production techn ques Prerequ s te wntten nstru tor ap prova

593 Appl ed Projects. (1 12) A
Prerequ s te' nstructor approva

594 Conference and Workshop in Child Drama. (3) A
Prerequ s te nstructor approva

611 Creative Drama Seminar. 3) A
Examinat on of current theory and pract ces n the f e d. Prerequ s te nstructor approva

618 Directing Practicum. 3) A
Pract ca experience n d rect ng and produc ng an ent re p ay or mus ca for young aud ences Prerequ s te: nstructor approva

649 Des gn Studio. (3) F, S
Projects nclude des gn of scenery costume ght ng, or sound for laboratory or mainstage product ons. May be repeated for cred t Pre requ s te nstructor approva

684 Internship. 3–6) F S, SS
F e d research n act ng mprov sat on w th youth, theatre for youth puppetry, and sce n graphy Prerequ's te: nstructor approva

691 Seminar: Scenography. (3 N
Exam nat on of and research nto modern con cepts and pract ces of scenography. Prerequ site. nstructor approva

693 Applied Project. 1 12 F, S SS
F nal projects for M F A Theatre cand dates in act ng scenography and theatre for youth. Prerequ s te nstructor approva

Omnibus Courses: See page 44 for omn bus courses that may be offered

College of Law

Richard J. Morgan, J.D.
Dean

PURPOSE

The prime function of the College of Law is to train men and women for the practicing legal profession and related professional assignments. In addition, the college has the responsibility to contribute to the quality of justice ad ministered in our society

Juris Doctor Degree

The College of Law offers a three year program of professional studies at the graduate level leading to the degree of Juris Doctor. Graduates enter many branches of the legal profession as well as careers in government, business, fi nance, industry, and education.

Students must satisfy all of the fol lowing requirements for a J.D. degree:

1. admission to the college as a candi date for the degree and satisfaction of any conditions imposed at the time of admission or before gradu ation from the college,
2. satisfaction of residency require ments for the College of Law;
3. successful completion of a mini mum of 87 hours of academic credit, of which 60* must be graded with a cumulative weighted average of 70 or better and of which no more than eight semester hours of "D" (60–69) grade work after the first year applies toward the 87 hours;
4. completion of all required college courses;
5. completion of the degree require ments within five years of admis sion into the college; and
6. completion of one substantial pa per.

All students, with the exception of transfer students, must be in residence full time for a minimum of six semes ters (or their equivalent). A semester in residence is earned when a student has been enrolled in a minimum of 10 hours of course work. Transfer stu dents must complete the work of at least three semesters in residence im mediately preceding the granting of a degree.

* Students who wish to be eligib e for mem bership in the Order of the Coif, an honor society open to the top 10% of each graduating class, must complete at least 75% 66 hours) of their law studies in graded classes

The College of Law offers three dual/concurrent degree programs:

1. J.D./Master of Business Administration,
2. J.D /Master of Health Services Administration; and
3. J.D./Ph.D. in Justice Studies.

Additional information about these programs is available from the College of Law.

ADMISSION

First year students are admitted only for the fall semester. The formal re quirements for admission to the Col lege of Law are (1) an undergraduate degree from an accredited four-year college or university and (2) a score on the Law School Admission Test (LSAT), administered by Law Ser vices, Box 2000, Newtown, Pennsylva nia 18940, in centers throughout the country.

To be assured consideration, appli cations are due by February 15. All other materials including the Law School Data Assembly Service (LSDAS) report, a typed personal statement not exceeding three pages, and recommendation letters should be received by the College of Law no later than March 15.

Each year many more students apply than can be accepted The College of Law receives about 15 applications for each of the 150 places to be filled in the entering class. Accordingly, the admission process is selective An at tempt is made to identify those appli cants whose credentials evidence abili ties to think clearly, to read and synthe size complicated materials, to write well, and to make a significant contri bution to the educational program of the College of Law.

Two main factors considered in the admissions process are the cumulative undergraduate GPA and the LSAT score. In combination, these factors give a starting point for detailed exami nation of the file When the combina tion is high, the likelihood of admis-sion is also high.

The selection process is not strictly mathematical since other matters often bear upon the validity of the GPA or LSAT and the capability of the candi-date. Therefore, the College of Law, through an Admissions Committee composed of faculty, staff, and student members, may review such factors as

an improved grade trend, the college or university attended, course selection patterns, the rigor of the academic program undertaken, distribution of college grades, a change in performance after an absence from college, unusual writing ability as evidenced by publication, a unique cultural background, performance despite educational or economical disadvantage, employment experience, graduate study, significant community/collegiate activities, and Arizona residency.

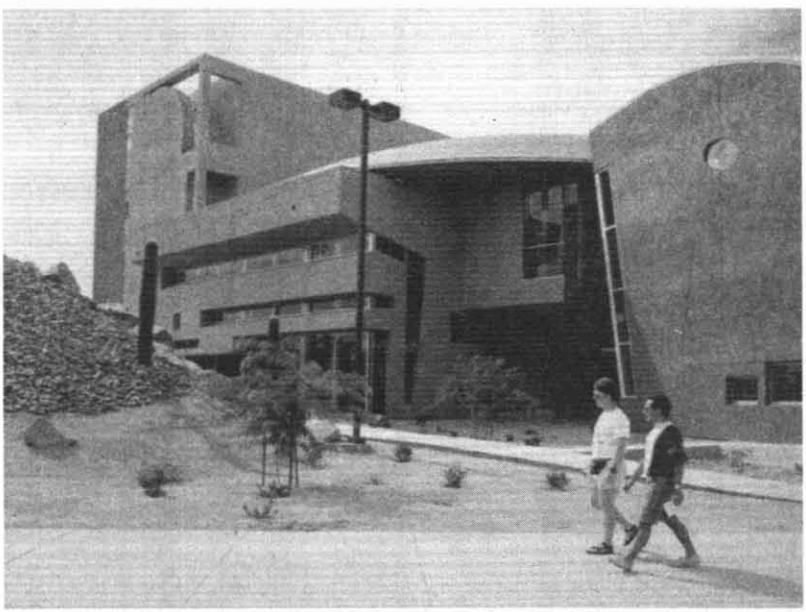
Affirmative Action. The College of Law has an affirmative action admissions policy, and applications from members of minority groups are encouraged. Under the program, consideration is given in admissions and financial aid decisions to qualified members of cultural, ethnic, or racial groups who have not had a fair opportunity to develop their potential for academic achievement, who lack adequate representation within the legal profession, and who would not otherwise be meaningfully represented in the entering class. Groups usually qualifying have been African Americans, American Indians, Hispanics, Asians, disabled persons, and the seriously economically disadvantaged.

Course of Study

The program of study in the College of Law is designed for full-time students. In the first year of the three-year program, the course of study is prescribed and incorporates the time-proven techniques of legal education. This first year gives students—by the "case method," by the "problem method," by "moot court," and through other techniques—an intensive exposure to the basic legal processes.

As a part of the program, first-year students are assigned to small sections. In the Legal Research and Writing program, first-year students prepare legal briefs and memoranda and receive feedback through the use of practice examinations. The program focuses on the development of writing and organizational skills necessary for success in law school and in the practice of law. The second and third years cover a wide range of courses varying in format as well as subject matter, allowing students to pursue both the basic subjects of law study and more specialized interests. By offering great freedom in the selection of subjects, the educational experience of the second and third years is in sharp contrast to the curriculum of the first year. In addition, the college offers a number of faculty-supervised clinical education programs and a program of supervised externships.

Law Journal. The College of Law publishes a professional law review, the *Arizona State Law Journal*, edited by students of the second- and third-year classes. Membership on the law journal is determined by grade performance in the first year and, for some, by submission of written work in a writing competition. Participation on the law review is hard but rewarding work. For those eligible, the review provides one of the finest avenues for legal education thus far developed, contributing to the student's intellectual advancement, to the development of law and the legal profession, and to the stature of the College of Law.



Grading

College of Law courses are graded under the following numerical scale:

90–99	Distinguished
85–89	Excellent
80–84	Very Good
75–79	Good
70–74	Satisfactory
60–69	Deficient
59	Failing

A grade of 60 or above is required to receive credit for any course.

Retention Standards. To be eligible to continue in the College of Law, students must maintain a cumulative weighted GPA of 70 or better at the end of each semester or summer session. Any student who fails to achieve a 70 GPA in any one semester, regardless of the cumulative GPA, is automatically placed on probation. Continuation of enrollment by probationary students is upon such terms and conditions as the college may impose.

A student whose cumulative GPA falls below the required level or whose semester GPA is less than 70 in two consecutive semesters is dismissed but may apply to the Office of the Dean for readmission. The Office of the Dean refers the application to a faculty Committee on Readmission. Where the GPA deficiency is slight and evidence of extenuating circumstances is convincing, readmission may be granted on a probationary status after a review of the reasons contributing to unsatisfactory performance and a finding that there is substantial prospect for acceptable academic performance. Continuation in school thereafter may be conditioned on achieving a level of performance higher than the overall 70 GPA. Further detailed information concerning the college's retention standards can be found in the *Bulletin of the College of Law*.

Special Honors at Graduation. At the time of graduation, students who have earned academic distinction in the

study of law may be awarded the designations *cum laude*, *magna cum laude*, and *summa cum laude*. The college also bestows membership in the Order of the Coif upon students in the top 10% of the class. Recipients of these awards are selected by the law faculty on the basis of academic performance.

Law Building and Law Library

The John S Armstrong Law Building is in the central campus near other colleges of the university and Hayden Library. The Law Building provides every modern facility for legal education and has been described by experts on planning law buildings as setting a new standard in functional design.

The John J. Ross William C Blakley Law Library, named in memory of two prominent Phoenix attorneys, is one of the finest law libraries in the Southwest with a collection of more than 310,000 volumes and microform volume equivalents. The collection includes a broad selection of Anglo American case reports and statutes as well as legal treatises, periodicals, encyclopedias, digests, citators, and administrative materials The collection includes growing special collections in the areas of international law, Indian law, Mexican law, and law and technology. The library is also a selective U.S government depository.

The library is housed in a dramatic and functional building that opened in August 1993. The building provides accessible shelving for the expanding collections and comfortable study space at carrels, tables, and lounge seating located throughout the library. The library has a 30 station computer lab as well as LEXIS and WESTLAW rooms each containing 10 stations The library also has 27 meeting and study rooms, a microforms facility, and a classroom

Students also have ready access to the other campus libraries, including the Charles Trumbull Hayden Library, the Daniel E. Noble Science and Engineering Library, the Architecture and Environmental Design Library, and the Music Library. The collections of the university libraries comprise more than 2.6 million volumes.

Center for the Study of Law, Science and Technology

The ASU Center for the Study of Law, Science and Technology is a multidisciplinary research center founded by the Arizona Board of Regents in 1984. The center publishes research studies, sponsors seminars and symposia, and houses visiting scholars and teachers. Through these programs, the center seeks to contribute to the formulation and improvement of law and public policy affecting science and technology and to the wise application of science and technology in the legal system.

In cooperation with the American Bar Association Section on Science and Technology, the center edits the *Jurimetrics Journal of Law, Science and Technology*

Indian Legal Program

In the spring of 1988, the faculty of the College of Law voted to devote substantial new resources and energy to an Indian Legal Program that would have a three part mission· education, legal scholarship, and public service to tribal governments.

The ASU College of Law is located at the center of an active and diverse community of Indian people, tribes, and governments In the state of Arizona, 21 tribal governments exercise sovereign authority over more than 23 million acres, or approximately 27% of the state. The closest reservation, that of the Salt River Pima-Maricopa Indian Community, is located within two miles of the law school, and eight other reservations are located within a 100 mile radius of the school.

Students at the College of Law have the opportunity to participate in all phases of the Indian Legal Program and gain in depth understanding of the legal issues affecting Indian tribes and people. Courses on Federal Indian law and seminars on advanced Indian law topics are offered on a regular basis. Students may participate in externships with the local tribal courts or spend a semester in Washington, D.C., working with the Senate Select Committee on Indian Affairs. This variety of academic and work experience provides the students an outstanding legal education with a firm grounding in both the theoretical and practical aspects of Indian law.

ACCREDITATION

The college is fully accredited by the American Bar Association and is a member of the Association of American Law Schools.

INFORMATION

Further detailed information concerning the course of study, admission practices, expenses, and financial assistance can be found in the *Bulletin of the College of Law*. To request the bulletin or application forms, call 602/965 7207 or write to

ADMISSIONS OFFICE, COLLEGE OF LAW
ARIZONA STATE UNIVERSITY
BOX 877906
TEMPE AZ 85287–7906

Law

Richard J. Morgan
Dean
(LAW 201) 602/965–6181

REGENTS' PROFESSOR
KAYE

PROFESSORS
ARTERIAN, BARTELS BENDER, BERCH, BLAZE, BROWN CALLEROS, ELLMAN, FELLER, FURNISH, GUERIN, KADER KARJALA LESHY, LOWENTHAL, MATHESON, MORGAN, MURPHY, ROSE SCHROEDER STANTON, TESON TUCKER, WEINSTEIN, WINER

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CLINICAL PROFESSIONALS
DALLYN, WEEKS

DIRECTORS
Indian Legal Program
RUSSELL
Legal Research and Writing and Academic Support Group
O'GRADY (Acting)
Center for the Study of Law, Science and Technology
STROUSE

PROFESSORS EMERITI
DAHL, MORRIS, PEDRICK

LAW

LAW 515 Contracts I. (3 F
Exploration of common law legal method and the structure of Article 2 of the U.C C in the context of issues of contract formation

516 Criminal Law. (3) F
The substantive law of crimes

517 Torts I. (3) F
Legal protections of personality, property, and relational interests against physical economic and emotional harms

518 Civil Procedure I. (3) F
Exp orat on of the structure of a lawsu t and techn ques of a ternat ve d spute reso ution Spec fic top cs nc ude commencement of suit jo'nder of parties d scovery, pretrial motions and subject matter junsd ction

519 Legal Method and Writing. (2) F
Examinat on of methods used to ana yze egal prob ems Rev ew of precedent statutory con struction and bas c res udicata prob ems. Use of bas c ega wnt ng formats

520 Contracts II. (2) S
Cont nuation of Contracts I focus ng on con tract interpretat on

522 Constitutional Law I. (3) S
Role of courts n the federal system, d stribu t on of powers between state and federa gov ernments, and the ro e of procedure n it ga- t on of constitutiona quest ons.

523 Property I. (2) F
nd c a of ownership found property estates n and and ord tenant

524 Legal Research and Writing. (2) S
Cont nuat on of LAW 519

525 Torts II. (2) S
Continuat on of Torts I w th emphas s on strict and products tabi ty

526 Property II. (3) S
Non-possessory interests n property (ease- ments covenants, servitudes) nu sance, and use plann ng, and transfers of nterests n property

527 Civil Procedure II. (3) S
Cont nuation of LAW 518; subjects n LAW 518 are addressed in greater depth as wei as personal junsdict on, res jud cata, co latera estoppel, and choice of law under the *Ene* doctrine

600 Administrative Law. (3) A
Adm nistrative process, emphas zing nature of powers exerc sed by adm'n'strat ve agenc es of government, problems of procedure, and scope of judicial rev ew

601 Antitrust Law. (3) F S
Leg s at on and ts imp ementation to prevent monopo y and bus'ness practices in restra'nt of trade, ncluding restrict ve agreements n- vo v ng pr ce f x ng, trade assoc ation act vi- t es and resa e price ma ntenance.

602 Partnership Taxation. (2 3) A
Federa tax consequences of form ng, operat- ng term nat ng or transferring partnersh ps

603 Conflict of Laws. (3) A
Problems arising when the operat ve facts of a case are connected with more than one state or nation Choice of law, bases of junsdict on, effect of fore gn judgments, and underly ng federa and const tut onal ssues

604 Criminal Procedure. (3) F, S
The nature of the crim na procedura system w th spec al focus on const tut ona protections for the accused

605 Evidence. (3) A
Princ p es and pract ce governing the compe- tency of w tnesses and presentat on of evi- dence nc ud ng the rules of exclus on and ro es of awyer, judge, and jury under the ad versary system

606 Federal Income Taxation. (3) F, S
Federal ncome tax n re ation to concepts of ncome property arrangement, bus ness activ ity, and current tax problems, w'th focus on the process of tax legislat on and adm'n stra tion

607 Advanced Civil Procedure. (3) F, S
An overview of the structure and ife cyc e of a lawsu t from p ead ngs to appeal emphasiz'ng the Federal Ru es of Civi Procedure.

608 Business Associations I. (3) A
Partnersh ps, l'm ted partnersh ps, and sma bus ness corporat ons nc udes a brief ntro- duction to accounting Deta ed ana ys s of the problems of forming a close corporation state aw duties of care and oya ty, management, d v dends and redemptions, ssuance of stock nternal d spute reso ution d ssolut on, and the general law of derivative act ons

609 Business Associations II. (3) A
nterrelat onship of federal and state law and a brief ntroduct on to corporate finance (1933 Act). A broad overview of arge company regulat ons nc ud ng reporting ru es, proxy regulat on, nsider trad'ng sa e of contro , ten der offers and takeovers, and go ng pr vate Prerequ s te LAW 608.

610 Advanced Criminal Procedure. (2 3) A
Top cs n crim nal procedure, with emphasis on ega constra nts on grand jury 'nvest ga- tions pol ce practices, pretrial release, pre mi- nary hearings, prosecutonal d scretion, and p ea barga n ng

611 Estate Planning I. (3) A
Tax aws re at ng to transfer of wealth both at death and during lifet me nc uding federa es tate tax gift tax and ncome taxation of es- tates and trusts.

612 Family Law. (3) A
Lega and non egal prob ems that an nd v dual may encounter because of a s tuat on as a fami y member.

613 Federal Courts. (3) A
Federa jud c al system relat onship of federal and state law; jur sd ct on of federa courts and their re ation to state courts

614 Labor Relations. (3) A
Col ect ve barga'n ng, inc ud ng the r ght of employees to organ ze and to engage n con- certed act v ties reso ution of quest ons con- cern ng the representation of emp oyees duty of emp oyers and un ons to barga n, admin s- trat on and enforcement of col ect ve barga n ng agreements

615 Public International Law. (3) A
Ro e of aw in nternat onal d sputes Drafting and nterpretation of treaties and mult atera convent ons are cons dered

616 Jurisprudence. (3) A
Introduct on to legal ph losophy, w th read ngs on the nature of aw and lega reason ng, the re ationsh p between aw and moral ty and equa ity and soc a just ce.

618 Trusts and Estates I. (3) A
Substant ve concepts nvolved n transm tt ng wea th nc ud ng nterstate success on w ls and w l substitutes, the modern trust as a fam' y protective dev ce, creat on of future in- terests n a planned estate, soc a restnct ons of a nontax nature, and methods of devot ng property to chantab e purposes

620 Civil Rights Legislation. 2 3) S
Coverage of the rights and remed es provided by federa c v l nghts eg s at on, princ pa y, the key prov s ons of the Reconstruct on Era C v l R ghts Acts portions of the emp oyment d scr minat on eg s ation and vot ng rights eg s ation.

621 Commercial Law: Sales and Negotiable Instruments. (3) A
Transact ons n the sales of goods and mechan sms for payment and cred t. Subjects nclude contract nformat on, warranty, r sk of oss damages, and documentary transactions n sa es of goods under Uniform Commerc a Code Article 2, the use of checks promissory notes etters of cred t and other nstruments under UCC art c es 3, 4 and 5, re ated bank ng practices and cred t transact ons

622 Commercial Law: Secured Trans- actions. (3) A
Secured transact ons under Article 9 of the Uniform Commerc a Code and other re evant sect ons. An overv ew of the creation perfec- t on, and priority effects of security interests Financ ng of bus ness enterprise and con sumer cred t

623 Commercial Torts. (3) A
Involves an ana ys s of actionab e wrongs against a business entity or aga nst propri etary rights he d by that ent ty covering the ent're spectrum of private remedies for com- petit ve wrongs

624 Community Property. (1 2) A
Property rights of husband and w fe· the Ari zona community property system; homestead

625 Constitutional Law II. (3) A
Fundamenta protect on for person, property, po tica and soc al rights.

627 Corporate Taxation. (3) A
Prob ems in taxab l ty of the corporation cor porate d stributions and corporate reorgan'za tions.

628 Creditor-Debtor Relations. (3) A
Cred tors remed es n sat sfaction of c a ms and debtors protect on and re ief under bank ruptcy other aws

630 Employment Discrimination. (2) A
Focus on T tle VI of the C v l R ghts Act of 1964, wh ch forb ds d scrim nat on n employ ment based upon race, re ig on nat onal or g n, or sex The substance and procedura as pects of T t e V I are covered n detail, nclud ng coverage adm n strative procedures, burdens of proof spec al prob ems of re g ous and sex d scrim nat on, statutory and court created defenses, sen'ority systems, and rem- ed es

631 Environmental Law. (3) A
L t gat on adm n strat ve aw and eg s at on re at ng to problems of env ronme ta qua ty Top cs covered may nc ude a r and water po - lut on, tox c substances pest'c des and rad a t on

632 Indian Law. (3) A
nquiry nto lega prob ems spec a to Amen can ndians and tnbes

634 Judicial Remed es. (3) A
The nature and m ts of njunct ve, rest tut on ary, and compensat ry remed es for the pro- tect on of persona property po t ca , and civ r ghts

635 Juvenile Justice System. (3 N
Spec al prob ems n the juven e system

636 Land Use Regulation. (3 N
Lega prob ems n the regulat on and control of and development by state and ocal govern- ments Adm n strat on of zonmg subd v s on, and other plann ng contro s, ssues of fa mess and procedure n the ut zat on of such con trois

638 Legal Profession. 2) F S
Organ zed bar d stnbut on of egal serv ces n modern soc ety economics of the profession profess ona canons of ethics for the bar and jud c ary and prob ems n po ic ng the profes s on

639 Natural Resource Law. 3) A
Exam nes the const tut ona bas s for federa and management and the d fferent kinds of pub c lands management schemes e.g , parks forests w d fe refuges emphas z'ng acquisit on of r ght to and regu at on of, the d fferent uses of pub c lands and resources (e g m nmg graz ng t mber w d! fe hab tat recreat on)

640 Securities Regulation. (2) A
Se ected problems arising under the ma or statutes concerned with regu at ng the secun t es market

641 State and Local Government. (2 3) N
Lega problems nvo ved n the organ zat on and adm n strat on of governmenta un ts in- c ud ng the c ty county town v age schoo d stnct, and spec a d str ct"

643 Water Law. (3 A
Acqu s t on of water r ghts water use contro s nterstate conf cts

644 Intellectual Property. (3) A
The protect on of nte ectua property and en couragement of creat v ty trade va ues, trade secrets patents copyrights perform ng arts and v sua arts

702 Alternative Dispute Resolution. 2–3) A
A broad exposure to methods of setti ng d s putes n our soc ety such as med at on arb trat on/conc at on and negot ation nc ud ng exam nat on of the current t gat on mode .

703 Law, Science, and Technology. 2 3) A
The ega mechan sms used n dea ng w th var ous ssues ra sed by contemporary sc ence and techno ogy Current egal responses to sc ence and technology are explored.

705 Mass Communications. (2 3) A
An examinat on of F rst Amendment pr nc p es and statut ry and regulatory requirements w th respect to the conventiona pnnt and broadcast media, as wel as recent technolo g es such as cab e

706 Immigration Law. (2 3 N
Explorat on of po t ca , econom c socia , and ega ssues concern ng immigrat on Specif c top cs covered 'nclude cit zensh'p and natura zat on, denatura zation deportat on and refugee r ghts and asylum.

707 Corrections and Sentencing. (2 3) N
Just ficat ons for pun shment the effect of punishment upon the nd v dua and soc ety statutory basis for sentenc ng in Anzona, and the ro e of the lawyer n the sentencing pro- cess

709 International Human Rights. (2 3) N
Internat ona ru es and procedures govern ng the protect on of human nghts

710 Real Estate Tax Planning. 2 3) A
D scuss on of top cs, nc ud ng but not im ted to rea estate nvestments as tax she ters, al ternat ve acqu sit on f nance dev ces, ref nanc ng techn ques and nontaxable exchanges.

711 Real Estate Transfer. (2 3) A
An exam nat'on of the ega aspects of the sa e and purchase of real property encom pass ng three areas the ro e of the awyer and broker n the transact on, the sa es contract and ssues re ating to t tle protect on

712 Religion and the Constitution. (2 3) A
An 'n depth study of the "establ shment' and "free exerc se" c auses of the First Amend ment to the U.S Const tut on

714 Law and Social Science. 2 3) N
nvest gat on of the use of soc a sc ence research and methods n the lega system Top cs nc ude psycho ogy of eyew tness den t ficat on, soc a -psychologica stud es of dec - s on mak ng, stat st ca ev dence of d scrim - nation econometr c studies of the deterrent effects of capita pun shment, and cl n ca predict ons of v o ent behav or

715 Professional Sports. (2 3) N
Un que lega prob ems re at ng to profess ona sports nc ud ng the r re ationsh p to ant trust laws the nature of player contracts and asso c ated tax prob ems

717 Legislative Process. (2 3) N
Exp ore both the lega and the pract cal con text w th n wh ch the eg s at ve process oper- ates w th a major component of the course be ing a eg s at ve draft ng project.

721 Education and the Law. (2 3) N
Current egal prob ems affect ng nstitut ons of higher education facu ty students, and gov ern ng boards

733 Negotiation, Mediation, and Counsel- ing. (3 N
Explores a ternat ve mode s of negotiated d s pute reso ut on as we l as the ro es of awyer and c ient n the negotiat n process Exten- s ve use of s mu at on exerc ses

735 Estate Planning II. (2 3) N
Preparat on of actua estate p ans and mp e ment ng ega documents for a variety of typi- ca pr vate cl ents Both tax and nontax ele- ments n preparat on of the p ans are consid- ered Prerequ s te LAW 611

736 Planning for the Business Client. (2 3) N
Plann ng transact ons nvo v ng bus ness orga- n zat'ons w th spec a emphas s on ncome tax and corporate cons derat ons

738 Practice Court. (2 3) A
Students act as awyers n conduct ng a case through a stages of tna from commence ment of the act'on to f nal judgment

745 The Supreme Court. 2 3) N
Intensive examinat on of se ected current de- cis ons of the U S. Supreme Court

768 International Business Transactions. (2 3) N
Prob ems and po cy cons derat ons nvolved in nternat ona trade; tariffs nternat onal monetary contro s and deve opment loans

770 Law Journal. (1 3) F S
Academ c cred t for successfu comp et on of work by a member of the staff of *Anzona State Law Journal*; max mum of 5 semester hours.

772 Internships in Law. (1–6) F, S SS
C v defender or prosecutor p acement and re ated classroom component

773 Internships in Law. (1–6 F, S SS
P acement n the Law Schoo C in c and re- ated c assroom component

774 Internships in Law. (1–6 F, S SS
P acement n Prosecutor C n c and re ated c assroom component

780 Moot Court. (1 3) F S
Academ c cred t for successfu complet on of work as a member of the Moot Court Board of D rectors maximum of 3 semester hours.

781 Individual Study. (1 F, S, SS
With the approva of a facu ty member a stu dent may research a egal subject of spec a nterest and prepare a paper su table for publ cat on.

782 Individual Study. (2) F, S, SS
See LAW 781.

783 Individual Study. (3) F, S SS
See LAW 781.

784 Moot Court Competition. (1–4) F S
Successfu part c pat'on and comp et'on of a nat ona moot court compet t'on

785 Externship. (1 12) F, S SS
Superv sed practical awyer ng in an externa p acement proposed by the student or estab shed by a sponsonng agency and approved by the Col ege of Law In add t on, an assoc - ated academ c component s estab shed by the student w th a member of the faculty

791 Seminar in Law. (1 12 F S

Omnibus Courses: See page 44 for omn bus courses that may be offered

College of Nursing

Barbara A. Durand, Ed.D.
Dean

PURPOSE

The faculty of the College of Nurs ing acknowledge their responsibility to health care consumers for the prepara tion of indiv iduals w ho provide nursing care of professional quality through teaching, research, and serv ice The purpose of the College of Nursing is to prov ide educational programs that pre pare professional nurses to meet the nursing care needs of individuals, groups, and communities. To achieve this purpose, the college offers under graduate, graduate, and continuing edu cation programs. Within the context of a liberal education, the degree pro grams prepare professional nurses w ho

1 understand and respond to chang ing health and social needs and ser vices,
2. influence nursing practice and health care through leadership and participation in professional and sociopolitical activities; and
3. utilize scientific know ledge to ad vance professional nursing prac tice.

The continuing education program provides opportunities for registered nurses to improve and expand their nursing practice to meet the health care needs of various populations and to fur ther their own professional develop ment

ORGANIZATION

The College of Nursing is organized around four divisions of major clinical areas w ithin nursing. adult health nurs ing, community health nursing, psycho social nursing systems, and parent child nursing The college offers an undergraduate program leading to a Bachelor of Science in Nursing degree, a graduate program leading to a Master of Science degree with preparation for advanced practice in nursing, and con tinuing and extended education oppor tunities for practicing registered nurses.

ADMISSION

Preprofessional Admission. Students are admitted into the College of Nurs ing as "prenursing" students.

In addition to meeting the university requirements for admission, students are required to have completed one year of high school chemistry.

Admission into NUR 223. All pre nursing students apply for admission into NUR 223, the first clinical course, six months before intended enrollment. Consideration for admission into NUR 223 is contingent on achieving at least a "C" grade in all required prerequisite courses in addition to a minimum 2.75 prerequisite GPA. Moreover, admis sion to NUR 223 is resource dependent, selection of students for admission is competitive, w ith preference given to students with the highest prerequisite GPAs

Prenursing students are required to seek academic advisement through the College of Nursing Student Services Office. This advisement includes course planning as w ell as information regarding application materials and deadlines.

Professional Nursing Major. Stu dents are granted professional nursing major status after successful comple tion (grade of "C" or better) of NUR 204, 214, 217, and 223.

Transfer Students. Any student en rolled in good standing at any NLN-ac credited baccalaureate school of nurs ing currently or within the past two years may apply for admission into the professional Nursing major All stu dents are required to seek advisement.

The college does not accept transfer credit courses especially science courses taken more than 10 years be fore the date of admission.

Transfer students must complete the application process a minimum of one full semester before the anticipated date of admission into the professional Nursing major and in accordance with college admission deadline dates. Transfer students must submit official transcripts, a catalog from the institu tion of transfer, and course outlines so that course equivalencies may be as sessed. Transfer students should plan to register for classes as early as pos sible to av oid class closures. A mini mum GPA of 2.75 is required for ad mission. All other admission require ments are the same as outlined on pages 31 36

Admission of Registered Nurses. Registered Nurses have alternatives av ailable to them in the completion of the baccalaureate degree. They are en couraged to work closely with an advi sor in planning their programs of study. NUR 306 Professional Development

for Registered Nurse Students: Process, Roles and Function and NUR 314 Health Assessment for Registered Nurses are required All other admis sion requirements are the same as out lined on pages 31 36. In addition, Registered Nurses must submit a pho tostatic copy of the current license to practice nursing.

Readmission. Students who have not been in continuous enrollment must pe tition for readmission to the profes sional nursing courses. Along with the petition, students must provide the fol lowing documents:

1. proof of current enrollment or read mission to ASU;
2. transcripts from all colleges at tended;
3. application for admission to the professional nursing courses; and
4. all other admission requirements as outlined on pages 328 329

State Board of Nursing Requirement. Students must have a high school di ploma or GED certificate to be eligible to write the State Board Examination for licensure as a Registered Nurse.

CPR Certification. All students enter ing the clinical nursing courses must be certified in cardiopulmonary resuscita tion (CPR) as evidenced by a current CPR card This certification must be maintained while in the program.

College Health Requirements. Stu dents enrolled in the professional Nurs ing major are responsible for fulfilling the requirements of the current health policies of the College of Nursing. The student is responsible for providing proof to the College of Nursing Student Services Office of having met these re quirements before enrollment in NUR 223 Nursing Process and Hospitalized Adult. The policy includes the follow ing requirements:

1. College of Nursing Health History Inventory and Record of Physical Examination;
2. proof of rubella immunity;
3. an annual tuberculin skin test (a Nursing student may not participate in any clinical experience without meeting this requirement);
4. hepatitis immunization sequence (Recombivax);
5. current CPR Certification;
6. proof of mumps, diphtheria, and tetanus immunity; varicella immu nity to be established through his tory or titer; and
7. some clinical agencies may require a pre drug screening test (at the ex pense of the student). A positive result precludes the start of a clini cal practice experience.

ASU Health Requirements. See pages 31 32.

Professional Liability Insurance. University liability insurance is limited. Therefore, it is highly recommended that students carry their own personal professional liability insurance when enrolled in clinical nursing courses.

Health and Accident Insurance. It is strongly recommended that all students carry their own health and accident in surance. Each student is personally re sponsible for costs related to any acci dent or illness during or outside of school activities.

ADVISEMENT

Students are responsible for meeting the degree requirements and seeking advisement regarding their program status and progress. Professional advi sors are available by appointment in the College of Nursing Student Services Office, 602/965 2987. These advisors assist students with program planning, registration, preparation of needed peti tions, verification of graduation re quirements, referrals to university and community resources, and career plan ning.

Student responsibilities include fol lowing university guidelines regarding submission of transcripts from all col leges other than ASU and obtaining the necessary signatures or computer veri fications required by the university.

Upon admission to the professional Nursing major, faculty advisors provide continued assistance to students in the Nursing major.

In addition, the College of Nursing requires that students file a program of study upon enrollment into the profes sional Nursing major.

Program of Study. Students in the College of Nursing file a program of study only after admission into the pro fessional Nursing major and before they can register for Junior II classes.

Student Employment. Students in tending to pursue the professional Nursing major on a full-time basis should expect to spend approximately 45 hours per week in class and study. It is suggested that any additional ac tivities or employment be kept at a minimum

DEGREES

Bachelor of Science in Nursing

The completion of the 129 credit curriculum in Nursing leads to a Bach elor of Science in Nursing degree. The purpose of the program is to prepare beginning professional nurses who pos sess the theoretical foundation and the clinical competence to function in vari ous health care settings. The graduate is prepared to deliver nursing care ser vices to individuals, families, popula tion groups, and communities. The un dergraduate program provides a foun dation for graduate studies in nursing at the master's level.

The program objectives for the un dergraduate curriculum are directed to ward preparation of graduates with generalist abilities. Based on the theo retical and empirical knowledge from nursing, the humanities, and physical, biological, and behavioral sciences, graduates are prepared to

1. synthesize knowledge from the sci ences and humanities with nursing theory to meet the goals of profes sional practice, which include health promotion, maintenance and restoration, illness care, rehabilita tion, health counseling, and educa tion;
2. provide professional nursing care to culturally diverse individuals, families, population groups, and communities, using theory based nursing process;
3. accept individual responsibility and accountability for providing nurs ing care to clients and for evaluat ing the outcomes of that care;
4. incorporate ethical and legal as pects of nursing into nursing prac tice,
5. evaluate research for its application to the improvement of nursing practice;
6. assume a leadership role at the gen eralist level in the promotion, maintenance, and restoration of health and rehabilitation and in ill ness care;

7. develop cooperative and collaborative relationships with clients and with other disciplines concerned with health, health care issues, and quality of life;
8. participate in identifying and evaluating current and needed health care services and policies; and
9. continue professional development in response to trends and issues in health care, changing nursing roles, and the impact of these and other health care issues on the client.

Nursing—M.S.

The College of Nursing offers a program leading to a Master of Science degree, which requires a minimum of 40 semester hours. Requirements for this program are described in the *Graduate Catalog*. Persons interested in applying for admission to the program should write to the Graduate College for a *Graduate Catalog* and application form (see page 366).

DEGREE REQUIREMENTS

The undergraduate program in Nursing includes 64 semester hours in nursing and 65 semester hours in other prescribed courses, including three semester hours in free electives, for a total of 129 semester hours for graduation. The 35 semester hours of general studies required by the university are included in the 129 semester hours.

	Semester Hours
English proficiency ENG 101 (3) and 102 (3) *or* ENG 105 (3) *or* ENG 107 (3) and ENG 108 (3) Students who complete ENG 105 (3) have satisfied the English proficiency requirement and do not have to take any additional English composition credits	6
HU or SB elective Students select one upper division three hour course from the general studies requirements list in humanities and fine arts or social and behavioral science courses.	3
SB electives* . . . . . . CDE 232 (3), PGS 101 (3); SOC 101 (3 [or 301 (3)], 415 (3) [or FAS 331 (3)]. Students select one additional three hour course that has cultural awareness as its basic content	15
S1 and S2 electives* . . . . CHM 101 (4), 231 (4), 235 (1); FON 241 (3); MIC 205 (3), 206 (1); ZOL 201 (4), 202 (4)	23

* Appropriate selection of courses fulfills College of Nursing degree requirements and university general studies requirements concurrently

Nursing Core Courses

		Semester Hours
NUR 119	Introduction to Nursing and Health[1] . . .	3
NUR 204	Pharmacological Therapeutics for Nursing	3
NUR 211	Nurse Client Relationships[1]	3
NUR 214	Health Assessment in Nursing Practice[1] .	3
NUR 217	Basic Clinical Skills[1] . . .	2
NUR 223	Nursing Process and Hospitalized Adult[2]	6
NUR 308	Pathophysiology	3
NUR 327	Comprehensive Nursing Care of Children[2]	4
NUR 328	Childbearing Family and Women's Health Care[2]	4
NUR 329	Psychiatric/Mental Health Nursing[2]	6
NUR 330	Care of Acute and Chronically Ill Adults[2]	4
NUR 403	Research in Nursing Practice	3
NUR 406	Leadership and Management in Nursing	2
NUR 407	Contemporary Issues in Nursing and Health	2
NUR 411	Gerontological Nursing	2
NUR 427	Community Health Nursing	3
NUR 428	Management of Clients in Health Care Settings[2]	4
NUR 429	Community Health Nursing: Clinical[2]	4
NUR 430	Home Health Care[2]	3
Total		64

[1] Nursing theory and laboratory observation
[2] Nursing theory and clinical experience

General Studies Requirements

	Semester Hours
Literacy and critical inquiry core Students select one three hour course from general studies intermediate literacy requirement (L1); NUR 403 (3) fulfills the advanced literacy and critical inquiry requirement.	6
Numeracy core Students select MAT 117 (3) and one three hour course from general studies numeracy requirement in the statistics category.	6
Humanities and fine arts core Students select two three hour courses from the general studies requirements, one of which must be an upper division course	6
Social and behavioral sciences core* . . . . . . CDE 232 (3), FAS 331 (3) or SOC 415 (3), PGS 101 (3), SOC 101 (3) or 301 (3)	9
Natural sciences core* . . . . . . CHM 101 (4), MIC 205 (3) and 206 (1) *or* ZOL 201 (4)	8
Historical awareness, global awareness, and cultural diversity in the United States Students who do not satisfy these requirements in humanities, fine arts, and social and/or behavioral sciences select appropriate courses from the general studies requirements	

* Appropriate selection of courses fulfills College of Nursing degree requirements and university general studies requirements concurrently

General studies courses are regularly reviewed. To determine whether a course meets one or more general studies course credit requirements, see the listing of courses, pages 53–71. General studies courses are also identified following course descriptions according to the "key to general studies credit abbreviations," page 52.

GRADUATION REQUIREMENTS

College requirements for graduation are consistent with those of the university. Candidates for the Bachelor of Science degree in Nursing are required to complete an approved program of study of 129 semester hours, including 53 semester hours of upper division credit.

ACADEMIC STANDARDS

Students admitted into the College of Nursing as prenursing students are subject to the general standards of academic good standing at the university; however, students who maintain standards of academic good standing do not necessarily qualify for admission into the first clinical course, NUR 223.

Consideration for admission into NUR 223 is contingent on achieving at least a "C" in all required prerequisite courses and a minimum GPA of 2.75 in prerequisite courses. In addition, a grade of "C" or better is required in all course work for the degree.

Once admitted into the professional nursing courses, students are allowed only two nursing course failures within the program. The third failure in a nursing course leads to an automatic disqualification from the College of Nursing.

Probation and disqualification is in accordance with university policies. Academic dishonesty is not tolerated in any courses and is subject to specific College of Nursing policies and procedures

GRADING POLICY FOR NURSING COURSES

Within the undergraduate program, grades are assigned to reflect levels of achievement in relation to course objectives Students who do not complete a required nursing course satisfactorily, receiving a grade of "D" or "E" (failing) or a mark of "W" (withdrawal), are not eligible to progress in the professional Nursing major. A required nursing course may be repeated only once.

Any petition for curriculum adjustment, course substitution, overload, readmission to a nursing course, or readmission to the professional Nursing major must be approved by the College Standards Committee.

Withdrawal is in accordance with the withdrawal policy of the university. Students who withdraw from required nursing courses must complete the Interruption in Curricular Progression form. This should be done in consultation with the appropriate faculty member. In addition, students are responsible for completing the university withdrawal procedure.

An *incomplete* in a required nursing course must be satisfactorily removed before progression in the Nursing major is permitted A grade of "I" is not allowed in clinical practice courses. See page 45 for university policy.

Audits and *pass/fail* grades are not acceptable for courses in the minimum 129 semester hour requirement for graduation.

STUDENT RESPONSIBILITIES

Health. Students who appear to lack the degree of physical and mental health necessary to function successfully as a professional nurse may be required to have a health examination and to have the results made available to the Standards Committee of the College of Nursing. Students whose health, behavior, and/or performance have been questioned are reviewed for continuation in clinical nursing courses by the Standards Committee. The student may appear in person before the committee and personally present information relevant to the committee's review. Additional information may also be presented in writing without making a personal appearance. The decision of the committee is final.

Professional. Professional behavior and appearance is required during all clinical nursing course activities.

Student Transportation. Students are responsible for their own transportation to and from health agencies and other selected experience settings, such as home visits to clients.

Comprehensive Assessment Test. In preparation for the professional licensing examination (NCLEX), all senior students, except Registered Nurse students, are required to take a comprehensive assessment test before graduation. Arrangements for taking the test and payment of fees are made during the student's final semester.

Laboratory Fees. In several nursing laboratory and clinical courses, students are provided an opportunity to practice and perfect nursing skills before contact with patients or clients. These courses require a heavy volume and usage of disposable equipment. Accordingly, students are assessed a fee for the following courses: NUR 119, 214 (or 314 for Registered Nurses), 217, 330, 429, and 430.

SPECIAL PROGRAMS

ASU West. The College of Nursing offers all 300- and 400 level nursing courses through ASU West.

The 100- and 200-level nursing courses are available at Glendale Community College. Students interested in the ASU West/Glendale Community College program should contact the College of Nursing Student Services Office for details and application procedures.

Continuing Education Program. This program presents a variety of non-credit offerings at the main campus, at ASU West, and at off-campus locations. These offerings are designed to assist practicing professional nurses in maintaining and enhancing their competencies, to broaden their scientific knowledge base, and to develop to a greater extent their skills in the changing health care environment. Programs are organized in response to both the nursing care needs of the population and the learning needs of nurses engaged in a variety of professional roles and clinical specialties. Workshops, conferences, institutes, short evening courses, and special programs are offered at times convenient to the working professional Some offerings are multidisciplinary and are open to non Registered Nurses. For descriptions of current continuing education offerings, contact the Continuing Education Program, College of Nursing (602/965 7431).

Extended Education. In addition to meeting continuing education needs and interests, Registered Nurses may also choose to enroll in credit courses offered by the College of Nursing at locations other than ASU Main or ASU West. Registered Nurses who want more information about the degree programs or the courses that may be taken by unclassified students should contact the Continuing Education Office (602/965 7431)

Community Health Services. The College of Nursing administers a Community Health Services Clinic located in Scottsdale, Arizona. Nurse practitioners provide primary care with an emphasis on promotion of wellness to families and individuals of all ages. Students in the College of Nursing may receive health care through the clinic. Many students obtain the physical examination required for entrance into NUR 223 at the clinic's facilities. The facility also serves as a learning laboratory for both master's and baccalaureate Nursing students.

ROTC Students. Students pursuing a commission through either the Air Force or Army ROTC program are required to take from 12 to 20 hours in the Department of Military Science. To preclude excessive course overloads, these students should plan on an additional one to two semesters and/or summer school to complete degree requirements. ROTC students must meet all of the degree requirements of the college

GENERAL INFORMATION

Student Services. The Student Ser vices Office in the College of Nursing provides academic advisement, general advisement, and referral to university resources. The staff of the Student Ser vices Office is available to help stu dents with a variety of concerns related to academic or personal issues. Pro spective students wanting more infor mation on College of Nursing programs or wanting to schedule an advisement appointment should contact the College of Nursing Student Services Office at 602/965 2987.

Scholarship and Financial Aid. For information regarding scholarships and loans, see pages 29 30 of this catalog. Information about scholarship and loan funds for Nursing students may be ob tained from the University Financial Aid Office or the College of Nursing Student Services Office.

Student Activities. All ASU students are members of the Associated Stu dents of ASU (ASASU) and participate in those campus activities of interest to them. The student government of the university, ASASU, has a strong pres ence and offers a variety of services and activities It is the official repre sentative of the student body in matters of governance and budgeting.

College Council of Nursing Students. The council is a member of ASASU and serves as the governing body of all student activities in the college. The council acts as a liaison between the Graduate Nurse Organization (GNO), the Student Nurse's Association (SNA), and the Nursing Students for Ethnic and Cultural Diversity The College Council of Nursing Students provides for communication, coopera tion, and understanding among under graduate students, graduate students, and faculty and represents the college in university and non university affairs.

Graduate Nurse Organization. GNO is the coordinating body for Nursing students in the graduate program. It provides programs, information, and orientation services for graduate stu dents and complements their academic experiences

Student Nurses' Association. SNA is a professional nurse organization By being a member of SNA, the student belongs to the National Student Nurses' Association (NSNA), which is the stu dent counterpart of the American Nurses Association for Registered Nurses. NSNA provides means for fi nancial assistance, career planning, a voice in Washington, an opportunity for involvement, and low cost compre hensive malpractice insurance.

Nursing Students for Ethnic and Cultural Diversity. This organization was formed in 1989 to provide a net work of information and support for students interested in issues of cultural awareness and diversity.

Sigma Theta Tau. The Beta Upsilon chapter of Sigma Theta Tau was char tered at the College of Nursing in 1976. Membership in Sigma Theta Tau is an honor conferred on undergraduate and graduate students who have demon strated outstanding academic and pro fessional achievement.

Learning Resources. In addition to learning resources provided by the uni versity, which include a large number of nursing and science texts, references, and journals, the College of Nursing has a Learning Resources Center. This center contains a well supplied nursing laboratory, audiovisual media, a variety of computers, and computer software related to nursing and health care.

Clinical Facilities. Learning experi ences with patients/clients and families are provided under the supervision of qualified faculty with the cooperation of a variety of federal, state, county, private health, and other agencies. The College of Nursing has contracts with more than 100 different agencies in the Phoenix metropolitan area and also op erates its own unique nurse managed clinic in a community setting. A vari ety of clinical laboratory facilities is available to students in this significant component of the programs. Whenever possible, students have a choice of clinical sites but are not guaranteed their choice of a clinical agency or in structor.

Nursing

PROFESSORS
DURAND, LUDEMANN, MURPHY, TAYLOR

ASSOCIATE PROFESSORS
BAGWELL, BRUNER, DAHL, FELLER, FINCH, GRONSETH, KELLER, KENNEY, KILLEEN KOMNEN CH, MATTSON, MELVIN, MILLER MOORE, NORTH, PERRY, RICHARDS, THEOBALD, THURBER

ASSISTANT PROFESSORS
ADAMS, BELL, GALE, GARRISON, GARRITY, HULL, ISMEURT, LUDLOW, MATAS PRIMAS, SEHESTED TOBIASON, WILLIAMS

LECTURER
DeS LVA

PROFESSORS EMERITI
BARDEWYCK, BRANSTETTER, JOHNSON, KATZMAN, KNUDSEN, KRUEGER, ROBERTS, SQU RES, STEFFL STUMPF, WURZELL

NURSING

NUR 119 Introduction to Nursing and Health. (3 F, S
Bas c nurs ng ph losophy process, and sk s 'nclud'ng hea th promot'on content as related to nurs ng pract ce

204 Pharmacological Therapeutics for Nursing. (3) F, S
Drug c assif cat ons and prototypes Psycho phys o og c prnc ples of drug act on Knowl edge bas c to safe admin stration n nurs ng pract ce. Prerequ's tes MIC 205; NUR 119 ZOL 202 or equ va ent

211 Nurse-Client Relationships. (3) F S
Focus on the therapeutic re ationsh p and ts app cat on to nurs ng. Concepts of anx ety, loss and gnef w l be emphasized. 2 hours lecture 3 hours ab. Prerequ s'tes ENG 102 PGS 101 SOC 101 or 301 or equivalent

214 Health Assessment in Nursing Practice. (3) F S
Introductory know edge and sk l s for system- at c phys ca psychosoc a nutrit ona and de ve opmenta nurs'ng assessments for cl ents over fe span 2 hours ecture 3 hours lab Prerequ s tes. FON 241; MAT 117, ZOL 202 or equ va ent. Corequisite· NUR 223

217 Basic Clinical Skills. (2) F S
Scient'f c pr nc p es, nursing concepts and se ected psychomotor sk l s for c n ca nurs ng pract ce. 1 hour ecture 3 hours lab. Prerequ sites MAT 117 M C 205 and 206 NUR 119 Corequis te NUR 223

223 Nursing Process and Hospitalized Adult. (6) F S
Theories, concepts, and pract ce n appl cat on of the nursing process in care for the hosp tal ized adu t w th se ected med ca surg cal prob lems 3 hours ecture, 9 hours ab Prerequ s tes: CHM 231 235 NUR 211 ZOL 202 or equivalent. Corequisites NUR 214 217. Pre or corequ site NUR 204

254 Health for All: Issues of World Health. (3) N
Introduction to issues of wor d hea th Deter m nants of health and relat onsh ps of hea th to development and change w l be exp ored Prerequ s te ENG 101 or equ valent. *General studies G*

306 Professional Development for Registered Nurse Students: Process, Roles, and Function. (3) F, S
Ph osophical and theoretical bases for profes sional nurs ng practice Nursing process for dec s on making Profess ona issues, va ues, and norms.

308 Pathophysiology. (3) F S
Focuses on concepts expl cat ng a terat ons in hea th states A psychophys o og ca v ewpo nt prov des the un fy ng framework. Prerequ s te CHM 231 235 and NUR 223 or nstructor ap prova .

314 Health Assessment for Registered Nurses. (3) F, S
Introductory knowledge and sk ls for system at c physical, psychosocia , and deve opmen ta nursing assessment over the fe span For RN's on y 2 hours ecture 3 hours lab

327 Comprehensive Nursing Care of Children. (4) F S
Nursing concepts and pract ce in caring for we l and hosp ta zed ch dren n a variety of c n ca sett'ngs. 2 hours ecture 6 hours ab Prerequ site: NUR 329

328 Childbearing Family and Women's Health Care. (4) F, S
Nurs ng concepts and pract ce n the repro ductive and perinata per ods ncludes the m pact of ch dbearing on fam y members and their re at onsh ps. 2 hours ecture 6 hours ab. Prerequisite NUR 223

329 Psychiatric/Mental Health Nursing. (6 F, S
Gu ded nurs ng experiences w th nd v dua s and groups based on theory and research 3 hours ecture 9 hours lab Prerequisites: CDE 232 or equ va ent, NUR 223. Pre or corequ site FAS 331 or SOC 415 (or equ va ent)

330 Care of Acute and Chronically Ill Adults. (4 F, S
Nursing concepts and pract'ce in caring for hospita ized adu ts w th complex acute and chron c med ca surg ca problems Theoret cal bases and re ated nurs ng management 1 5 hours lecture, 7 5 hours lab Prerequisites: NUR 308; jun or stand ng n Nursing major

403 Research in Nursing Practice. (3) F, S
Components of the research process. S gn fi cance of research to the mprovement of nurs ng pract ce and deve opment of the profes s on. Prerequ s tes NUR 328 329 3 hours stat st cs. *General studies L2.*

406 Leadership and Management in Nursing. (2) F, S
Selected theoretica frameworks for organ za t on management and leadersh p in nurs ng Prerequ s tes. NUR 330 and 403 *or* nstructor approva

407 Contemporary Issues in Nursing and Health. (2) F, S
Se ected contemporary ssues nf uencing nurs ng and the hea th care system. Prerequ - s te sen or status or instructor approval

411 Gerontological Nursing. (2) F, S
Prov des perspective of biopsychosoc al geronto og ca content app cab e to nurs ng pract ce and research Prerequ s tes: FON 241 and NUR 223 and 308 *or* nstructor ap prova

427 Community Health Nursing. (3) F, S
ntroduct on to pub c health theory and prin c p es of community hea th nurs ng pract'ce. Prerequ site: NUR 330

428 Management of Clients in Health Care Settings. (4) F S
Appl cat on of princ p es of nurs ng manage ment and eadersh p n health care sett ngs 1 hour ecture 9 hours lab Prerequisite. NUR 330 Pre or corequ s tes NUR 406 407

429 Community Health Nursing: Clinical. (4) F S
C n cal experience n commun ty health nurs ng ro es and eadership strateg es n a variety of sett ngs 12 hours ab Pre or corequ s te NUR 427

430 Home Health Care. (3) F S
Issues trends, and pract ce n the deve op ment and de very of home hea th care 1 hour ecture, 6 hours ab. Prerequ s tes NUR 411 429.

431 Introduction to Cardiovascular Nursing. (3) N
Se ected aspects of card ovascu ar nurs ng D agnost c eva uat on, h story and physica as sessment med ca and surgica nterventions, and prevent ve and rehab tat ve manage ment Prerequ s te NUR 223 or nstructor ap proval

432 Cardiovascular Nursing Laboratory. (1) N
Experiences to accompany NUR 431 Obser vation d rect care, dec s on making and p an n ng for clients n var ous stages of card ac d sease 3 hours lab Prerequisite: NUR 223 or nstructor approval Corequisite. NUR 431

433 Abnormal Stress in the Maternity Cycle. 2 3) N
C nica nurs ng n high risk obstetrics Abnor ma stresses for pregnant women effects n newborns, and appropr ate nurs ng nterven t ons. 2 hours ecture 3 hours ab opt onal. Prerequ s te NUR 328 or nstructor approva

434 Cultural Variations of Health and Illness. (2 3) N
Hea th iness be efs behaviors, and nterven tions in se ected ethn c cu tures ntegrating sc entif c and fo k med c ne n nursing pract ce 2 hours ecture 3 hours ab optiona Prerequi s te nstructor approva

435 Nursing of Children with Developmental Disabilit'es. (3) N
Congen ta and acqu red phys ca and menta developmenta disorders nc ud ng the evalu at on of ch d and fami y and commun ty re sources Prerequ'site NUR 327 or nstructor approval

438 Aging and Mental Health. (3) N
Exp ores and assesses psychosoc a and menta hea th aspects of ag ng geropsych atric theory, and geronto og ca research app cab e to practice. Prerequisite 12 hours n Nurs ng major or nstructor approva .

439 Aging and Mental Health Practicum. (1) N
Opt ona cl n ca pract cum for students en ro ed n NUR 438 3 hours per week.

440 Introduction to Computer Applications in Health Care. (3) N
Emphasis on app cations that most d rect y affect nurses n staff pos t ons Prerequ s te senior stand ng in Nurs ng major or nstructor approva

441 School Nursing Practice. (3) N
Role of the profess ona nurse 'n p ann ng imp ementation and evaluat on of the schoo hea th program Prerequ site NUR 327 or RN status

442 Sexuality in Illness and Disability. (3) N
Cons derat'on of i nesses, injur es and treat ments that have mplicat ons for sexual func tion of patients and cl ents.

457 Third-World Women. (3) F
Econom c sociopo it ca and demograph c context for understand ng the roles of th rd world women n hea th fami y, work educa t on, and commun ty Cross sted as SPF 457 WST 457 Prerequ s te: 6 hours of soc a sc ence cred t or nstructor approval *General stud es· SB, G.*

494 Special Topics. (1–4) F, S SS
Advanced study and or superv sed pract ce n an area of nurs ng Lecture and ab to be ar ranged Prerequ s te: 12 hours n Nursing ma jor or nstructor approva

500 Research Methods. (3) F S
Research methods nc ud ng research conceptual zat on and des gn n nurs ng. Pre or corequ s te graduate eve inferent al stat s t cs course

501 Perspectives of Adult Health Nursing. (2) F S
Prov des students with an overv ew of theo ries concepts and research re evant to the nurs ng care of adults

502 Adult Health Nursing: Theory I—Health Restoration. (2) F
Evaluates theor es, mode s concepts and re search app cab e to the care of adults requ r ing nurs ng ntervent on for restorat on of hea th Corequ s te: NUR 580

503 Adult Health Nursing: Theory II—Health Promotion. (2) S
Eva uates theories mode s concepts, and re search appl cable to the care of adu ts requir ng nursing ntervent ons for promot on/ma n tenance of hea th Corequ s te NUR 580

504 Critical Care of the Adult: Theory I. (2) F
Theoret ca know edge essent a to the care of critical y i adults Behaviora and phys'olog ca concepts are addressed. Pre or corequi site NUR 582. Corequ'site NUR 580

505 Critical Care of the Adult: Theory II. (2) S
Theoretical knowledge essentia to the care of crit ca ly I adu ts Mu t p e organ system dys functions are addressed Prerequ s te· NUR 504 Corequ site NUR 580

511 Public Health and Community Health Nursing Perspectives. (2 F, S
Analysis of contemporary pub 'c hea th and community hea th nursing ssues, research, and conceptual theoret cal foundat ons

512 Community Health Nursing: Theory I. (2) F
Ana ys s of theories/research approaches for the study of commun ty health nurs ng, commun ty hea th program deve opment, and fam y health care. Corequis te NUR 580

513 Community Health Nursing: Theory II. (2) S
Ana yze ssues, theor es, and research relevant to commun ty hea th nurs ng leadersh p program p ann ng/eva uation and manage ment of hea th care systems Prerequis te NUR 512 Corequ s te NUR 580.

521 Community Mental Health/Psychiatric Nursing Perspectives. (2) F, S
Comparison of nurs ng theories w th psych at nc psycho og ca theor es App es to pract ce n mental health/psych atr c sett ngs and pro v des bas s for mult p e ro es

522 Community Mental Health/Psychiatric Nursing: Theory I. (2 F
Ana ysis of issues theor es and research n restorat on and promot on of mental hea th Emphasizes deve oping conceptual frame work for psych atr c nurs ng Corequ's te. NUR 580.

523 Community Mental Health/Psychiatric Nursing: Theory II. (2) S
This course ass sts the student n cnt ca ly ana yz ng ssues theories and research re evant to commun ty mental hea th nursing Prerequ s te NUR 522 Corequ s te NUR 580.

532 Nursing of Children: Theory I. (3) F
Ana ysis of concepts theories, and research related to nursing care of we l ch dren Focuses on hea th c ent and env ronment Lecture, d scuss on Corequ s te. NUR 580.

533 Nursing of Children with Special Needs: Theory II. (3) S
Ana ys s of concepts theories and research re ated to nurs ng care of ch dren w th spec al problems or at r sk Lecture, discussion Prerequ site NUR 532 Corequis te: NUR 580

534 The Childbearing Family: Theory I. (3 F
Analys s of concepts, theor es, and research re ated to nurs ng care of ch dbearing fam es Focuses on hea th, c ent, and env ron ment Lecture, d scussion Corequ s te NUR 580

535 Childbearing Family with Special Needs: Theory II. (3) S
Ana ys s of concepts theories and research re ated to nurs ng care of ch ldbear ng fam es w th specia needs and h gh nsk Lecture d scuss on Prerequ s te: NUR 534 Corequ s te NUR 580

541 Nursing Leadership Perspectives. (2) F
Cr t ca ana ys s of historica contemporary, and futurist c project ons of concepts theories, sty es and ssues n nurs ng leadersh p ro es Sem nar d scuss on

542 Nursing Administration Theory I. (2) F
Pr nc p es, object ves and methods of manag ng nurs ng serv ces analyzed. Roles strate g es and theories for managing human and f nanc a resources are explored. Lecture d s cuss on Prerequ s te adm ss on to the graduate program

543 Nursing and Health Care Finance. (3) S
Provides an understanding of f nances n nurs ng and hea th care account ng, language concepts budgeting rates re mbursement, and cap tal financ ng are ana yzed Lecture, d scuss on

544 Nursing Administration Theory II. (2) S
Synthes s of knowledge and sk s ga ned n prev ous courses to deve op advanced nurs ng role Lega econom c, soc opo t cal, ethi ca , and professiona nf uence ana yzed Sem nar case study ana ys s Prerequ sites NUR 541 542 543

551 Theory Development. (3) F, S
Purpose s to prov de the student w th oppor tun t es to analyze, eva uate, and deve op con cepts re evant to nurs ng

552 Contemporary Issues: Health Care and Nursing. (3 F, S
Analys s of health po cy econom cs and pro gram plann ng for nurs ng hea th profess on a s. Emphas zes po t ca soc ocu tura and demograph c factors

562 Health Promotion. (2) F
F rst d dact c nurse cl n c an course Focuses on hea th care concepts and strateg es to promote and ma nta n hea th of the chi d, adu t and fam y Prerequ s te nstructor approval Corequ s te NUR 580

563 Health Management. 2) S
Second d dact c nurse c n c an course Analy s s of common se f im ting hea th prob ems w th ntegrat on of hea th assessment for c n cal decis on making Prerequ s te instructor approva Corequ s te NUR 580

571 Teaching in Nursing Programs. (2) S
Ana ysis of theories ssues and research re ated to teach ng n nurs ng Focuses on the process of teach ng/learn ng

576 Computer Applications in Health Care. 3 F
Ana ys s of current and developing computer app cations in health care Emphas s on nurs ng app cat ons n adm n strat on educat on and pract ce Prerequ s tes NUR 440 or equ va ent graduate stand ng n Nursing or re ated f e d

578 Gestalt Therapy I. (3) F
An ntroduct on to theory and methodo ogy of Gesta t therapy and ts uses for menta hea th promot on and restoration

579 Gestalt Therapy II. 3 S
Focus s on further deve opment of Gestalt therapy and ts appl cat on in work ng w th various c ent populat ons Prerequisite NUR 578.

580 Practicum (Electives). 1–4) N
C n ca app cat on of theor es concepts and pr nc p es such as hea th promot on health management health ma ntenance teach ng management and spec a cl n ca stud es.

580 Advanced Nursing Practicum I, II. (2–6) F, S
C in ca appl cat on of theor es concepts and pnnc p es. Tracks w th n the areas of concen trat on nclude the fo ow ng
(1) Adult Hea th Nurs ng
(2) Cnt ca Care Nurs ng
(3) Commun ty Hea th Nurs ng
(4) Commun ty Menta Hea th/Psych atnc Nurs ng
5) Nurs ng of Ch ldren
6 Ch dbear ng Fam y
7 Nursing Adm n strat on
Conferences. Prerequ s tes adm ssion to the graduate program nstructor approva .

581 Family Systems Theory in Health Care. (3) F
Cr tica ana ys s of ssues and research re evant to fam ly systems theory. Emphas s on relat onsh p between theory and pract ce.

582 Advanced Human Physiology. (3) F
Ana yzes major theories and concepts of hu man phys o ogy nterre ationsh p of phys o ogy and health is exp ored

583 Pathophysiology. (3) S
Manifestation of altered human phys ology and d sease Systems theory is used to ana yze the relat onships of d sease and phys o ogy

585 Stress Reduction. (3) F
Theory, app cation and eva uat on of m nd/body re axat on methods, inc ud ng physio og ca effects. Research find ngs emphas zed Da y student pract ce. Prerequ s te· graduate stand ng or nstructor approva

588 Qualitative Methods in Nursing Research. (2) SS
Prov des an ntroduct on to the use of qua ta t ve approaches, discovery procedures, ana y s s interpretat on of data and contr bution to theory bu lding

591 Seminar. (2–4) N
Advanced top cs, inc ud ng curriculum deve opment and health promotion Prerequ s te instructor approval n se ected courses

593 Applied Project. (3)
Emphas s on the synthes s and app cat on of research to an dent f ed c n ca nurs ng prob em. Prerequ s tes: NUR 500 nferent a stat s t cs.

598 Special Topics. (2–4) N
Spec a study, nc ud ng ssues n hea th care and organizations, management n nursing eth ca issues, and c n cal nurse special st ro e Prerequ s te: nstructor approval n se ected courses

599 Thesis. (1–6) F, S SS
Research proposa development data co ec t on and analys s thesis writ ng, and thes s oral defense S x hours requ red

Omnibus Courses: See page 44 for omn bus courses that may be offered

HUMAN DEVELOPMENT

HDE 395 Overview of Aging. (3) F
Mu tid sc pl nary introduct on to gerontology Explores the characterist cs experiences prob ems, and needs of older persons

586 Origins of Human Behavior. (3) F, S
Cr tica examinat on of theories, issues and research n the developmenta period of in fancy through ado escence Prerequ s te course n ch ld deve opment

588 Development in Adulthood and Aging. (3) F, S
Cnt ca exam nation of theories and research of adu thood and ag ng

Omnibus Courses: See page 44 for omn bus courses that may be offered

College of Public Programs

Anne L. Schneider, Ph.D.
Dean

PURPOSE

The College of Public Programs of fers a wide range of undergraduate and graduate course work, both on and off campus, to full time students and as part of continuing education. Each aca demic unit of the college not only as sumes responsibilities in preparing its own majors, but provides a variety of service courses for the rest of the uni versity. The college is committed to providing excellence in teaching, re search, and public service Conse quently, the units work closely with numerous public, quasi public, and pri vate agencies at the national, regional, state, and local levels

ORGANIZATION

The College of Public Programs is composed of five academic units: the Department of Communication, the Walter Cronkite School of Journalism and Telecommunication the School of Justice Studies, the Department of Rec reation Management and Tourism, and the School of Public Affairs. Each aca demic unit is administered by a chair or director

The general administration of the college is the responsibility of the dean, who is responsible to the university president through the senior vice presi dent and provost.

ADMISSION

Freshmen. Any incoming freshman (0–24 semester hours) who meets the minimum university admission require ments as detailed on pages 31 36 is ad mitted to any chosen undergraduate academic unit of the college as a *pre major* in that respective academic unit

Major Status Admission. Entry to any undergraduate academic unit of the college with status as a major requires the completion of at least 56 semester hours with a minimum cumulative GPA of 2 50 plus whatever additional requirements the respective academic unit imposes When a student has com pleted course work at ASU, the GPA is computed on ASU courses only and must be based on a *minimum* of nine semester hours of courses with grade options of "A," ' B," "C," "D," or "E."

Most upper division courses in the college are not open to premajors. Premajors shou d check the cata og in formation in their major fie ds to deter mine any course enrollment restric tions.

Students should refer to the section of the catalog with reference to their preferred areas of study for specialized departmental retention requirements and/or continued enrollment in their major courses.

Transfer Students. Any person apply ing for admission or transfer to an aca demic unit of the college is admitted as a major of that unit if the student has met the specific requirements as listed in the section for the respective aca demic unit.

Transfer Credit. In most cases, course work successfully completed at a regionally accredited four year insti tution of higher education is accepted into the respective academic unit

Course work successfully completed at an accredited two year institution of higher education (community or junior college) transfers as lower division credit up to a maximum of 64 semester hours.

Successful completion is defined for purpose of transfer as having received a grade comparable to an "A," "B," or "C" at ASU. The acceptance of credits is determined by the director of Admis sions, and the utilization of credits to ward degree requirements is at the dis cretion of the academic unit.

ADVISEMENT

The College of Public Programs pro fessional academic advisement staff is committed to assist students in devel oping meaningful educational plans that will meet their academic, career, and persona goals in an ongoing pro cess of evaluation and clarification.

The advisors strive to perform their duties in a professional, ethical, confi dential, accurate, and supportive man ner, respecting student diversity and needs, and always holding the indi vidual in highest regard The student and advisor should accomplish this pro cess in a spirit of shared responsibility to develop academic excellence, strong decision making skills, and self reli ance.

A student who has been admitted to the College of Public Programs is as s'gned an academic advisor from the academic unit of the student's n ajor area of study Questions on advisement

should be directed to the student's academic advisor or to the Student Services Office of the College of Public Programs.

Mandatory Advisement. The following categories of students are required to receive advisement and to be cleared on the Mandatory Advisement Computer System before they may register for classes:

1. all freshmen;
2. transfer students in their first semester at ASU;
3. students with admissions deficiencies;
4. students with special admissions status;
5. students on probation;
6. students who have been disqualified; and
7. students with a cumulative GPA less than 2.00.

Course Load. A normal course load per semester is 15 16 semester hours. The maximum number of hours for which a student can register is 18 semester hours unless an overload petition has been filed and approved by the Department/School Standards Committee and the Undergraduate Curriculum, Standards, and Grievances Committee of the College.

Overload petitions are not ordinarily granted to students who have a cumulative GPA of less than 3.00 and who do not state valid reasons for the need to register for the credits. Students who register for semester hours in excess of 18 and do not have an approved overload petition on file have courses randomly removed through an "administrative drop" action.

Specific degree requirements are explained in detail under the respective college, school, and department sections.

College of Public Programs Degrees, Majors, and Concentrations

Major	Degree	Administered by
Baccalaureate Degrees		
Broadcasting Emphases: broadcast journalism, business/management	B.A.	Walter Cronkite School of Journalism and Telecommunication
Communication	B.A., B.S.	Department of Communication
Journalism Emphases: news editorial, public relations, visual journalism	B.A.	Walter Cronkite School of Journalism and Telecommunication
Justice Studies	B.S.	School of Justice Studies
Recreation Concentrations: recreation management, tourism	B.S.	Department of Recreation Management and Tourism
Graduate Degrees		
Communication	M A.	Department of Communication
Communication Concentrations communicative development, intercultural communication, organizational communication	Ph.D.	Committee of Faculty
Justice Studies	M.S.[1]	School of Justice Studies
Justice Studies Concentrations: criminal and juvenile justice; dispute resolution; law, justice, and minority populations; law, policy, and evaluation; women, law, and justice	Ph.D [2]	Committee on Law and Social Sciences
Mass Communication	M.M.C.	Walter Cronkite School of Journalism and Telecommunication
Public Administration Concentrations· public information management, public management, public policy analysis and evaluation, urban management and planning	M.P.A.	School of Public Affairs
Public Administration	D.P.A.[2]	Committee on Public Administration
Recreation Concentrations. outdoor recreation, recreation administration, social/psychological aspects of leisure, tourism and commercial recreation	M.S.	Department of Recreation Management and Tourism

[1] Graduate students in the School of Justice Studies and the Department of Anthropology are able to receive a concurrent M S. degree in Justice Studies and M A degree in Anthropology

[2] This program is administered by the Graduate College. See the "Graduate College" section of this catalog.

Specific degree requirements are explained in detail under the respective college, school, and department sections.

Baccalaureate Degrees

The College of Public Programs of fers academic instruction in four areas. Successful completion of a four year program of 126 semester hours is speci fied by the respective academic unit.

Graduate Degrees

Master's degree programs are of fered by five academic units of the Col lege of Public Programs. Specific re quirements are listed under the respec tive school or department section.

Interdisciplinary Programs

Information on all graduate degree programs in the College of Public Pro grams is detailed in the *Graduate Cata log.*

Doctor of Public Administration. The D.P A. degree program is interdis ciplinary in nature and is offered by faculty from various colleges The pro gram is administered by an executive committee appointed by and respon sible to the dean of the Graduate Col lege. The purpose of the program is to prepare skilled professional public ad ministrators for high level positions in the public sector

Justice Studies—Ph.D. A Ph.D. de gree program in Justice Studies reflects a law and society perspective and inte grates philosophical, legal, and ethical approaches with social science and policy science methodologies. This program is interdisciplinary in nature, and participating faculty are appointed by the dean of the Graduate College to serve as members of the ASU Commit tee on Law and Social Sciences. Stu dents may develop an individualized area of substantive specialization through consultation with their program committees or may choose from the ar eas of concentration identified with the program. The areas of concentration are as follows:

1. criminal and juvenile justice;
2. dispute resolution;
3. law, justice, and minority popula tions;
4. law, policy, and evaluation; and
5. women, law, and justice.

Communication—Ph.D. The Ph.D degree program in Communication pre pares students for the scholarly study of message related behaviors. The pro gram offers the following concentra tions:

1. communicative development (the influence of communication on maturation processes, such as rela tional development);
2. intercultural communication (in teraction among members of dif ferent cultures); and
3. organizational communication (the exchange of messages in formal and informal organizations).

As an interdisciplinary program, fac ulty from a variety of departments, who are appointed by the dean of the Gradu ate College, participate in teaching and advising Ph.D. students.

BACCALAUREATE DEGREE REQUIREMENTS

English Proficiency

Students must demonstrate reason able proficiency in written English by achieving a grade of "C" or better in both ENG 101 and 102 or in ENG 105 or its equivalent. Should a student re ceive a grade lower than "C" in any of the courses, it must be repeated until the specified proficiency is demon strated. Transfer students from col leges outside Arizona should consult the college Student Services Office in Wilson Hall to assure completion of this requirement.

Writing Competence Requirement

In addition to ENG 101 and 102 or their equivalent, one of the following courses in written expository composi tion is required of all undergraduate majors: BUS 233, 301; ENG 215, 216, 217, 218, 301; JRN 201. This course may be counted as fulfilling the univer sity general studies literacy and critical inquiry (L1) requirement if it is on the university approved list.

Communication Requirement

One of the following courses is re quired for all undergraduate majors: COM 100, 225, 230, 241, 259. It may be included within the university gen eral studies requirements, the College of Public Programs requirements, or the department/school degree program, where appropriate.

Computer Science Requirement

A computer science course is re quired for all undergraduate majors. Any numeracy (N3) course from the university general studies list is accept able. It may be included within the numeracy requirement or department/ school degree program, where appro priate.

Foreign Language Requirement

The Walter Cronkite School of Jour nalism and Telecommunication is the only academic unit of the college that has a foreign language requirement in order to complete work successfully for the Bachelor of Arts degree in either Journalism or Broadcasting. Refer to the degree requirement section of the school for detailed information.

Pass/Fail Option

Students enrolled in the College of Public Programs do not receive credit for any pass/fail courses taken at ASU.

Students who have completed pass/ fail courses before admission in the col lege or at another institution must peti tion their acceptance through the Col lege Undergraduate Curriculum, Stan dards, and Grievances Committee.

The College of Public Programs does not offer any courses for pass/fail credit.

Limitation on Physical Education Activity Hours

No more than eight hours of physical education activity courses may be counted within the minimum 126 hours required for graduation.

College Course Requirements

In addition to the university general studies requirements, the College of Public Programs requires the following.

Humanities and Fine Arts. Zero to three semester hours minimum are re quired for a total of nine semester hours when combined with the university general studies requirement of six to nine semester hours.

Architecture
architectural philosophy and history, APH

Art
art history, ARS
studio art, ART

Communication
COM 210, 222, 225, 241, 271, 341, 344, 421, 422, 441, 442

Dance
dance history, DAH
dance performance, DAN

English
ENG (other than First Year Compo sition). Reading courses from community colleges are *not* in cluded.

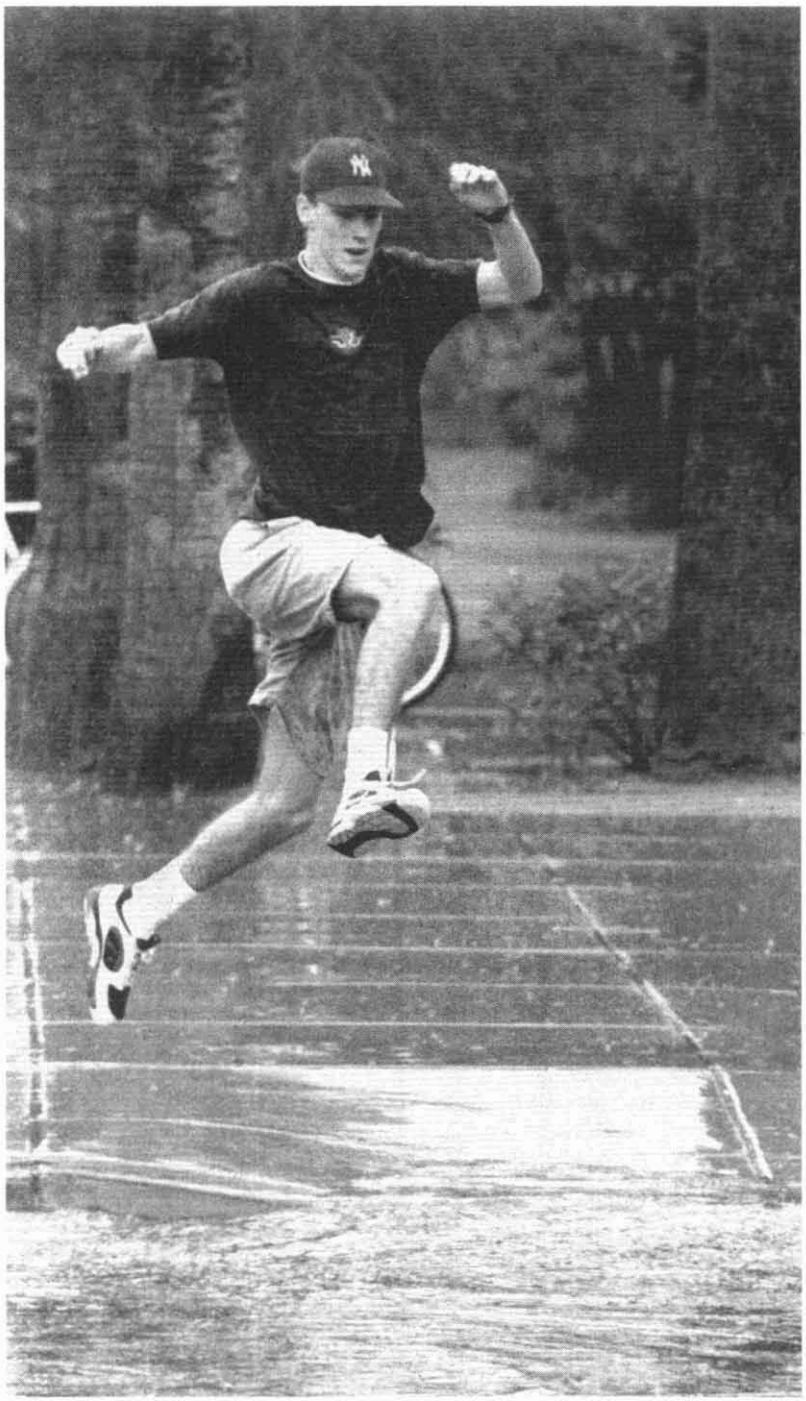
Foreign Languages
FLA, CHI, FRE, GER, GRK, HEB, IDN, ITA, JPN, LAT, POR, RUS, SPA, THA

Honors
HON 171, 172

Interdisciplinary Humanities
humanities, HUM

Music
general music electives, MUS
music history and literature, MHL
music performance, MUP
music theory and composition, MTC

Philosophy
history and philosophy of science, HPS
philosophy, PHI



Religious Studies
REL

Theatre
history, literature and theory, THE
theatre performance and production, THP

Social and Behavioral Sciences. Nine to 12 semester hours minimum are required for a total of 18 when combined with the university general studies requirement of six to nine semester hours.

Anthropology (Social and Behavioral)
ASB

Business
advertising, ADV
business administration, BUS
decision and information systems, CIS
economics, ECN
finance, FIN
legal and ethical studies, LES
management, MGT
marketing, MKT
quantitative business analysis, QBA

Communication
All communication courses *other* than those listed above under humanities and fine arts requirements

Design
DSC

Engineering
analysis and systems, ASE
industrial and management systems engineering, IEE
Society, values and technology, STE

Geography (Cultural)
GCU

History
HIS

Journalism and Telecommunication
journalism, JRN
mass communication, MCO
telecommunication, TCM

Justice Studies
JUS

Recreation Management and Tourism
REC

Planning (Urban)
PUP

Political Science
POS

Psychology (Social and Behavioral)
PGS (includes general introductory courses)

Sociology
SOC

Women's Studies
WST

To satisfy the above college course requirements in both social and behavioral sciences and humanities and fine arts, students may choose from the university general studies list or supplement from courses listed above.

Students may not use courses from their major department/school to satisfy the above college course requirements.

GENERAL STUDIES REQUIREMENTS

All undergraduate students in the College of Public Programs are required to complete the university general studies requirements in order to be eligible for graduation in any of the undergraduate curricula offered by the college.

General studies courses are regularly reviewed. To determine whether a course meets one or more general studies course credit requirements, see the listing of courses, pages 53–71, and the *Schedule of Classes*, published each semester. General studies courses are also identified following course descriptions according to the key to general studies credit abbreviations, page 52.

Department and School Course Requirements

Students should refer to the respective department or school section of the catalog and to department or school advisement documents for more information on requirements.

GRADUATION REQUIREMENTS

Graduation requirements for the College of Public Programs include the following:

1. department/school course requirements;
2. college degree requirements;
3. university general studies requirements; and
4. all other university graduation requirements.

Undergraduate Credit for Graduate Courses. To enable undergraduate students to enrich their academic development, the Graduate College and the individual academic units of the College of Public Programs allow qualified students to take graduate-level courses for undergraduate credit. To qualify for admission to a graduate level course, the student must have senior status (87 or more semester hours successfully completed) and a cumulative GPA of 3.00 or higher. In addition, permission to enroll must be given before registration and must be approved by the instructor of the course, the student's advisor, the department chair or school director, and the dean of the college in which the course is offered.

ACADEMIC STANDARDS AND RETENTION

Good Standing. Any premajor or major student of the respective academic units of the college is considered in good standing for the purpose of retention if the student maintains a cumulative GPA of 2.00 or higher in all courses taken at ASU.

Probation. Any student who does not maintain good standing status as described above may be placed on probation. A student on academic probation is required to observe any limitations or rules the college may impose as a condition for retention.

Disqualification, Reinstatement, and Appeals. The terms of disqualification, reinstatement, and appeals are identical with those of the university as set forth on pages 48–49 of this catalog.

All academic discipline action is the function of the Student Services Office, WILSN 203, under the direction of the dean of the college. Students having academic problems should contact this office for advisement (602/965-1034).

SPECIAL PROGRAMS

University Honors College

The College of Public Programs participates with the University Honors College, which affords superior undergraduates opportunities for special classes taught by selected faculty and limited in size and for special advisement, preferential preregistration, and a senior honors thesis. Participating students can major in any academic program. A full description of the requirements and the opportunities offered by the University Honors College can be found on pages 79–81 of this catalog.

For more information, students should contact the College Student Services Office, WILSN 203, and the University Honors College.

College of Public Programs Council

The council is a unit of ASASU and serves as the coordinating body of student activities in the college. The council fosters communication, cooperation, and understanding among undergraduate students, graduate students, faculty, and staff. As the official representative student organization to the dean and college administration, the council appoints student members to faculty committees, cosponsors events with the college alumni association, and represents students at college and university functions.

Communication

Charles R. Bantz
Chair
(STAUF A412) 602/965-5095

PROFESSORS
ARNOLD, BANTZ, GOYER, HECHT, JAIN, KASTENBAUM, K. VALENTINE

ASSOCIATE PROFESSORS
ALBERTS, BULEY, CARLSON, COREY, CRAWFORD, DAVEY, MARTIN, MAYER, MILLER, PETRONIO, STIFF, C. VALENTINE

ASSISTANT PROFESSORS
CORMAN, GONZÁLEZ, NAKAYAMA, TROST

ASSOCIATE INSTRUCTIONAL PROFESSIONAL
OLSON (Director of Forensics)

PROFESSORS EMERITI
DAVIS, PERRILL, RICHARDS, STITES, WILLSON

PURPOSE

The Department of Communication exists to advance the understanding of message related human behavior for the purpose of improving communicative interactions. Teaching, research, and service are directed to the continued development of knowledge and application of principles of communication. Courses of study are designed to provide students with relevant programs adapted to individual academic and professional goals.

GENERAL INFORMATION

A minimum GPA of 2 50 is required for enrollment in all upper division courses and COM 207. A minimum GPA of 2.25 is required for enrollment in COM 110, 241, 250, and 263.

Communication Major Requirements. Undergraduate students may be admitted to major status after meeting all of the following requirements:

1. completion of at least 56 semester hours with a minimum cumulative GPA of 2.50 computed on ASU courses only and based on a *minimum* of nine semester hours of courses with grade options of "A," "B," "C," "D," or "E";
2. completion of university First Year Composition requirements (see pages 71 72) with a minimum grade of "C" in each; and
3. completion of 12 hours of Department of Communication core course requirements (COM 100, 207, 225, 308) with a minimum grade of "C" in each.

DEGREE REQUIREMENTS

B.A. and B.S. Degrees

Of the minimum required 54 hours (12 hours of departmental core courses plus the 42 hours noted below), at least 30 hours must be 300 or 400 level courses. In addition to university, college, and department core course requirements, all majors must complete a combination of required and optional courses consisting of at least 42 hours

Of the minimum 42 hours, 18 hours must consist of three pairs from the following list of five pairs of courses.

1. COM 110 Elements of Interpersonal Communication and COM 410 Interpersonal Communication Theory and Research;
2. COM 241 Introduction to Oral Interpretation and COM 441 Performance Studies;
3. COM 250 Introduction to Organizational Communication and COM 450 Theory and Research in Organizational Communication;
4. COM 263 Elements of Intercultural Communication and COM 463 Intercultural Communication Theory and Research; and
5. COM 321 Rhetorical Theory and Research and COM 421 Rhetoric of Social Issues.

Of the minimum 42 hours, 12 hours must be communication electives and 12 hours must be related area courses. All courses outside the department must be at the 300 or 400 level A minimum grade of "C" is required in each course, except for a maximum of six hours of "Y" credit available to qualified students in COM 281, 382, and/or 484.

In addition to the requirements listed above, students seeking the Bachelor of Arts or Bachelor of Science degree must satisfy the university general studies requirements as noted on pages 50–71 and College of Public Programs general studies requirements as noted on page 338. Communication courses may *not* count toward general studies requirements for the intermediate level (L1) of literacy and critical inquiry core courses, the humanities and fine arts core courses, nor the social and behavioral science core courses.

Students should consult their advisors for current information concerning College of Public Programs and Department of Communication lists of courses applicable to general studies requirements and for information concerning differences in requirements for the B.A. and B.S. degrees.

SECONDARY EDUCATION—B.A.E.

Communication. An academic specialization in communication is offered to students pursuing the Bachelor of Arts in Education degree with a major in Secondary Education. As the major teaching field, the academic specialization in communication consists of a minimum of 43 hours in communication (including COM 480). Students must complete all courses required by the university and the College of Public Programs. Students must complete the Department of Communication core courses (COM 100, 207, 225, 308), COM 480, at least one hour of COM 281 in either Forensics or Oral Interpretation, and three pairs of the following five pairs of courses: COM 110 and 410, 241 and 441, 250 and 450, 263 and 463, and 321 and 421. Students must also take three of the following courses: COM 222, 230, 325, and 329 Students should consult the College of Education to ascertain the general studies requirements for this degree.

As the minor teaching field, the academic specialization in communication consists of a minimum of 31 semester hours in communication Students must take COM 100, 225, 281, 480, and two of the following three pairs of courses COM 110 and 410, 241 and 441, and 321 and 421. Students must also take three of the following courses: COM 222, 230, 325, and 329. In addition, COM 207 may be taken, since it is a prerequisite for many communication courses.

Communication Internships

Internships consist of supervised field experiences and are available to upper-level undergraduate students with major status and a GPA higher than 2 50 (COM 484) and to graduate students (COM 584). An application for internship must be completed at least one full semester before the intended term for an internship. Contact the department for specific deadline dates. Internships must receive prior approval from the departmental coordinator of Internship Programs *before* student registration for the course. Internships may be taken once or repeated for credit up to a total of 12 hours, but not more than six hours may be applied toward the major.

DEPARTMENTAL GRADUATE PROGRAMS

In addition to offering a Master of Arts degree program, the Department of Communication also administers the interdisciplinary Doctor of Philosophy degree program in Communication. Consult the *Graduate Catalog* for the requirements and areas of concentration

COMMUNICATION

COM 100 Introduction to Human Communication. 3) F, S SS
A topics-oriented introduction to basic theories dimensions and concepts of human communicative interaction and behavior. *General studies SB*

110 Elements of Interpersonal Communication. (3) F S, SS
Demonstration and practice of communicative techniques in establishing and maintaining interpersonal relationships *General studies SB*

207 Introduction to Communication Inquiry. (3 F S, SS
Bases of inquiry into human communication, including introduction to notions of theory philosophy problems, and approaches to the study of communication Prerequisite COM 100.

210 Issues in Interpersonal Communication. (3 F, S
Exploration of theoretical, ethical, and philosophical approaches to communication in human relationships Prerequisite COM 110.

215 Listening. (3) N
Study of theory and practice of effect ve isten ng behav ors nc ud ng ntens ve ski exer- c ses

222 Argumentation. (3) A
Ph'losoph ca and the ret ca foundat ons of argumentat on, nclud ng a compar son of mode s of advocacy and evidence *General studies· L1*

225 Public Speaking. (3) F S SS
Verbal and nonverba communicat on n plat form speak ng. Discussion and pract ce n vo- ca and phys ca de very and n purposefu or gan zation and development of publ c com munication *General stud es L1*

230 Small Group Communication. (3) F S SS
Pnnc p es and processes of sma group com mun cat on, attitudes, and sk s for effect ve particpat on and eadersh p n smal groups, sma group prob em so v ng, and dec s on mak ng *General stud es: SB.*

241 Introduction to Oral Interpretation. (3) F, S SS
The commun cat on of terary materials through the mode of performance. Verbal and nonverbal behav or nterface of nterpreter w th iterature and aud ence and rhetorical and dramat c analys's of terary modes *Gen eral studies· L1.*

250 Introduction to Organizational Communication. 3 F, S, SS
ntroduct on to the study of commun cat on n organ zations nc ud ng dent f cat on of van- ab es, ro es, and patterns nfluenc ng commu- n cat on n organ zat ons. Prerequ s te· COM 207 *General stud es SB*

251 Interviewing. 3) F, S
Pnnc p es and techn ques of nterv ew ng, n clud'ng pract ce through rea and s mu ated n terv ews in nformationa persuasive and em ployee-re ated situat ons. Not open to fresh- men

259 Communication in Business and the Professions. (3) F, S, SS
Interpersona , group, and pub ic communica- tion n bus ness and profess ona organiza tions. Not open to freshmen and not ava lable for cred t toward the major

263 Elements of Intercultural Communication. (3) F S
Bas c concepts, pr nc p es, and sk l s for im- prov ng commun cation between persons from d fferent m nor ty, rac a ethn c, and cu tura backgrounds *General studies: SB, C, G*

271 Voice Improvement. (3) N
ntensive persona and group experience to improve normal voca usage nclud ng artcu- lat on and pronunc at on.

275 Nonverbal Communication. 3) F, S, SS
The effects of space, t me body movement env ronment, objects and voice qua ity on hu man commun cat on and nteract on Not open to students with credit in COM 294 ST Be- yond Words.

281 Communication Activities. (1 3) F S SS
Nongraded part cipation n forens cs or nter- pretat on cocurr cu ar act v t es. Max mum 3 semester hours each semester Prerequisite· nstructor approva

294 Special Topics. 3) F S, SS
Prerequisite· nstructor approval

308 Empirical Research Methods in Communication. (3) F S, SS
Examinat on of empirica research methods n commun cation nc ud ng experimental sur- vey, descnpt've and other quant tative ap- proaches. Prerequ s te COM 207 *General stud es L2*

312 Communication, Conflict, and Negotiation. (3) F, S
Theories and strateg es of commun cat on rel evant to the management of confl cts and the conduct of negotiat ons. Prerequ s te COM 100 or instructor approva

316 Gender and Communication. (3) F, S
ntroduct on to gender-re ated commun cat'on Verba nonverba and para ngu stic differ ences and s mi ar t es are exam'ned with n so c a psycholog cal, and h stonc perspect ves

320 Communication and Consumerism. (3) A
Cntical evaluat on of messages des gned for pub c consumpt on Perceiv ng evaluat ng and responding to po it ca soc al, and com merc a commun cat on *General studies: SB.*

321 Rhetorical Theory and Research. (3) F S SS
H stonca deve opment of rhetor ca theory and research in communication, from class ca ant qu ty to the present Prerequ site: COM 207. *General studies L2 HU H*

325 Advanced Public Speaking. 3) F S
Soc a and pragmat c aspects of pub 'c speak ng as a commun cat ve system: strateg es of rhetorical theory and the presentat on of forms of pub c commun cation Prerequisite COM 225 or instructor approva

329 Persuasion. (3) F S SS
Varnab es wh ch inf uence and modify att tudes and behav ors of message rece vers nc ud ng analys s of theories research, and current prob ems Prerequ s te. COM 207 or nstructor approval *General stud es. SB.*

341 Social Contexts for Performance. (3) N
Adaptation and performance of l terature for the commun ty outs de the un versity Re search nto the practical uses of performed it erature.

344 Performance of Oral Traditions. (3) N
Cultura bel efs and va ues stud ed through ethnograph c research and performance of persona narrat ves, fo k ore myths, egends, and other ora tradit ons. Lecture f e dwork, research paper *General studies: HU*

371 Language, Culture, and Communication. (3) A
Cu tural nf uences of anguage on commun cat on, nclud ng soc a funct ons of language b ingua ism b cu tura sm and b d a ectism Prerequ s te· COM 263 or nstructor approva . *General stud'es· G.*

382 Classroom Apprenticeship. (1 3) F, S SS
Nongraded cred t for students extend'ng their expenence w th a content area by assist ng with c assroom superv'sion n other COM courses max mum 3 semester hours each se mester) Prerequ s te. nstructor approval. ·

394 Special Topics. (1–4) F, S, SS
Prerequ s te: nstructor approva .

410 Interpersonal Communication Theory and Research. (3) F, S SS
Survey and ana ysis of major research topics paradigms and theor es dea ng w th mes sage exchanges between and among soc'al peers Prerequ s tes COM 110 and 308 *or* n structor approva *General studies. SB*

411 Communication in the Family. (3) A
A broad overv ew of communicat on ssues found n marr age and fam y fe, focus ng on current topics concern ng commun cat on n the fam y Prerequ s tes. COM 110 and 207 *or* nstructor approval.

414 Crisis Communication. (3) N
Ro e of commun'cation n cris s deve opment and ntervent on Prerequ s te instructor ap proval.

417 Communication and Aging. (3) N
Cnt ca study of changes n human communi- cat ve patterns through the later adu t years w th attention on ntergenerat ona re at on ships and se f-concept funct ons Prerequ s te nstructor approva .

421 Rhetoric of Social Issues. (3) A
Critica rhetorical study of signif cant speakers and speeches on soc a ssues of the past and present. Prerequ s te COM 321 or instructor approva . *General studies HU*

422 Advanced Argumentation. (3) N
Advanced study of argumentat on theories and research as appl ed to pub c forum ad versary scho arly, and lega sett ngs Prereq u site· COM 222 or nstructor approval

430 Leadership in Group Communication. 3 N
Theory and process of leadersh p in group commun cation emphas zing ph osoph cal foundat ons contemporary research, and ap pl cat ons to group situations Prerequ's te· COM 230 or nstructor approval. *General stud ies. SB*

441 Performance Studies. (3) S
Theory practice and cnt c sm of texts in per formance. Emphas s on the nteraction be- tween performer text, aud ence and context Prerequis'te: COM 241 or nstructor approva

442 Interpretation and the Mass Media. (3) N
The relat onship of modern med a (rad o TV, and fi m) to ora nterpretation and iterature

445 Narrative Performance. (3) N
Theory and practice of perform ng narrat ve texts e g , prose f ction oral h stories d aries, essays, etters) Inc udes scr pt ng, d rect ng and the rhetorical analys s of story te ing. Pre requisite: COM 241 or nstructor approval

446 Interpretation of Literature Written by Women. 3) N
Students exp ore through performance and cr t'cal wr ting literature written by women

450 Theory and Research in Organizational Communication. (3 F, S SS
Cnt ca rev ew and analys s of the dom nant theories of organ zat ona commun cat on and the r coro lary research strateg es Prerequ - s tes COM 250 and 308 *or* nstructor ap- prova . *General studies· SB.*

451 Employee Participation Processes in Organizations. (3) A
Pnnc p es concepts and eadership for mp e mentat on of "Qua ity C rc es" and s m ar em p oyee nvo vement processes. Prerequis'tes. COM 230 and 250 *or* instructor approva

453 Communication Training and Development. (3) F, S
Examinat on of the procedures and types of commun cation train ng and deve opment n business ·ndustry and government Prerequ sites COM 250 and 308 *or* nstructor ap prova

456 Political Communication. (3) F S
Theory and research re ated to po t ca cam pa gn commun cat on. The persuas ve pro- cess of po it ca campa gn ng, the ro e of the media the cand date and mage creat on Cross sted as MCO 456 Prerequisites COM 250 and 308 *or* nstructor approva *General studies· SB*

457 Communication and Information Diffusion. (3) F
Ro e of commun cation n d ffus on of nforma tion Princ ples and practices for the system- atic dissem nation of information to implement change in var ous soc a systems. Prerequ - s tes COM 250 and 308 *or* instructor ap prova *General studies. SB.*

463 Intercultural Communication Theory and Research. (3) F S, SS
Survey and analys s of major theories and re search dea ng w th communicat on between peop e of d fferent cu tural backgrounds pri manly n nternat onal settings. Lecture, dis- cussion sma l group work. Prerequ s tes· COM 263 and 308 *or* instructor approva . *General stud es SB, G*

465 Intercultural Communication Workshop. (3) N
Experient a ly based study of commun cat'on between members of different cultures de- s gned to he p students mprove their ntercu tural commun cat on sk s Prerequ s te in- structor approval.

472 Development of Language as Communicative Behavior. (3 N
Development of language and nterpersonal commun cat ve behav ors of ch' dren through ado escence nc ud ng express ve and recep t ve competenc es and nteract ons w'th oth ers Prerequisite: instructor approva *General studies· SB.*

480 Methods of Teaching Communication. (3) N
Ana ys s, organization and presentation of textual and other classroom matenals Prereq uis te nstructor approval

484 Communication Internship. (1 12) F S SS

494 Special Topics. (1 3) F, S, SS
Prerequ s te 'nstructor approva .

501 Research Methods in Communication. (3) F
Cnt ca ana ys s of systems of nqu ry in com mun cat on focus ng on the dent f cat on of vanab es and approaches to conducting re search n commun cat on. Prerequ s te. n structor approva

504 Theories and Models in Communication. (3) F
Theory construct on, metatheoretica con cems, models construct defimt on and com parative analys s of current theones in com- mun cation Prerequisite: instructor approva

508 Quantitative Research Methods in Communication. (3) S
Empirica research des gns, measurements, and stat st ca strateg es and techn'ques in ana yz ng and evaluating experimenta and descnpt ve research n commun cat on. Pre requ s tes COM 501 and 504 or instructor ap- proval

509 Qualitative Research Methods in Communication. (3) S
Qua tat ve research methods includ'ng inter v ew ng, f eld methods and other nonquantita t ve techniques for analyzing commun cation Prerequisites COM 501 and 504 or nstructor approval.

510 Interpersonal Communication Theory and Research. (3) A
Contemporary theories and research 'n nter personal communication Prerequ sites COM 501 and 504 *or* nstructor approval

512 Death, Society, and Human Experience. (3) N
Exam nes dying death bereavement and su c de from both ndiv dua and soc ocu tura perspect ves n terms of options for commun - cation and act on in death-re ated situat ons Prerequ site nstructor approva

521 Rhetorical Criticism of Public Discourse. (3) N
H story and s gn f cance of rhetorica theory and cr ticism n the ana ys s of pub ic d s course Prerequ s tes COM 501 and 504 or nstructor approval

529 Theories of Persuasion. (3) A
Analys s of representative theories and mod e s of persuas ve processes and the'r imp 'ca t'ons for commun cat ve behav or Prerequi- s tes. COM 501 and 504 *or* instructor ap prova

531 Theories of Small Group Communication. (3) A
Theory and research n sma l group nterac tiwn and decision mak ng focus ng on commu n'cat'ona var ab es wh ch affect sma l group output Prerequisites COM 501 and 504 *or* n structor approva .

541 Research Perspectives in Interpretation. (3) N
Superv sed research n the h stor'ca and con- temporary re ationsh ps between the nter- preter the text, and the audience Prerequ - s tes COM 501 and 504 *or* nstructor ap proval

555 Communicative Processes in Organizations. (3) A
Systemat c ana ys s of commun cat ve interac t ons between organ zat ona structure, nfor mation flow and human behaviors n the orga- n zationa sett ng Prerequ s tes COM 501 and 504 *or* instructor approva

563 Intercultural Communication. (3) A
Ana ys s of contemporary theory and research concern ng the effects of a variety of cu tural vanab es on commun cat on between people. Prerequ s tes: COM 501 and 504 *or* nstructor approva .

575 Language and Message Systems. (3) N
S gn/symbo systems; persona funct onal, and contextua aspects of message systems· measurement of "meaning " Prerequisites COM 501 and 504 *or* instructor approva

584 Communication Internship. (1–12 F S SS

596 Pro-Seminar in Communication. (0) F, S
D'scuss on of research projects w th the fac- u ty Prerequ s te admiss on to the graduate program

601 Multidisciplinary Perspectives in Research in Communication. (3) F
Cnt cal rev ew of approaches aspects con- cepts, and issues associated w th research n commun cat on. Prerequ s te nstructor ap- prova

604 Theory Construction in Communi cation. (3) F
Review and ana ys's of ph losoph cal prob- ems nherent n commun cat ve research and of meta-theories des gned to deal w th these prob ems. Prerequ site COM 504 or nstructor approva

608 Multivariate Statistical Analysis of Data in Communication. (3) S
Stat stica analys s of commun cation research data Mu t variate procedures used in commu n cation research and methods of causal ana ysis Prerequisites. COM 501 508 *or* equ valents

609 Advanced Qualitative Research Methods in Communication. (3) F
Ana ys s of ssues in the pract'ce of qua tat ve commun cat on research, nc ud ng data gath- ering, f e dwork ssues, ana ysis strateg es and report ng results Prerequisite: COM 509 or instructor approva

780 Practicum: Research in Communication. (3) S
Gu ded practice in the conduct of commun ca t'on research Top c dent f cat on, procedures formats and eth cs of publ sh ng Prerequ s tes COM 601 604

Omnibus Courses: See page 44 for omn bus courses that may be offered

Walter Cronkite School of Journalism and Telecommunication

Douglas A. Anderson
Director
(STAUF A231) 602/965–5011

PROFESSORS
ANDERSON, CRAFT, CRONKITE
HALVERSON MERRILL, SYLVESTER

ASSOCIATE PROFESSORS
BRAMLETT-SOLOMON, GALICIAN,
GODFREY, HOY, LENTZ, YOUM

ASSISTANT PROFESSORS
ALLEN, MATERA, RUSSELL

CLINICAL ASSOCIATE PROFESSORS
ITULE LEIGH

INSTRUCTOR
CASAVANTES

PROFESSORS EMERITI
BENNETT, BROWN, CROWDER,
ELLIS, MILNER, RANK N,
SILVER SMITH

MAJOR REQUIREMENTS

All students enrolling in courses in the Walter Cronkite School of Journal ism and Telecommunication must com plete a minimum of 30 semester hours with at least a 2 50 cumulative GPA be fore they are permitted to enroll in school courses at the 200 level.

All students intending to take school courses beyond the 100 level also must complete an English proficiency exam with a passing score. The exam is ad ministered by the school.

Upper division courses in the school are open to majors or to those students with a minimum cumulative GPA of 2.50 Certain upper division courses are open only to majors.

To achieve professional (major status in either Journalism or Broadcasting, a student must complete at least 56 semester hours with a minimum cumulative GPA of 2.50. The student must achieve professional status (2.50 GPA) before the 87th semester hour is earned, or else the student is disqualified from taking courses in this school.

To ensure that students receive a broad academic background, no more than 36 semester hours in courses in the major may apply to the 126 semester hours required for graduation. At least 18 hours of major courses required by the school, including one writing course, must be taken at ASU. A student must receive a grade of "C" or higher in all courses taken in the major and in the required related field area. Specific areas that may be used to fulfill the related field requirement are listed on the curriculum check sheets for each major available in the school. Courses elsewhere in the university that duplicate or are closely related to school subject matter may be restricted by the school.

B.A. REQUIREMENTS

All students are required to complete 16 semester hours of courses in a foreign language or the equivalent to the intermediate level.

Broadcasting. This major consists of 42 semester hours, of which 30 must be in school courses and 12 in a related field. Students must take a required core of courses: MCO 110, 402; TCM 200, 201, 235. The student also must choose one major professional emphasis area from the following: broadcast journalism or business/management

These courses are in addition to other degree requirements. See "University Degree Requirements," pages 71 73.

Journalism. This major consists of 42 semester hours of which 30 must be in school courses and 12 in a related field. Students must take a required basic core, consisting of JRN 201, 301, and 313, MCO 110 and 402, and either MCO 418, 421, or 450 or JRN 412. The student also must choose one major professional emphasis area from the following three. news editorial, public relations, or visual journalism.

These courses are in addition to other degree requirements. See "University Degree Requirements," pages 71 73

Related Field. Each student is required to complete a 12 semester hour related field to complement the courses taken in the major emphasis areas

See the curriculum check sheets for each major for the full details and approved related field areas

B.S. REQUIREMENTS

The Bachelor of Science program is under review by the faculty and is not available as an option for students entering under this catalog.

SECONDARY EDUCATION—B.A.E.

Journalism. The academic specialization in journalism as a major teaching field consists of 45 semester hours. The following courses are required: JRN 201, 301, 313, 351, 480; MCO 110, 402. An additional 24 hours, including 12 hours in school course offerings, must be taken on approval by the advisor in consultation with the student The remaining courses may be in closely related fields.

The academic specialization in journalism as a minor teaching field consists of 24 semester hours. The following courses are required· JRN 201, 301, 313, 351, 480; MCO 110. The remaining courses are to be selected in consultation with a journalism advisor.

GENERAL STUDIES

The students must satisfy the university general studies requirements found on pages 50–71 and the College of Public Programs general studies requirements found on page 338. The School of Journalism and Telecommunication has additional general studies requirements, described below. The school requires the student to accumulate a total of 54 semester hours in general studies. The student is advised to review carefully the appropriate school curriculum check sheet to be sure courses taken move the student toward graduation with the least amount of delay and difficulty.

Humanities and Fine Arts. Three to six semester hours are required for a total of 12 semester hours when combined with university general studies.

Social and Behavioral Sciences. Nine to 12 semester hours are required for a total of 18 when combined with university general studies.

Additional courses may be taken in each of the groups and from the electives listed to complete the total of 54 semester hours required by the school.

Within the program there are specific course requirements. Students are required to take one course in each of the following areas: communication (applied speech), computer science, economics, English composition (beyond the freshman level), English literature, history, mathematics (numeracy requirement), two natural science lab courses, philosophy, political science (either POS 110 or 310), psychology, and statistics.

GRADUATE PROGRAM

Master of Mass Communication. The curriculum for the M.M.C. degree is designed to help students achieve intellectual and professional growth, to prepare students for positions in the mass media, and to provide a background to enable those currently in the media to advance their careers. Information on the Master of Mass Communication program is detailed in the *Graduate Catalog.*

MASS COMMUNICATION

MCO 110 Introduction to Communication. (3) F S, SS
Organization function and responsibilities of the media and adjunct services. Primary emphasis on newspapers, radio, television and magazines Not open to students with credit for MCO 120 Prerequisites complete first Freshman English course with "C" grade, major

120 Media and Society. (3) F, S
Role of newspapers magazines radio, television and motion pictures in American society. Not open to students with credit for MCO 110. Designed for nonmajors *General studies. SB.*

402 Communications Law. (3) F S, SS
Legal aspects of the rights, privileges and obligations of the press radio and television. *General studies L2*

418 History of Communications. (3) F S
American journalism from its English and colonial origins to the present day Development and influence of newspapers, magazines radio, television and news gathering agencies *General studies. SB H*

421 News Problems. 3 S
Trends and problems of the news media emphasizing editorial decisions in the processing of news Prerequisite 9 hours of mass communication/journalism/telecommunication courses or instructor approval.

430 International Communication. (3) F, S
Comparat ve study of commun cation and me dia systems nformation gathering and d s- sem nat on under different pol tical and cul tural systems *General stud es G*

450 Visual Communication. (3) F, S, SS
Theory and trad t on of communication through the visua med a w th emphasis on the cont nu ty of trad tions common to modern v sual med a *General studies· HU.*

456 Political Communication. (3 F S
Theory and research re ated to po it ca cam pa gn commun cat on The persuas ve pro cess of po it ca campa gn ng, the role of the med a the cand date, and mage creat on Cross- sted as COM 456. Prerequ s tes COM 250 and 308 *or* nstructor approval *General stud es SB*

460 Race, Social Change, and Media. (3) S
A read ngs sem nar des gned to give students a prob ng exam nat on of the nterface be tween AHANA Americans and the mass me d a n the Un ted States *General stud es: C.*

463 Introduction to Media Statistics. (3) F, S
An introduct on to stat st cal ana ysis as ap p ed to the mass media. Prerequisite profes- siona status n Broadcast ng or Journa 'sm.

501 Newswriting and Reporting. (3) F
Designed for graduate students n the MMC program who have undergraduate degrees in nonjourna ism areas Objective s to teach fun damentals of wr t ng and reporting Lecture ab. Prerequ s te: acceptance nto MMC graduate program

503 Press Freedom Theory. (3) S
Exam nat on of ph osoph ca and lega as pects of press freedom. Emphas s on F rst Amendment theory evo ution from 1791 to present.

510 Research Methodology in Mass Communication. (3) F, S
dentif cation of research prob ems in mass commun cat on. Overview of questionna re construct on Attent on to survey, historica content ana ys s, experimental, and lega re search methods.

520 Mass Communication Theories and Process. (3) F
Analys s of various theoretic models of mass · commun cation with emphas s on the app ica- t ons of these theor es to various professiona communicat'on needs.

522 Mass Media and Society. (3) S
Mass media as soc a nst tut ons, part cu arly interaction w th government and pub ic Em- phas s on criticism and normat ve statements

530 Media Ethics. (3) F
Eth ca convent ons and pract ces of print and e ectron c media as they re ate to the govern ment and pr vate sectors of the soc'ety

Omnibus Courses: See page 44 for omn bus courses that may be offered

JOURNALISM

JRN 201 Journalism Newswriting. (3) F S SS
Wrt ng news for the print media Prerequi- s tes. MCO 110 or 120; successfu comp etion of Eng sh prof c ency requirement demon strated typ ng ab l ty of 30 words per m nute *General studies: L1.*

301 Reporting. (3) F S
Fundamenta s of news gather ng, 'nterv ew- ng, and in-depth report ng Prerequ s tes JRN 201 major *General stud es. L2*

313 Introduction to Editing. (3) F, S
Copyed t ng and head ine wrt ng. E ectron c ed t ng on persona computer term na s. Pre requ s tes JRN 301 major.

351 Photojournalism I. (3) F, S
Tak ng deve op ng and print ng p ctures for newspapers and magazine product on on a med a dead ne bas s Students shou d have their own cameras. Prerequ s te JRN 201 or instructor approva

401 Public Relations Techniques. (3 F S
Theory and pract ce of pub c ty pub c re a t ons, and re ated techn ques and procedures Prerequ s tes: JRN 301 or TCM 315 major

412 Editorial Interpretation. (3) N
The press as an nf uence on pub ic op n on The ro e of the ed torial n ana yz ng and nter pret ng current events. Prerequ s te JRN 301

413 Advanced Editing. (3 F, S
Theory and pract ce of newspaper ed t ng ay out and des gn, picture, and story select on Prerequisite. JRN 313

414 Business and Industrial Publications. (3) F S
Theory and practice of ayout, typography, and des gn for magaz nes brochures, and in dustr a pub cations. Prerequ s te JRN 401.

415 Writing for Public Relations. (3) F, S
Deve opment of spec f c wr t ng techn ques for the practit oner in publ c relat ons agenc es and divisions of major organ zat ons Prerequ - s'te: JRN 401

420 Reporting Public Affairs. (3) F S
Instruct on and ass gnments n reporting the courts, schools government, city ha soc al prob ems, and other areas nvo v ng publ c s- sues Prerequ s te JRN 301

422 Business Reporting. (3) N
Ana yzing and report ng econom c and con- sumer affa rs Prerequisites 3 hours of eco nom cs, JRN 301

440 Magazine Writing. (3) F S
Wrt ng and market ng magaz ne art c es for pub cation. Prerequ s te. JRN 301 or nstruc- tor approva

451 Photojournalism II. (3) F S
Theory and pract ce of photojourna sm with emphas s on shooting 'ght ng and ayout for the med a. Prerequis te: JRN 351

452 Photojournalism III. (3) F, S
Advanced theory and pract ce of photojourna sm with emphas s on the photo essay and i ustrat ons n b ack and white and co or. 2 hours ecture, 2 hours ab. Prerequ s te JRN 451

460 Print Media Management. (3) S
Prob ems and funct ons nvo ved n the man- agement and market ng of a newspaper or magazine Interact on of management with the organ zat on and community. Prerequ s te JRN 201 or nstructor approva

465 Precision Journalism (3) S
An advanced wrt ng course with focus on re port ng pol s and surveys and other numer ca y based stories as we l as on understand ng the concepts that under e po ls and sur veys Lecture, ab Prerequisite: JRN 301 or instructor approva

470 Depth Reporting. 3) F, S
The course s designed to ntroduce students to strateg es for wr t ng n-depth newspaper or magaz'ne articles Lecture, ab Prerequ s te JRN 301, profess ona status instructor ap- prova .

480 Methods of Teaching Journalism. (3) N
Methods of nstruct on organ zat on, and pre- sentat on of appropriate content n journa ism Prerequisite 6 hours of journa sm at 300 leve and above or nstructor approva

Omnibus Courses: See page 44 for omn'bus courses that may be offered

TELECOMMUNICATION

TCM 200 Fundamentals of Radio-Television. (3) F S SS
Structure of te ecommunications in the Un ted States history, regulat on, organ zation w th emphas s on broadcasting Re ationsh p to ad vert s ng research and government agenc es Prerequ s tes MCO 110 or 120 successfu complet on of Engl sh prof ciency requ rement

201 Rad o-Television Writing. (3) F, S SS
Wrt ng for electron c med a news and cont nu ty. Prerequ s tes MCO 110 or 120 suc cessfu comp et on of Eng ish prof c ency re- qu rement demonstrated typ ng ab ty of 30 words per m nute *General stud es. L1*

235 Production Techniques. (3) F S, SS
Introduct on to bas c concepts of aud o and v deo product on Operat on of portable cam- eras, recorders, m crophones, i ghts, ed t ng, and postproduct on equ pment w l be ntro- duced Prerequ s tes TCM 200, successfu comp etion of Eng sh prof c ency requ rement

300 Advanced Broadcast Newswriting. 3) F S
Techn que and pract ce n newswr t ng for broadcast and cab e app ication ons Prerequ site TCM 201

315 Broadcast News Reporting. (3) F S
News and nformat on pract ces of networks, stat ons, and industry Practice in wnt ng, re porting and edit ng with emphas s on aud o Prerequ s tes TCM 201, 235. *General stud es L2*

330 Advanced Broadcast Reporting. (3) F, S
News and nformat on pract ces of networks stations and industry Advanced pract ce n wrt ng report ng and ed ting w th emphasis on v deo Prerequ site: TCM 315

332 Broadcast Programming. (3) F S, SS
Programm ng theory and eva uat on, regula- t on ethics and respons b 'ties and bas cs of aud ence psychograph cs and effects Prereq u site: TCM 200

336 TV Studio Production. (3) F S
ntroduct on of mu t camera product on n the stud o Teamwork and group product on are emphas zed through ab assignments cover ing a var ety of program types Prerequ s tes TCM 235 major

343 Broadcast Announcing. 3) F, S
Techn ques of rad o and te ev sion announc ng Prerequ s tes TCM 201 235

431 Advanced Radio-TV Writing. (3) N
Techn que and pract ce n nonnews wrt ng for rad o and te evis on emphas z ng creat ve and commerc a approaches to copywnting and copy presentat'ons Prerequ s te TCM 201

433 Broadcast Sales and Promotion. 3) F, S
Basics of e ectron c med a market ng prac t ces, inc uding commerc a time sa es techn ques and rad o/TV promot on fundamentals Prerequ s te TCM 200

435 Cable TV and Emerging Telecommunication Systems. 3 F, S
Structures and ut zat on of cab e, ndustna , and nstruct onal telev s on sate t te and v d eocassettes Prerequ s te. TCM 200

437 Advanced TV Production. (3) F S
Emphas s on nd v dua product on projects of the student's own conception and des gn ut izing stud o, f eld and postproduct on techn ques Prerequ's te TCM 336

472 Broadcast Station Management. (3) F S, SS
Management pr nc p es and practices, nc ud ing organ zat on, procedures po c es, person ne prob ems, and f nanc a aspects of stat'on management. Prerequ site TCM 332

480 Television News Practicum. (1 3 F, S
Writ ng report ng, and product on of the televi s on newscast Prerequ s te TCM 330.

Omnibus Courses: See page 44 for omn bus courses that may be offered

School of Justice Studies

Rita Mae Kelly
Director
(WILSN 327) 602/965–7682

REGENTS' PROFESSORS
ALTHEIDE, PALUMBO

PROFESSORS
CAVENDER HAYNES, HEPBURN, JOHNSON, KELLY KENNEDY, LAUDERDALE, MUSHENO, SCHNEIDER

ASSOCIATE PROFESSORS
BORTNER, FERRARO, GOLDBERG, HERNANDEZ, JUR K SCHADE, ZATZ

ASSISTANT PROFESSORS
LUJAN, PINO, R D NG IN

PROFESSORS EMERITI
BRUNS MELICHAR, SHUMAN

PURPOSE AND PHILOSOPHY

The school provides an interdisciplinary setting for studying justice from a social science perspective. Primary components of justice studies include theories of justice, social and economic justice, criminal justice, juvenile justice, and justice for women and minority populations, with an emphasis on American Indian justice issues. The curriculum focuses on examination of social science research, critical analysis of existing institutional arrangements pertaining to justice, and the exploration of alternatives.

DEGREES

Justice Studies—B.S.

The curriculum for the Bachelor of Science degree in Justice Studies provides interdisciplinary social science courses relevant to law and justice for students working in the justice field, those anticipating justice related careers (including the legal profession), and interested non Justice Studies students.

Justice Studies—M.S.

The faculty in the School of Justice Studies offer a program leading to the Master of Science degree with a major in Justice Studies. The study of justice is an interdisciplinary problem oriented field of scholarship, research, and teaching. The field embraces those aspects of social and behavioral sciences that are relevant to an understanding of law, justice, social control, and social change and that entail a critical examination of the systems that have evolved for handling attendant problems. The Master of Science degree has been designed to prepare students for professional positions in justice related agencies, for teaching in community colleges, and for further study and research in the justice field Information on the Master of Science degree in Justice Studies is detailed in the *Graduate Catalog.* For more information, call 602 965–6008.

Concurrent M.A. in Anthropology and M.S. in Justice Studies

Graduate students in the School of Justice Studies and the Department of Anthropology are able to receive a concurrent Master of Science degree in Justice Studies and Master of Arts degree in Anthropology. The principal purpose of the program is to prepare individuals with combined and complementary knowledge and skills for basic and applied research and administrative and educational activities related to justice studies and anthropology.

Students have to be admitted separately to each program, following the guidelines set forth by the Graduate College, the Department of Anthropology, and the School of Justice Studies. Additional information on the M A. in Anthropology and the M.S. in Justice Studies may be obtained from the Department of Anthropology and the School of Justice Studies.

Admission to Undergraduate Program

The Bachelor of Science degree in Justice Studies is an upper division program. Upon admission to the university, Justice Studies students are classified as premajors. Major status is required for graduation, and premajors are not allowed to take 400 level JUS courses.

Justice Studies students may achieve major status by

1. earning a minimum of 56 semester hours;
2. earning a minimum cumulative GPA of 2.50 (calculated on semester hours earned at ASU); and
3. completing, with a minimum grade of "C" in each and a 2 50 minimum average GPA for all of the following classes: ENG 101 and 102 *or* ENG 105; JUS 105 (or 305), 301, 302, and 303; and the College of Public Programs writing competence requirement

Upon completion of these requirements, the School of Justice Studies administratively assigns the premajor to major status.

For Justice Studies students to take a non core 300 level JUS course, they must have at least a "C" in each of the JUS core courses JUS 105 (or 305), 301, 302, and 303 and a minimum average of 2.50 for these four classes.

For non Justice Studies students to take a non core 300 level JUS course, they must have (1) major or professional status in a discipline or (2) a minimum of 56 hours (junior status) and a minimum cumulative GPA of 2.00. Non Justice Studies students are ineligible to take JUS 301, 302, and 303.

For non-Justice Studies students to take a 400 level JUS course, they must have (1) major or professional status in a discipline or (2) a minimum of 56 hours (junior status) and a minimum cumulative GPA of 2.50.

Academic Advisement. Justice Studies students admitted as premajors are advised by the school's academic advisor. All students are encouraged to seek advisement in order to formulate an appropriate educational plan. Justice Studies majors may also be advised by the school's faculty.

A comprehensive discussion of de gree requirements for the Bachelor of Science degree in Justice Studies is contained in the school's *Undergradu ate Advisement Guide*, available in WILSN 342 and via requests by mail or phone (602/965 7727). Every Justice Studies undergraduate receives the *Ad visement Guide* as well as an evaluation of transfer work, if any, by the school's advisement staff upon admission or re admission to the university.

DEGREE REQUIREMENTS

The School of Justice Studies awards a Bachelor of Science degree upon the successful completion of a curriculum consisting of a minimum of 126 semes ter hours including university general studies requirements, College of Public Programs requirements, justice studies courses, and electives. Additionally, the student must

1. earn major status,
2. earn a minimum of 50 semester hours of upper division courses,
3. complete a minimum of 30 semes ter hours, in residence, including 24 in justice studies courses (nine of which must be at the 400 level);
4. earn a grade of "C" or better in all justice studies courses taken at ASU that apply to the justice stud ies component of the curriculum (i e., nonelectives); and
5. meet the university's residency and scholarship requirements

A comprehensive discussion of degree requirements for the B.S. in Jus tice Studies is contained in the school's *Undergraduate Advisement Guide.*

General Studies Program. To assure the breadth and depth of their educa tion, all Justice Studies undergraduates must complete the university general studies requirements and additional fundamental requirements prescribed by the College of Public Programs and the School of Justice Studies For de scriptive information on these require ments, refer to "University General Studies Program Requirements" on pages 50–52, "Baccalaureate Degree Requirements" on pages 71 73, and the *Undergraduate Advisement Guide*, available in WILSN 342 and via re quests by mail or phone (602/965 7727).

Justice Studies Program. The re quired justice studies component con sists of 51 semester hours, of which 15 must be taken in a related field ap proved by the school. JUS 105 (or 305), 301, 302, and 303 are required for all degree candidates. Equivalent courses may be substituted when ap propriate. Through advisement, a group of justice studies courses may be recommended to ensure a comprehen sive exposure appropriate to the stu dent's interests. For specific informa tion in this area, refer to the *Under graduate Advisement Guide.*

Electives. Students are encouraged to utilize the unique opportunities af forded by the university to pursue per sonal and educational interests, whether in the form of a broad sampling of other disciplines or the deeper probing of a single field Any course offered by the university may be used as an elec tive

Transfer of Community College Credits. Credits transferred from ac credited community colleges are ac cepted as lower division credits up to a maximum of 64 semester hours The acceptance of credits is determined by the director of Admissions, and the ap plicability of credits toward degree re quirements is determined by the faculty of the School of Justice Studies.

JUSTICE STUDIES

JUS 100 The Justice System. (3 F, S SS
Overv'ew of the just ce system Roles of law enforcement personne the courts and cor rect onal agenc es Ph soph ca and theoret ca v ews in h stor cal perspect ve. *General studies SB*

105 Introduction to Justice Studies. (3) F, S SS
ntroductory overv ew to the study of just ce from a soc a science perspect ve Pr mary topics include just ce theories and justice re search Not open to students with cred t n JUS 305 This course s appropriate for fresh- men and sophomores Lecture d scuss on

200 Concepts and Issues of Justice. (3) F S SS
ssues re at ng to just ce po cies perspec- t ves techn ques ro es nstitut ona arrange ments management uses of research, and nnovat ve patterns *General studies: SB*

294 Special Topics. (1 3) F, S SS
Top cs chosen from various f e ds of just ce stud es

301 Research in Justice Studies. (3) F S, SS
Focus s on develop ng and eva uat ng re search des gns, data co ect on and the rela t onsh p between va id ty and re ab ity Meth ods for conduct ng research are a so stressed Prerequisite: open to Just ce Stud es students on y.

302 Basic Statistical Analysis in Justice Studies. (3) F S SS
Introduct on to the fundamenta s and app ca t on of descript ve and nferentia statist cs w th emphasis n the just ce area. Prerequ s te the university mathemat cs requirement *General studies. N2*

303 Justice Theory. (3) F S, SS
An exam nation of c ass c and contemporary ph losoph es and theor es of just ce, including lega socia , and cr m na just ce Prerequ s te: Refer to the statements of e igib ty on page 345 of th s cata og.

305 Principles of Justice Studies. (3) F S, SS
ntroductory overv ew to the study of just ce from a soc al science perspect ve Primary topics nclude just ce theories and just ce re search Not open to students w th cred t n JUS 105 This course is appropriate for juniors and sen ors Lecture d scuss on

306 The Police Function. (3) F S, SS
A ternative object'ves strateg es, programs nstitutiona arrangements, ro es perspec- t ves and nteragency re at onsh ps of the po l ce. Lecture d scuss on Pre or corequ s te: JUS 105 or 305 or instructor approva .

308 The Adjudication Function. (3) F S SS
History and deve opment of courts, trial by jury, and other d spute reso ut on mecha n sms select on and removal of judges and ju- r es, organization structure and jurisdict on of courts tr a and nontria processes of the jud c ary Lecture d scuss on Prerequ s te Refer to the statements of el g b ty on page 345 of th s cata og.

310 The Correctional Function. (3) F S SS
Survey of h story deve opment organizat on of nstitut onal/commun ty correct ons n Americа Overv ew of correctional thought, pract ce treatment research Lecture, discus s on Prerequ s te Refer to the statements of e ig b ity on page 345 of this cata og.

311 Prevention of Delinquent and Criminal Behavior. (3) F S SS
Theor es of prevent on, ndiv dua group, and commun ty approaches ntervent on at appro pr ate stages, contemporary aw enforcement and correct ons pract ces Lecture, d scuss on. Prerequ s te Refer to the statements of e g b l ty on page 345 of th s cata og.

320 Community Relations in the Justice System. (3) F S SS
Focus on deve op ng an nformed p an and po cy for ncorporat ng research f nd ngs about the surround ng community w th n van ous justice serv'ces and agenc es. Top cs n- c ude soc a stratif cation m nority groups and v ct mo ogy Lecture d scuss on. Prerequisite Refer to the statements of el g b l ty on page 345 of this catalog

329 Domestic Violence. (3) F S SS
Lega h stor ca , theoretical and treatment aspects of domest c vio ence, nc ud ng ch' d abuse, woman batter ng, incest and marita rape. Lecture, discussion Prerequisite. Refer to the statements of e g b ity on page 345 of th s cata og.

335 Organized Crime. (3) F, S
The nature of organ zed crime and ts llegal activit'es, theories of conta nment and efforts by just ce agenc es to counter ts dom nance n soc ety Lecture d scuss on. Prerequ s te: Refer to the statements of e g b ty on page 345 of this cata og

340 Juvenile Justice. (3 F S SS
A cnt ca exam nation of the h story and devel opment of the juven e court and the juven le just ce system Lecture d scuss on Prerequi site Refer to the statements of e igibi ty on page 345 of this catalog

360 Law and Social Control. (3) F, S SS
Reso ut on of social ssues through the app cat on of aw as an agent of soc'a control. Na ture sanct ons, and l m ts of aw. Categories of aw and schoo s of jur sprudence. Lecture, d scuss on Prerequ s te: Refer to the state ments of e g b ity on page 345 of this cata og *General studies SB*

370 Women, Work, and Justice. (3) F, S SS
Exam nation of gender inequa ity n the work p ace, 'nc ud ng the nature of women s work, theoret ca ssues, and mode s for promot ng gender just ce at work. Lecture d scuss on Prerequ s te Refer to the statements of el g b'l ty on page 345 of this catalog

394 Special Topics. (1 3) F S SS
Topics chosen from various fields of just'ce studies Lecture, d scuss on Prerequ's'te· Re fer to the statements of e gib ty on page 345 of th s cata og

404 Imperatives of Proof in the Justice System. (3) F, S, SS
Prob ems and means of establ sh ng dent ty and fact 'n relat on to arrest, detention, adjud cat on, sentenc ng, and correct ona case management Lecture d scuss on. Prerequ s te Refer to the statements of el g b ty on page 345 of th s cata og

422 Women, Law, and Social Control. (3) F, S SS
An exam'nation of soc a economic and ega factors that are re evant to mechan sms of so c al contro of women nc ud ng forma egal contro and nforma contro through v o ence Prerequ s te Refer to the statements of el g bi ty on page 345 of this cata og

435 White Collar Crime. (3) F S, SS
Overv ew of major ssues in business, profes siona and off c a ru e vio at ons. ncludes consumer fraud, securit es v o at ons uneth cal profess ona sm and pol t cal corrupt on Lecture, discuss on Prerequ s te Refer to the statements of e gib ity on page 345 of this cata og.

440 Organization and Administration of the Justice System. (3) F S SS
ntroduct on to bas c research theories and the r app cation to crim na just ce manage ment Emphas's on supervisory and m dd e management theory and po icy deve opment. Lecture d scuss on Prerequ s te. Refer to the statements of e g b ty on page 345 of th s cata og.

450 Alternatives to Incarceration. 3) F S SS
nvestigat on of various alternatives to ncar cerat on; advantages/d sadvantages, major s sues nc ud ng net widen ng cost effect ve ness, r sk assessment, commun ty cr me pre vention Lecture, research Prerequisite Refer to the statements of el g b l ty on page 345 of th s cata og

460 Feminism and Justice. (3) F S, SS
Explores feminist thought and crit'ques trad tiona pol tica theories Exam nes issues of rac sm sexua ty and the law Lecture d scuss on. Prerequ s'te· Refer to the statements of el g b i ty on page 345 of th s cata og

461 Substantive Criminal Law. (3) F, S, SS
Crim nal ab ity. Crimes aga nst persons, property, and soc ety Governmenta sanc t ons of nd v dua conduct as formu ated by leg's atures and the courts Lecture, d scus s on Prerequ s te Refer to the statements of e ig b ity on page 345 of this catalog

462 Procedural Criminal Law. (3) F, S, SS
The crim nal process Constitutiona and lega problems assoc ated w th arrest, search and se zure and due process of aw. Lecture d s cussion Prerequisite Refer to the statements of e ig b rty on page 345 of this cata og

463 Discretionary Justice. (3) F, S, SS
Use abuse, key ssues/man festat ons of d'scretion 'n ega system and other soc etal insti tutions Theoret cal/emp'nca nkages be tween d scretion and d'scrim nation based on race, ethnicity, and gender. Lecture, d'scus s on. Prerequis te. Refer to the statements of e 'gibi ity on page 345 of th s catalog *General studies: L2 SB.*

469 Political Deviance and the Law. (3) F, S, SS
An exam nat'on of the controversies created by po it ca and deviant behavior, nc uding a critica view of aw as an agent of soc a con tro Lecture d scuss on Prerequis'te: Refer to the statements of e g b ty on page 345 of th s catalog *General studies SB*

474 Legislation of Morality. (3) F S SS
Addresses h stonica and contemporary ssues re ated to soc al justice movements aw, and mora ity n a p ura ist c society Issues nc ude AIDS, buna rights homosexua ty poverty, prost tut on, and rac'al d'scrim nat on. Prereq u s te Refer to the statements of e 'gibi ty on page 345 of th s catalog *General stud es· L2.*

484 Internship. (3–6) F, S, SS
Ass gnments n a just ce-re ated placement designed to further the student's ntegrat on of theory and practice nternships are arranged through consultation of students w th p ace ments Students must consult w'th the school for appropriate appl cat on and registration procedures May be taken for a tota of 12 hours cred t, of wh ch a max mum of 6 are ap p ied to the major Prerequisite: major status s required, open to Just'ce Stud es students on y

494 Special Topics. (1 3) F, S, SS
Top cs chosen from various f e ds of just ce studies Lecture d scuss on Prerequis te: Re fer to the statements of el g b l ty on page 345 of th s cata og.

498 Pro-Seminar. (1 3) F S, SS
Sma group study and research for advanced students. May be repeated for cred t up to a max'mum of 9 hours, no more than 3 app ed to the major Prerequisites. major status and a m n mum cumulat ve GPA of 3.00 and 'nstruc tor approva

499 Independent Study. (1 3) F, S, SS
Original study or nvest gat on n the advanced student's field of nterest under the supervi s on of a faculty member May be repeated for credit up to a maximum of 6 hours a l appl cab e to the major Read ngs conferences, tuto ria s. Prerequ s tes: nstructor approval, ma jor status; m n mum GPA 'n JUS courses of 3.00; sen or standing

500 Justice Research Methods. (3) F, S SS
Theor es and methods of research with em phas s on deve opment of designs most re evant to just ce data and prob ems.

501 Justice System, Theory, and Issues. (3) F S
Ana ys s of the justice structure and process w'th n various theoret ca frameworks Issues such as d scret on, d vers on, and p ea nego t ations

502 Primary Management in Justice Agencies. (3) S
Concepts of modern management and their app ication to just ce related agency superv sion and management.

503 Crime and Social Causation. (3) S
Theories of dev ance and crime as they relate to soc a po cies and spec'fic response of the just ce comp ex

509 Statistical Problems in Justice Research. (3) F S
Methodo og cal prob ems of research des gn and statist ca methods spec f c to just ce stud es

510 Understanding the Offender. (3 F
Survey of earn ng persona ity and b o og cal theories of causat on and the r re evance to understand ng crim na and de nquent behav ior.

514 Justice Policy. (3) F
Assessment of the po tics of just ce po 'cy as wel as an understand ng of the bas c tools ava lab e to soc'a sc ent sts for ana yz ng the formulat on, 'mp ementation and eva uat on of just ce po cy

520 Qualitative Theory and Data Collection. (3) F
The bas c theoret ca rat ona e and perspectives for just ce re ated qua itative research, e g symbol c nteract on sm. Techniques for data co ection e.g. ethnography and depth nterv ewing

521 Qualitative Data Analysis and Evaluation. (3) S
Ana ysis of qua itat ve data e g fie d notes, depth 'nterv ew transcripts, document analy s s, cod ng, and retr eval w th a microcomputer qua tat ve evaluat on

540 Justice Administration. (3) S
Administrat ve po c es and pract ces used in just ce agenc es and the r appl cat on to the various facets of the just ce adm n strat ve pro cess

541 Justice Planning: Innovation and Change. 3) S
Normat ve factors n plann ng for standards and goa s in the justice system Appl cat on of nnovat on and change techn ques n an 'nter dependent system

547 Program Evaluation. (3) F S, SS
Nature role of program evaluat on; types, program mon tor ng, impact and process assess ment, eva uab ty assessment, methods, ut l zat on and po t cs of eva uat on Lecture, lab Cross isted as PAF 547 Pre or corequ sites JUS 500 recommended

550 Alternatives to Incarceration. 3 F, S SS
nvestigat on of various a ternat ves to ncar cerat on, advantages/d sadvantages major is- sues nc ud ng net w dening cost effective ness, risk assessment, commun ty cr me pre vent on Lecture research

560 Women and Crime. (3) F
Nature and extent of fema e crime, causat on theories, and the treatment of fema es n the aw and ust ce system

570 Juvenile Delinquency. (3) F
Study of de nquency nc ud ng causat on theories A ternat ve def n t ons of de in quency, off c al statist cs and the critique and ana ys's of the nteraction between soc a nst tut ons and youth

571 Juvenile Justice System. (3) S
Graduate leve introduct on to juveni e justice system inc ud ng historical development ph osoph ca or entat on organ zat ona struc- ture, and contemporary controvers es.

579 Political Deviance. (3) F
The sem nar examines the po itics of dev ance by ntegrating the study of conf 'ct with as- pects of social organ zat on, espec'a y state format on

584 Internship. (3 or 6) F S SS
Ass gnments n a just ce agency des gned to further the student s integration of theory and pract ce. Placements are arranged through consultation w th students and agenc es

591 Seminar. (1 3) F, S, SS
Top cs chosen from various f elds of justice stud es. May be repeated for cred t

610 Law and the Social Sciences. (3) S
Normative conceptua izations of aw aw and the adm n strat ve state mpacts of aw on so- c ety; discret on street leve bureaucrats and the l v ng aw

620 Justice Research and Methods. (3) F
Concept deve opment research des gn, data co ection strateg es, egal research, and bu d- ing computer databases relevant to the study of justice

630 Data Analysis for Justice Research. (3) F
B variate and mu tivariate techn ques of data ana ys's and hypothes s test'ng for just ce-re- lated research and use of nformat on and sta t stical programs.

640 Theoretical Perspectives on Justice. (3) F
Ana ysis of ph osophical perspectives of us- tice nkages between soc a sc ence theory and just ce constructs app cation of just ce to soc'a issues

669 Political Trials and Indigenous Justice. (3) S
Focuses upon research on po t ca trials devi ance and concept ons of nd genous and con- temporary justice Lecture, d scuss on.

Omnibus Courses: See page 44 for omn bus courses that may be offered

Recreation Management and Tourism

Maria T. Allison
Chair
(GHALL 204) 602/965–7291

PROFESSORS
ALLISON, CHEATHAM, HALEY

ASSOCIATE PROFESSORS
TEYE, VIRDEN, YOSHIOKA

ASSISTANT PROFESSORS
GRUVER, VOGT

PROFESSOR EMERITUS
GREEY

DEPARTMENTAL MAJOR REQUIREMENTS

Freshmen enrolling in the Depart ment of Recreation Management and Tourism and students transferring from other departments within the university must have completed 56 semester hours with a minimum 2.50 cumulative GPA before being officially admitted with major status to the Bachelor of Science degree program in Recreation. As part of this minimum requirement, students must successfully complete REC 210 and both ENG 101 and 102 or ENG 105 (or the English Proficiency Exami nation) with a grade of "C" or better.

Transfer students who have com pleted 56 semester hours or more at an other institution must remove any of the above course or scholastic deficien cies before being admitted with major status to the Bachelor of Science degree program in Recreation.

Students must complete the univer sity general studies requirements and the College of Public Programs course requirements in addition to major re quirements. General studies courses may not be used concurrently toward the general studies requirement and re lated requirements within the major core.

RECREATION—B.S.

The Bachelor of Science degree pro gram in the Department of Recreation Management and Tourism centers upon the systematic study of leisure related phenon ena, including human behavior and development, resource use, envi ronmental and social issues, and public policy. It is a professional program that features full exposure of students to a multifaceted concept of leisure and the quality preparation of these students for professional level entry into leisure ser- vice occupations.

This multidisciplinary degree pro gram is designed to provide the student with the competencies necessary for employment in management positions in such diverse leisure delivery systems as municipal recreation and park de- partments, county park departments, YMCAs, YWCAs, Boys and Girls Clubs of America, visitor and conven tion bureaus, senior centers, retirement communities, resorts, and other compo nents of the tourism/commercial recre ation industry. Graduates have also been employed by state offices of tour ism, state parks departments, and vari ous federal recreation resource agen cies

PROGRAM REQUIREMENTS

The 63 hour Bachelor of Science de- gree program in Recreation has two concentrations: recreation management and tourism. Students pursuing the rec reation management concentration can further specialize in therapeutic recre ation, community recreation, outdoor recreation, or youth agency administra- tion (American Humanics). This con centration consists of 33 hours of major core courses, 15 hours of recreation-re- lated courses, and 15 hours of related areas courses. The major core courses for the concentration appear below. REC 330, 462, and 463 require a mini mum GPA of 2.50 and must be taken in sequence, not concurrently.

Recreation Management Core Courses

			Semester Hour
REC	120	Leisure and the Quality of Life	3
REC	210	Leisure Delivery Systems	3
REC	330	Programming of Recreation Services	3
REC	350	Promoting and Marketing Recreation Services	3
REC	364	Foundations of Therapeutic Recreation	3
REC	462	Management of Recreation Services	3
REC	463	Senior Internship	12
REC	482	Assessment and Evaluation of Recreation Services	3
Total			33

The tourism concentration consists of 39 hours of major core courses, six hours of recreation related courses, nine hours of nonmajor related course work, and nine hours of directed elective courses. The major core courses for this concentration appear below. REC 330, 462, and 463 require a minimum GPA of 2.50 and must be taken in sequence, not concurrently.

Tourism Concentration Core Courses			Semester Hours
REC	120	Leisure and the Quality of Life	3
REC	210	Leisure Delivery Systems	3
REC	305	Introduction to Travel and Tourism	3
REC	330	Programming of Recreation Services	3
REC	350	Promoting and Marketing Recreation Services	3
REC	372	Tourism Planning	3
REC	458	International Tourism	3
REC	462	Management of Recreation Services	3
REC	463	Senior Internship	12
REC	482	Assessment and Evaluation of Recreation Services	3
Total			39

In both the recreation management and tourism concentrations, the related areas and directed electives course work must be selected from a departmental list of approved university courses.

Youth Agency Administration/ American Humanics Certificate Program. In addition to the two concentrations within the Bachelor of Science degree program in Recreation, a certification program is offered in the area of Youth Agency Administration/American Humanics. This certificate program features professional affiliation with and certification by American Humanics, Inc., the national leader in education for youth and human service agency administration. American Humanics represents such agencies as the American Red Cross, Big Brothers/ Big Sisters, Boys and Girls Clubs of America, the Boy Scouts of America, Camp Fire, 4 H, Girls Clubs of America, the Girl Scouts of the USA, Junior Achievement, the United Way, YMCA, and YWCA.

This program provides an academic approach featuring unique issues of voluntary, not for profit agency management and includes active participation by agency professionals who offer workshops, seminars, field trips, and cooperative education experiences.

			Semester Hours
REC	300	Fund Raising	3
REC	310	Volunteerism	3
REC	320	Youth and Human Service Workshop	4
REC	420	American Humanics Institute	1
REC	430	Managing Not for Profit Agencies	3
Total			14

Additional Department Requirements. Two hundred hours of recreation leadership experience (volunteer hours) are required before enrollment in REC 463 Senior Internship. Students are not permitted to take additional course work during their senior internship placement period. Approval of internships for main campus students must be requested from the Department of Recreation Management and Tourism office on the main campus.

A student must attain a grade of "C" or higher in all courses within the major, including the related area. Specific courses that may be used to fulfill the related requirements are listed in a brochure available through the department.

RECREATION

REC 120 Leisure and the Quality of Life. (3) F, S, SS
Conceptual foundations for understanding the role of leisure in the quality of life. Social, historical, psychological, cultural, economic and political foundations of play, recreation and leisure. *General studies SB*

150 Outdoor Pursuits. (3) SS
Theories and practical applications related to outdoor recreation pursuits. Interdisciplinary approach to wilderness issues and philosophies, culminating in an outdoor experience. Field trip required.

160 Leisure and Society. (3 F, S, SS
Analysis of the human recreation response to leisure. Historical survey of philosophical, psychological, and socioeconomic bases for development of systems that provide leisure programs. Non-Recreation majors only. *General studies SB*

210 Leisure Delivery Systems. (3) F, S
Introduction to development, management and organization of the public, not for profit and private sectors of the leisure services profession. The course is organized into five modular units which study the delivery of services in the recreation and tourism professions. Lecture, team taught. Prerequisites REC 120; Recreation premajor

300 Fund Raising. (3) F
Methods, techniques and directed experience in fund raising for voluntary youth and human services agencies. Budget control and accountability.

305 Introduction to Travel and Tourism. (3) F, S
An examination of the components of the travel and tourism industry at the state, national and global levels.

310 Volunteerism. (3) F
Administration of volunteer service programs. Study and analysis of the volunteer personnel process.

320 Youth and Human Service Workshop. (1) F, S
Forum for exchange between students and professional agency personnel. Variable topics, guest speakers. Prerequisite: instructor approval.

330 Programming of Recreation Services. (3) F, S
Foundations for effective program planning in varied leisure delivery systems. Prerequisites: REC 210. Recreation major. *General studies L2*

340 Outdoor Survival. (3) F, S, SS
Interdisciplinary approach to outdoor survival including attitudes, psychological stress, physiological stress, preparation, hypothermia, navigation, flora and wild life. Field trips required.

350 Promoting and Marketing Recreation Services. (3) F, S
Basic principles of promoting recreation services and strategies focusing on promoting and marketing concepts as they apply to recreation/tourism settings. Prerequisite: Recreation major or instructor approval.

360 Recreation Resource Management and Policy. (3) N
Management and decision making in recreation resource agencies. Policy analysis and use conflicts. Prerequisite: Recreation major.

364 Foundations of Therapeutic Recreation. 3 F, S
Introduction to special recreation and therapeutic recreation services for persons with disabilities. Offers both a community and clinical perspective on specialized services. Prerequisite: Recreation major or premajor.

370 Outdoor Recreation Systems. 3) F
Introduction to outdoor recreation resource delivery systems, history of wilderness and outdoor recreation resources; the role of outdoor recreation in society; outdoor recreation agencies, related environmental issues. Prerequisite: junior standing or instructor approval.

372 Tourism Planning. (3) F
Application of economic and regional planning concepts, theories, and policies to tourism destination development at the local, state, regional, and national levels. Prerequisites: REC 305. Recreation major.

380 Wilderness and Parks in America. (3) S
An examination of the American Conservation Movement and the relationships between the environment and recreation behavior.

400 Processes and Techniques in Therapeutic Recreation. (3) F
In-depth analysis of theoretical and philosophical approaches to therapeutic recreation practice with emphasis on various facilitation techniques used in therapy. Prerequisites: REC 364 or instructor approval.

401 Program Design and Evaluation in Therapeutic Recreation. (3) F S
In depth ana ysis of assessment, treatment p anning program mp ementation documen tation, and evaluat on strategies employed in therapeutic recreat on practice Prerequisites REC 364; REC 400 or instructor approva

415 Tourism Transportation Systems. (3) F S
Examination of the ro e of various modes of transportation n domest c and nternat onal tourism deve opment. Prerequ s te REC 305.

420 American Humanics Institute. (1) F, S
M ni- ntens ve nat ona management institute for vo untary youth and human service agency personne Out-of-state conference required. Prerequisite· nstructor approva

430 Managing Not-for-Profit Agencies. (3) S
Ana ys s of adm n strat ve structure, dec's'on making and program de ivery w th not for profit youth and human service agencies

440 Recreation Areas and Facilities Development and Management. (3) N
Survey of deve opment and management of publ c, private, and commercial recreat on ar eas and fac ities with a focus on meeting program needs

450 Leisure and Aging. (3) N
An exp orat on of the role of leisure n later maturity and the influence of the ag ng process on eisure behavior. Lecture, off-campus ab. Prerequ'sites REC 210 and 364 *or* n-structor approval

458 International Tourism. (3) F
A globa examination of internationa tourism and ts s'gnificance as a veh c e for soc a and economic deve opment. *General studies G*

460 Clinical Issues in Therapeutic Recreation. (3) S
An exp oration of contemporary prob ems/'s-sues confronting the therapeut c recreat on field, nc udes phi osophica h storical, prac tice management research, and educational ssues. Lecture off-campus ab Prerequis'tes: REC 364 and 400 *or* instructor approva

462 Management of Recreation Services. (3) F S
Bas c prnciples of adm nistration and their ap-pl cat on in successfu administrative s tua-t ons Analys's of administrative funct on, structure and pol c es Prerequisites: REC 330 Recreat on major

463 Senior Internship. (6 or 12) F, S, SS
Supervised gu ded experience n selected agenc es Prerequ's'tes· REC 462 senior stand ng, Recreation major

482 Assessment and Evaluation of Recreation Services. (3) F, S
ntroduct on to applied e sure research with an emphas s on program eva uation research des gn, data col ection techn ques, and data analys s Prerequ s te: REC 330

500 Research Methods I. (3) S
Introduction to recreat on research methods, with emphas s on methodo og cal quest ons research ssues, and techniques relevant to contemporary socia research Prerequ'site. approved stat stics course, 500 leve or above.

501 Research Methods II. (3) S
Advanced treatment of methodo og cal issues analys s of data, computer app ications, and thesis proposal deve opment. Prerequ s te REC 500.

540 Recreation Services for the Aged. (3) N
An app ied or entation to the soc al/psycho-logical theories of recreation and the aged

552 Historical and Philosophical Foundations of Leisure. (3) F
An analys s of the fundamenta histor ca and phi osoph ca concepts ssues and problems confronting the e sure studies profess on.

555 Social and Psychological Aspects of Leisure Behavior. (3) A
An empinca and theoret ca ana ysis of soc a cu tura , and psycholog ca foundations of ei-sure behav or

558 Integrative Seminar. (3) A
Advanced exp orat on and assessment of cur-rent trends w thin the le sure stud es profes-s on. Th s course has var ab e topics, nclud-ng, but not l mited to· cross-cultura analys s of e sure, urban recreation p anning and re-sources sociocu tura dimens ons of tourism development, wi derness management Pre requisite REC 552

569 Current Issues in Tourism. (3) F
General survey of the tourism iterature w th an emphas s on relevant theor es, concepts and current research.

570 Social Aspects of Outdoor Recreation Management. (3) S
An analysis of the soc a aspects of natura re source recreation management and p ann ng Prerequisite REC 370 or equ va ent.

Omnibus Courses: See page 44 for omn bus courses that may be offered

School of Public Affairs

N. Joseph Cayer
Director
(WILSN 208) 602/965–3926

PROFESSORS
CAYER, COOR, DANEKE, HALL MANKIN, MONT EL, MUSHENO, MUSHKATEL, PERRY, WESCHLER

ASSOCIATE PROFESSORS
BROWN, DeGRAW

ASSISTANT PROFESSORS
ALOZIE, CAMPBELL, LAN

PROFESSORS EMERITI
BECKER, SACKTON

The faculty in the School of Public Affairs offer a graduate program lead ing to the professional degree Master of Public Administration (M.P.A.). The M.P.A. degree is accredited by the Na tional Association of Schools of Public Affairs and Administration (NASPAA) Commission on Peer Review and Ac creditation and is listed on the Annual Roster of Accredited Programs in con formity with NASPAA standards. The faculty also participate in the interdisci plinary degree program leading to the Doctor of Public Administration Consult the *Graduate Catalog* for informa tion about these programs.

The basic aims of the school are as follows:

1. to offer professional education pro grams leading to graduate degrees in Public Administration and to en courage midcareer education for public administrators by offering evening course work at the ASU main campus, the ASU Downtown Center, and the state government complex;
2. to maintain a research program designed to identify problems, dis seminate information, and propose solutions to major public problems; and
3. to provide a high level of public service in meeting needs in Ari zona and the nation.

ADVANCED PUBLIC EXECUTIVE PROGRAM (APEP)

APEP is designed to provide the public sector executive with analytical approaches and skills that help mobi lize ideas, people, and resources in sup port of public programs. To meet these objectives, APEP uses interdisciplinary faculty teams to provide a series of short courses, seminars, and other train ing devices to help public managers be come more effective and efficient.

MORRISON INSTITUTE FOR PUBLIC POLICY

Created by a grant from Marvin and June Morrison in 1981, the institute acts as a liaison among government of ficials, university faculty, and the pri vate sector to identify and provide analysis of timely public policy issues. In fulfilling this role, Morrison Institute conducts descriptive and original re search, conferences, and consultations and produces publications on a wide range of topics, including urban growth, natural resources, education, government systems, health care, social services, the quality of life, and eco nomic development. The institute also sponsors a Legislator's Institute annu ally and is active in providing research for city and state town hall projects.

PUBLICATIONS DIVISION

The Publications Division is a re source unit created to encourage faculty research on current topics of public in terest through its publications program. The purpose of the program is the dis semination of research on public policy and public administration to academics, public managers, officials, and con cerned citizens, with a focus on issues of special importance to Arizona

The program publishes policy, re search, and management papers and a semiannual newsletter on the activities of the School of Public Affairs The di vision also supports the other research units of the school by publishing their work or providing technical assistance.

PUBLIC AFFAIRS

PAF 500 Research Methods I. 3 F, S
Presentation of mult vanate stat st cs, com puter applicat ons and ntroduct on to major research design ssues. Prerequ s te an ap proved course n stat stics.

500 Research Methods II. (3) F S
Advanced treatment of des gn and measure- ment ssues w th emphas s on app ed re- search projects by students Prerequ s te PAF 500

501 Statistics in Administration. (3) F S
App icat on of stat'st cal methods to prob ems n finance, personne survey and p ann ng

502 Computers in Administration. (3) A
Experience n use of computer technology for pub ic adm n strat on prob em so v ng.

503 Organization Theory. (3) N
Organ zation theones and current research emphasis w th app 'cat on to pub c adm n s tratve organizat ons

504 Comparative Administration. (3) N
L terature on comparat ve pub c admin stra tion theory Bureaucrac'es and the r mpact on the pol tical development process Se ected nat ons w l be stud ed.

505 Intergovernmental Relations. (3) N
Evolut on growth, present status, and charac teristics of the U S federal system of govern- ment. Federa state relat ons state oca re a tions, reg ona sm counc ls of government n terstate cooperat on, grants- n-a d, and revenue sharing

507 Bureaucracy and Public Affairs I. (3) F S
Ana yses of the conceptual and contextual e ements of publ c adm n stration and pol cy

508 Bureaucracy and Public Affairs II. (3 F, S
Ana yses of pub ic adm'n strat on concepts ap plied to management situations nc ud ng per- sonnel, f nance budget ng, dec s on mak ng, and imp ementation

509 Organization Change and Develop- ment. (3) N
Exploring the nature and management of change and deve opment as a too to ach eve organ zat ona goa s· effecting p anned change

510 Governmental Budgeting. (3) F S
Lega soc a , econom c and po t ca nature of governmenta budgets and the budgetary pro cess Theor es and soc a consequences of budget dec sion mak ng and pract ces of bud get contro

511 Governmental Finance Management. (3) A
Sources f fund ng management of funds and debts and genera pattern of expend tures n states count es, cit es and d str cts. Prerequ site: PAF 510

512 Public Affairs Economics. (3) A
Ro e of econom cs n pub ic affa rs with ex amp es from transp rtat on urban form R o Sa ado project hous ng and use flood con- tro growth and aspects of energy econom cs.

520 Public Management. (3 A
The management process n government and pub c agenc es w th emphasis on the execu t ve eadersh p w th n the pub c sector

521 Public Personnel Management. (3) A
H story of the c v l serv ce, recru tment selec t on pos t on and wage c assif cation mot va- t ona ana ys s, productiv'ty, pub c un on sm and eth cs n pub c serv ce.

522 Public Labor Relations. (3) A
R se of pub c union'sm, manageria p cy to- ward un on sm conf ct reso ut on mpact of un'onism on budgets personnel po c es, and publ c po 'cy

523 Public Information Systems. (3) A
Systems ana ys s concepts and theory as ap p ed to adm n stration A ternative modes of nformat on organ zat on and the r impact n pub c dec s on mak ng

524 Community Conflict Resolution. 3 N
nterd sc p nary approach to understanding the dynam cs of commun ty confl ct Strateg c cons derat ons n po cy design and advocacy, potent a react on to confl ct Re evant mode s and research f nd ngs generated by both case stud es and comparat ve methods

525 Public Program Management. (3) A
Governmenta serv ce programm ng formu at ng, f nanc ng operating eva uat ng and re port ng Ana ys s of nteragency re at onsh ps and the role and conduct of research in the programm ng process

526 Public Sector Human Resource De- velopment. (3) A
Concepts and techn ques of organ zat onal deve opment n the pub c sector nc ud ng staff ng superv sor tra n ng, execut ve devel opment resource p ann ng, and employee train ng

530 Management of Urban Government. (3) A
Adm n strat ve pract ces and behav or w th n the urban po t ca adm n strat ve env ronment Functional areas such as cit zen part c pat on urban p ann ng, urban transportat on, and the conf icts between urban po t cs and admin s trat ve eff c ency

531 Comparative Urban Administration. (3) N
Deve opment of urban governments w th n d f ferent cu tura soc'al, and po it ca m eu Cit- es w thin deve op ng countr es as wel as n the deve oped countr es of Europe and North Amer ca

532 Urban Planning Administration. (3) A
H storical and present day uses of urban plan n ng and procedures for ts mp ementation Bas c pr nc p es and practices

535 The City and County Manager. (3) A
The manager's ro e and resources in the dif- fering forms of adm n strat ve, egislat ve, and commun ty sectors

540 Public Policy Analysis. 3 A
Theories wh ch attempt to exp a n pub c po cy formu at on App icat on of soc a sc ence to po cy ssues.

541 Topics in Public Policy Analysis. (3) A
May be repeated for cred t Top cs may n c ude but are not m ted to the fo ow ng
a) Ag ng
b Art
c Educat on Po cy
(d Env ronmental Pub c Po icy
(e Hea th
(f) Nat ona Pub c Pol cy
g) Pub ic Safety
(h) Recreat on
(i) Transportat on
(j We fare

542 Science, Technology, and Public Af- fairs. 3) N
The nf uence of sc ence and techno ogy on governmenta pol cy making sc ent sts as ad- m'n strators and advisors, governmenta po icy mak ng for sc ence and technology, govern- ment as a sponsor of research and develop ment

543 Public Management of Land. (3) N
Descript on and ana ysis of urbanizat on pro cesses An emphas s s p aced on the app ica- t on of urban theor es to deve op ng urban centers, with a f cus on Maricopa County

544 Preparation of Reports in Public Ad- ministration. (3) N
Intens ve practice n wr tten and ora presenta- tion of reports to conferences covered w th prob ems n pub c adm nistration V sua a d techn ques

545 Research Data Management. (3) N
Techniques and prob ems associated w th data management n a research env ronment Database management systems security and integrity, access b ty and cost

546 Database Management Systems in Public Administration. (3) N
Concept and use of modern database man agement systems 'n an adm n strative organ - zat on Advantages and disadvantages of th s approach

547 Program Evaluation. (3 N
Various methodo og es ava ab e for the evalu- ation of pub c po c es and programs. Cross l sted as JUS 547

548 Women, Politics, and Public Policy. (3) N
Exp ores how po tical ph osophy, pol tics, and pub c po cy affect and are affected by women

549 Minority Communities and Public Policy. (3) A
Examines pub ic pol cy ssues of concern to or affecting B ack Lat no, and Amencan nd an communit es as we as those groups mpact on the po icy process. Seminar.

550 Survey Research in the Public Sector. (3) N
Design and implementation of survey research methods, with an emphasis on public sector applications. Prerequisites: PAF 500 and 501 *or* JUS 500 and 509 *or* instructor approval.

552 Urban Housing Policy. (3) N
Comprehensive consideration of the revitalization of American cities with major emphasis upon the housing process and related institutions and services.

554 Urban Growth Administration. (3) N
Examines the process of urban growth and change. Partnership roles played by public and private sectors in management are emphasized.

555 Environmental Policy and Management. (3) N
Analysis of environmental policy and planning issues and principles related to the analysis and management of natural and urban/regional resources.

556 Urban Policy Making. (3) A
Analysis of the opportunities and costs of influencing public policy and the roles of officials and bureaucracies in decision making.

560 Information Management. (3) A
Concepts and theory of information and information technology in public sector organizations.

570 Advanced Public Policy Analysis. (3) A
Course emphasizes the structure of policy problems, forecasting policy alternatives, optimizing resources, and reducing uncertainty in policy making. Prerequisite: PAF 540.

591 Seminar. (1–12) F, S
Topics may include but are not limited to the following:
(a) General Public Administration
(b) Public Finance Administration
(c) Public Management
(d) Urban Affairs and Urban Planning
(e) Public Policy Analysis
(f) Information Management
(g) Business and Government
(h) Emergency Management

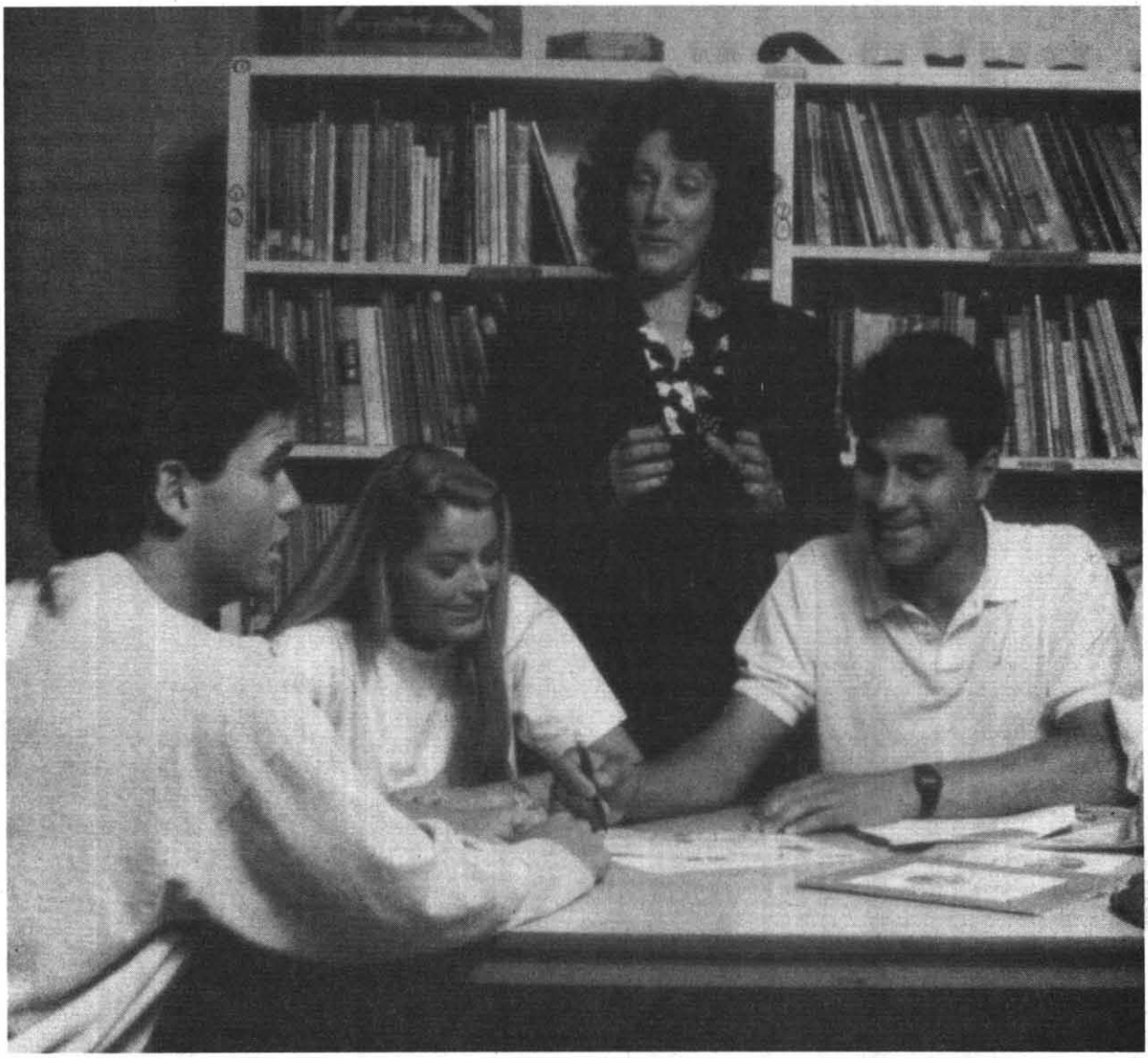
600 Research Design and Methods. (3) F
Advanced methods of research design and analysis. Prerequisites: formal graduate level course work in statistics and in research methods.

601 Seminar: Policy Analysis and Program Evaluation. (3) S
Normative and conceptual issues of policy formulation, implementation, and evaluation; empirical approaches and methods of program evaluation and policy analysis.

602 Seminar: Foundation of Public Administration. (3) F
Ethical, social, legal, and philosophical foundations of public administration.

603 Seminar: Organization and Behavior in the Public Sector. (3) S
Structure, organization, conduct, and performance of public sector institutions in the administration of public policy. Prerequisite: PAF 602.

Omnibus Courses: See page 44 for omnibus courses that may be offered.



School of Social Work

Emilia E. Martinez-Brawley, Ed.D.
Dean

PURPOSE

The purpose of the School of Social Work is to prepare professional social work practitioners who are committed to understanding and serving those in need of help.

The mission of the School of Social Work is the training of professional social workers for beginning level generalist practice (B S W and for clinical, administrative, and community practice (M.S.W.). The focus is on those populations who are most oppressed and most in need of social services. A special emphasis is placed on working with ethnic/racial minorities of the Southwest.

The school is totally committed to the university's mission to be competitive with the best public research universities in the country. Faculty members have active research agendas under way that venture into a wide variety of topics, including work with children, with drug and alcohol abusers, with the developmentally disabled, in human services planning, and in many other areas of interest.

ORGANIZATION

The School of Social Work has no separate departments or units. Generally speaking, curriculum planning, faculty teaching areas, and student advising tend to cluster around four programmatic areas the Bachelor of Social Work (B.S.W.), the Master of Social Work direct practice concentration (M.S.W. DP), the Master of Social Work planning, administration and community practice concentration M.S W PAC), and the Doctor of Philosophy (Ph,D.) with a major in Social Work. Some faculty teach in more than one of these programmatic areas.

ADMISSION

Bachelor of Social Work

The Bachelor of Social Work degree program is divided into the pre Social Work major and the Social Work major

The pre Social Work major consists of freshman and sophomore students who have been admitted to the university and have declared Social Work as their major, as well as students transferring to the School of Social Work from other colleges within the university and other universities or junior colleges who have not completed the admission requirements to the program Students transferring from other universities or community colleges as premajors should follow the procedure outlined on pages 34–35 of this catalog. Students transferring from other colleges within the university must obtain a Change of College form from the School of Social Work Student Services Office, WHALL 133.

Admission Procedure for Social Work Majors. This procedure is for students who have 54 semester hours or more and have taken SWU 271, 291, 301, and 310. Students wishing to enter the Social Work major are required to apply for admission to the program in addition to obtaining an official Certificate of Admission to the university. Students are eligible to apply for admission to the Social Work major during the last semester of the sophomore year. It is expected that applicants have completed 54 semester hours and the required Social Work courses by the end of the semester in which they are applying. Students are admitted to the major at the beginning of the term following the semester during which they apply

Students may obtain a Social Work major application packet at the School of Social Work Student Services Office, WHALL 133, or request that one be mailed to their home address by calling 602 965–6081

Applicants are reviewed for admission for the fall and spring semesters. Students applying must have a Certificate of Admission to the university in their files by November 1 for spring admission and March 1 for fall admission. Students should allow at least four additional weeks to receive acceptance. All other application materials (i.e., application form, additional statement, and two letters of reference) must be returned to

SCHOOL OF SOCIAL WORK
STUDENT SERVICES OFFICE
ARIZONA STATE UNIVERSITY
BOX 871802
TEMPE AZ 85287 1802

by November 1 for spring admission or March 1 for fall admission. Failure to meet these deadlines may result in the applicant having to wait for the next admissions period. Applicants are notified by mail of the committee's decision within five weeks after the application deadline. Those applicants who

have been denied admission may re quest a conference with the program di rector to discuss the decision and to ob tain guidance in the development of fu ture plans.

Criteria for Admission. Admissions are based on the following criteria:

1. A minimum cumulative GPA of 2.00 is required.
2. A minimum cumulative GPA of 2 75 in core Social Work courses (SWU 271, 291, 301, and 310) and a grade of "C" or better in all So cial Work courses are required.
3. Lower-division general studies re quirements described by the uni versity and as part of the B.S.W. program must be completed.
4. The applicant's educational and ca reer goals must be compatible with the educational objectives of the school.
5. Before admission to the major, ap plicants are required to have a minimum of 240 hours of social work experience in human ser vices. Voluntary, paid, and/or equivalent family personal experi ences are acceptable.
6. References are required for each applicant. Two references from persons who have known the appli cant in a professional capacity are to be submitted by the applicant Additionally, a third reference is later requested by the school from the applicant's SWU 310 instruc tor. This reference is used in the field placement process.

Admission is selective and based on available resources. Not all students who meet minimum requirements are admitted to the program.

Leave of Absence. Occasionally, for health or personal reasons, B.S.W. ma jors find it necessary to interrupt their studies. Students considering such re quests meet with an advisor to look at alternatives and then meet with the di rector of Admissions to process the re quest and a feasible educational plan. A student may request a leave of ab sence from the Social Work program for a period of one year. (This leave applies only to the Social Work pro gram and not to the university. No leave of absence is granted from the university.) Requests for a leave of ab sence must be made in writing. Except when recommended by the Committee on Academic and Professional Stan dards, the student must be in good standing in the program at the time the request is made. Students should be aware that nonattendance at the univer sity for one or more semesters requires reapplication to the university Failure to request a leave of absence by B.S.W. majors results in removal from the pro gram.

Readmission. Undergraduate students (premajor and major) who have previ ously attended ASU but have not been enrolled at this institution for one or more semesters are required to apply for readmission following university procedures as outlined on page 41. Students who were previously B.S.W. majors may, in addition, be required to reapply for major status.

Transfer Credit. Credits transferred from any accredited junior or commu nity college are accepted up to a maxi mum of 64 semester hours. Commu nity college students planning to trans fer at the end of their first or second year should plan their community col lege courses to meet the requirements of the ASU curriculum selected. Stu dents attending Arizona community colleges are permitted to follow the de gree requirements specified in the ASU catalog in effect at the time they begin their community college work, provid ing their college attendance is continu ous. See page 72, "Guidelines for De termination of Catalog Year "

Courses transferred from community colleges are not accepted as upper-divi sion credits earned at ASU. Arizona students are urged to refer to the *Ari zona Higher Education Course Equiva lency Guide* for the transferability of specific courses from Arizona commu nity colleges. Copies of the guide are available in the Student Services Of fice, WHALL 133. In choosing courses at a community college, stu dents should be aware that a minimum of 50 hours of work taken at the univer sity must be upper division credits. While attending a community college, students are encouraged to elect general studies and lower-division courses in the major field.

Direct transfer of courses from other accredited institutions to the School of Social Work is subject to the existence of parallel and equal courses in the school's curriculum. Transfer credit is not given for courses in which the low est passing grade ("D") or a failing grade ("E" or "F") was received.

Credit for "life experience" is not given in lieu of course requirements. A minimum of 30 semester hours earned in resident credit courses at ASU is re quired for graduation.

Master of Social Work

Applications to the M.S W program are accepted only during the period be ginning November 1 and ending March 1 preceding the fall semester to which the applicant is seeking admission. All applicants are reviewed for admission for the fall semester only.

Regular Admission. Applicants must be acceptable to both the Graduate Col lege and the School of Social Work. Among other considerations for accep tance by the Graduate College, the ap plicant must have a minimum GPA of 3.00 (4.00 = A) in the last two years of work leading to the bachelor's degree. The applicant's score on the aptitude examination the Graduate Record Ex amination or Miller Analogies Test is also considered in making decisions re garding admission. All students are re quired to complete a course in human biology successfully before enrollment in the graduate program. Additionally, all students must have successfully completed a course in statistics either before admission or by the end of the first year in the M.S.W. program. The school also requires that applicants must either

1. have graduated with a liberal arts undergraduate degree;
2. have graduated with a B.S.W. from an accredited school of social work; or
3. for students with other undergradu ate degrees, have taken 30 credit hours in liberal arts courses at the undergraduate or graduate level.

The 30 semester hours must include course work from the social/behavioral sciences, natural sciences, and humani ties. The distribution should approxi mate the current policy undergirding the B.S.W. program:

1. 18 hours in social and behavioral sciences;
2. six hours in natural sciences with at least one course in human biology; and
3. six hours in humanities.

Provisional Admission. Applicants with lower test scores or grades below minimum levels may be considered for provisional admission if there is coun terbalancing evidence suggesting the potential of outstanding performance in the Master of Social Work program. Normally, final determination of re moval of provisional status is made by the time the student has completed 12 hours of approved graduate study. The provisional student does not begin field work until this status has been changed. However, the student carries the same academic load as a regularly admitted student and is expected to meet the same standards for continuation in the program.

Application Procedure. The follow ing items should be submitted to

ADMISSIONS OFFICE, GRADUATE COLLEGE
ARIZONA STATE UNIVERSITY
BOX 871003
TEMPE AZ 85287 1003

(1) the application for admission to the Graduate College and (2) two tran scripts from each institution where the applicant has attended previously.

The following items should be sub mitted to

SCHOOL OF SOCIAL WORK
STUDENT SERV CES OFFICE
ARIZONA STATE UNIVERSITY
BOX 871802
TEMPE AZ 85287 1802

1. application to the Graduate Social Work program;
2. statement of educational and career goals in sufficient detail to indicate compatibility with the educational objectives and capabilities of the School of Social Work;
3. three letters of reference using the reference letter forms provided by the School of Social Work; and
4. test scores from either the Graduate Record Examination or the Miller Analogies Test.

Transfer Credit. Upon recommenda tion of the Admissions Committee, the first year of graduate study (up to 30 graduate semester hours) earned as a matriculating graduate student at an- other CSWE accredited school of so cial work may be transferred toward the M.S.W. degree. A full transcript from the school at which the credit was ob tained is required.

A maximum of nine graduate semes ter hours earned as an unclassified stu dent in the ASU School of Social Work may be transferred. Up to six semester hours of prior graduate work in another ASU program or another university may transfer as elective credit if ap proved by the program director. A combination of credit earned as an un classified student in other programs or universities may not exceed nine se- mester hours.

Consideration for acceptance of prior graduate credits must be applied for at the time of admission. The grades for all transfer credit must be a "B" or bet ter.

Work offered toward a master's de gree must be completed within six con- secutive years. The six years begin with the first course included on a student's approved program of study.

Exemptions and Waiver Examinations

The number of semester hours re quired to complete the M.S.W. degree ranges from 40 to 60, with 60 hours representing the standard program. In addition to transferring in credit (see policy on transfer credit), admitted stu dents may acquire up to 20 hours of credit toward the degree by a combina tion of (1) exempting up to nine hours of foundation course work without ex- amination or (2) successfully complet ing examinations in any of the founda tion courses except field.

Exemptions. Only students from B.S.W. programs accredited by the Council on Social Work Education can be considered for exemptions. To be eligible for an exemption from any course, students must have received their B.S.W. degree no more than five years before the date of admission or be able to demonstrate current continuing education credits. Admitted B.S.W. students from ASU are exempted from the courses listed below without exami nation if they meet the stated GPA re quirements. B.S.W. students from other accredited programs may also be exempted from the same courses but must submit their course content mate- rial (course description, syllabus, and outline) for review by the M.S.W. di rector for an equivalency review to de termine exemption. B.S.W. students may be exempted from the following courses:

1. SWG 502 if the student has at least a 3.50 GPA for both SWU 301 and 402 or equivalent social work courses;
2. SWG 531 if the student has at least a 3.50 GPA for both SWU 331 and 432 or equivalent social work courses; and
3. SWG 533 if the student has at least a "B" in SWU 474 or an equivalent social work course.

Waiver Examinations. Students who believe they have successfully com pleted equivalent undergraduate courses or have related work experi- ence covering content to be taught in the M.S.W. courses listed below can re quest to test out of those courses by taking a written waiver examination. Waiver examinations are offered for the following courses:

		Semester Hours
SWG	501 Human Behavior in the Social Environment I	3
SWG	502 Human Behavior in the Social Environment II	3
SWG	510 Direct Practice I	3
SWG	511 Direct Practice II*	3
SWG	520 Practice Oriented Research	3
SWG	531 Social Policy and Services I	3
SWG	533 Ethnic Minorities and Social Work	3
SWG	580 Community and Organizational Change	3

* Only students who successfully pass the waiver exam for SWG 510 Direct Prac tice I are allowed to take the waiver exam for SWG 511 Direct Practice II.

Part-Time Program. A limited num ber of students are admitted each year to a planned part-time program. Stu dents interested in this option must spe cifically apply to the part time pro gram. This program is completed in accordance with the plan developed. A maximum of one year of field educa tion may be done by special arrange- ment in the agency where the student is employed.

Social Work—Ph.D.

In general, an applicant for the Doc tor of Philosophy degree with a major in Social Work should hold a Master of Social Work degree from an accredited

school of social work and have demonstrated professional growth in the practice of social work. Exceptions to this general requirement may be made for applicants with an advanced degree in a related field and exceptional practice or research experience in social work

Admission to the Ph.D. program requires completion of all admission requirements and procedures set forth by the Graduate College and test scores from the Graduate Record Examination. Applications are accepted up to March 1 preceding the fall semester to which the applicant is seeking admission Students are admitted only in the fall semester

Application Procedure. The following should be submitted to

ADMISSIONS OFFICE, GRADUATE COLLEGE
ARIZONA STATE UNIVERSITY
BOX 871003
TEMPE AZ 85287 1003

1. the application for admission to the Graduate College;
2. two transcripts from each institution where the applicant has attended previously; and
3. test scores from the Graduate Record Examination.

The following should be submitted to

SCHOOL OF SOCIAL WORK
STUDENT SERVICES OFFICE
ARIZONA STATE UNIVERSITY
BOX 871802
TEMPE AZ 85287 1802

1. application to the Doctor of Philosophy program;
2. statement of educational and career goals in sufficient detail to indicate compatibility with the educational objectives and capabilities of the School of Social Work;
3. examples of written work or published materials, and
4. four letters of reference, using the reference letter forms provided by the School of Social Work.

ADVISEMENT

Bachelor of Social Work

Students are responsible for meeting the degree requirements and seeking advisement regarding their program status and progress. Upon entrance to the School of Social Work, each student is assigned an advisor. The advisor assists students with program planning, registration, preparation of needed petitions, verification of graduation requirements, referrals to university and/or community resources, and assistance with career planning. Students must meet with an advisor before any registration transaction.

Master of Social Work

A faculty advisor is assigned to each enrolled student at the beginning of his or her first semester of graduate work. Faculty advisors are available to assist students with career and professional concerns An advisor in the Student Services Office of the School of Social Work provides technical assistance in filing Programs of Study, course selection, and any other academic issues. Students must meet with an advisor before any registration transaction.

Social Work—Ph.D.

At the time of matriculation, each student is assigned a faculty advisor who is a member of the Doctoral Program Committee.

The advisor helps the student with educational planning. The advisor also discusses research interests with the student and refers the student to those faculty members who seem best qualified in the substantive field in which the student has an interest. Students are expected to use their own initiative in developing relationships with faculty at the School of Social Work and the university at large who share their theoretical and research interests.

DEGREES

Bachelor of Social Work

The school's undergraduate curriculum leads to a Bachelor of Social Work (B.S.W.). The B.S.W. degree program is accredited by the Council of Social Work Education. The principal objective of the undergraduate curriculum is to prepare students for beginning level generalist practice in social work. The program is also designed to prepare students for culturally sensitive practice and to provide preparation for graduate training in social work. The B.S.W. program offers social welfare content in general studies courses for College of Liberal Arts and Sciences students. During the freshman and sophomore years, students concentrate on obtaining a strong background in liberal arts and sciences and are classified as premajors until they are officially admitted to the major. Entrance into the Social Work major from the premajor is not automatic (see "Admission," pages 353 354).

Junior and senior Social Work majors focus on Social Work courses in social policy and services, human behavior in the social environment, social work practice, research, and field instruction in community agencies In addition, majors take elective courses in related areas.

The B.S.W. level practitioner is seen as a generalist. The curriculum focuses on such roles as advocacy, referral, case management, and problem solving functions with individuals, groups, families, organizations, and the community

Master of Social Work

The Master of Social Work program prepares professional social workers for advanced direct practice, administrative, and community practice positions. The program puts major emphasis on preparing social workers capable of responding effectively to the needs of the special populations in the Southwest the ethnic minority groups of the region, the aged, urban and rural poor, children at risk, the disabled, and women who are victims of poverty, discrimination, and violence in its curriculum and its practicum assignments.

The M.S.W. program is a two year, 60 hour program that includes a foundation year and a concentration year. In the foundation year, all students complete the same course work and field education requirements. In the concentration year, students select either direct practice (DP) or planning, administration and community practice (PAC).

Social Work—Ph.D.

The doctoral program of the School of Social Work prepares students to contribute to the field of social welfare and the profession of social work through research, teaching, and other scholarly activities.

The program seeks to broaden the student's knowledge of the field of social work and the supporting social and behavioral sciences, to deepen the student's understanding of the area of specialization, and to enable the student to make a contribution to that area through scholarship and research.

Most students specialize in theory and research in social development, social treatment, or some combination of both. Social development includes social administration, social planning, social policy, and community development. Social treatment includes direct practice with individuals, families, or small groups.

Students may construct programs that combine social development and social treatment and may develop specializations in various substantive areas, e.g., child welfare, aging, mental health, and medical care.

DEGREE REQUIREMENTS

All candidates for graduation in the Bachelor of Social Work curriculum are required to present at least 126 semester hours, of which at least 50 hours must consist of upper division courses. A minimum cumulative GPA of 2.00 is required for graduation.

Course Load. A normal course load per semester is 15 16 semester hours. The maximum number of hours for which a student can register is 18 semester hours unless an overload petition has been filed with and approved by the director of the Undergraduate Program.

Overload petitions are not ordinarily granted to students who have a cumulative GPA of less than 3.00 and who do not state valid reasons for the need to register for the credits. Students who register for semester hours in excess of 18 and do not have an approved overload petition on file have courses randomly removed through an "administrative drop" action.

English Proficiency. Students must demonstrate reasonable proficiency in written English by achieving a grade of "C" or better in both ENG 101 and 102 or in ENG 105 or its equivalent Should a student receive a grade lower than "C" in any of the courses, the course must be repeated until the specified proficiency is demonstrated. Transfer students from colleges outside Arizona should consult the Student Services Office in the School of Social Work, WHALL 133, to assure completion of this requirement.

Undergraduate Student Enrollment in Graduate Classes. Undergraduate students at ASU in their senior year may enroll in a maximum of six graduate semester hours in the School of Social Work, providing they have an overall GPA of 3.00 or higher at the time of enrollment and have secured the required signatures for approval If the course is not used to meet an undergraduate graduation requirement, it may be eligible for use in a future graduate program on the same basis as work taken by a nondegree graduate student.

Field Instruction. Field instruction for the B.S W. program is offered concurrently with classroom study. Students are assigned to a social service agency and work under the supervision of a School of Social Work approved social work professional Field instruction permits testing theory in practice and gives a base of experience to class discussions. Qualified agencies in several Arizona communities are utilized for field instruction.

B.S.W. students work in one placement for 16 hours a week, for a total of 480 hours over two semesters. In assigning the placement, the school takes into account the student's educational needs and career goals Generalist social workers need to be familiar with the methods of working with individuals, families, and groups, as well as in organizations and communities and with all ages and ethnic groups. The faculty are committed to establishing the capabilities necessary for high quality, social work generalist practice.

B.S.W. field instruction agencies are located primarily in the Phoenix metropolitan area. Specially arranged, more distant placements may require up to a two hour drive. Although car pools are possible, personal transportation is strongly recommended while attending school.

Bachelor of Social Work

Requirements for the Bachelor of Social Work degree are as follows:

	Semester Hours
First year Composition	6
General studies requirement	44
Social Work core requirement	45
Electives	31
Total	126

First-Year Composition Requirement

Students are required to take both ENG 101 and 102 (six semester hours) *or* ENG 105 (three semester hours). See the statement on English proficiency, pages 40 and 71 72.

Those students taking ENG 105 must complete three additional hours in any subject to total 126 semester hours for graduation.

Social Work Core Requirement

			Semester Hours
SWU	271	Introduction to Social Work	3
SWU	291	Community Resources	3
SWU	301	Human Behavior in the Social Environment I	3
SWU	310	Social Work Practice I	3
SWU	331	Social Policy and Services I	3
SWU	402	Human Behavior in the Social Environment II	3
SWU	410	Social Work Practice II*	3
SWU	411	Social Work Practice III*	3
SWU	412	Field Instruction I*	5
SWU	413	Field Instruction Seminar I*	1
SWU	414	Field Instruction II*	5
SWU	415	Field Instruction Seminar II*	1
SWU	420	Practice Oriented Research	3
SWU	432	Social Policy and Services II	3
SWU	474	Ethnic/Cultural Variables in Social Work	3
Total			45

* Majors only.

SWU 412 and 414 each require 16 hours weekly per semester in the field. Students must file an application for field work before registration for the courses.

No credit is granted toward fulfilling major core requirements in any course in the student's major unless the grade in that course is at least a "C."

Electives

Students are required to take 31 semester hours of courses in areas related to social work. The practice model of the program is a social work generalist.

Each student is encouraged to consult with an advisor in selecting electives. Economics, education, psychology, and sociology are only a few of the academic units offering knowledge of value to the professional social work practitioner.

General Studies Requirements

To meet university general studies requirements and to assure breadth and depth in the student's education, all Social Work students must complete a total of 44 semester hours of general studies courses with the designated minimum semester hours in each of the following general studies core areas. Students may choose the requirements for the catalog under which they entered the university or the following:

			Semester Hours
L1 and L2 courses*			6
N1, N2 courses*			6
		including a course in statistical analysis	
HU courses*			6
		including PHI 101 Introduction to Philosophy (3	
SB courses*			18
Topical, indigenous series that pertains to a 20th century focus on a) ethnic minorities of the Southwest (3) and on (b) women (3)			
ECN	111	Macroeconomic Principles (3)	
PGS	101	Introduction to Psychology (3)	
POS	110	Government and Politics (3) or POS 310 American National Government (3)	
SOC	101	Introductory Sociology (3) or SOC 301 Principles of Sociology (3)	
S1 and S2 courses*			8
		including a course in human biology with lab (e.g., ZOL 120, 201, 202) (4)	
Total			44

* For requirements in this area, see pages 50–52, "The University General Studies Requirements."

General studies courses are regularly reviewed. To determine whether a course meets one or more general studies course credit requirements, see the listing of courses, pages 53–71. General studies courses are also identified following course descriptions according to the key to general studies credit abbreviations, page 52.

Awareness Areas. A minimum of one course must be taken from each of the following awareness areas: cultural diversity in the United States, global awareness, and historical awareness. Courses may concurrently satisfy a requirement in the general studies core area. For a complete listing of courses that satisfy these areas, contact Student Services, WHALL 133.

Master of Social Work

The standard program consists of 60 hours, including both classroom instruction and field practicum. It is divided into a foundation year (core curriculum) and a concentration year. During both years, students spend two days a week in a practicum setting. The foundation curriculum is the same for all students and must be completed before entering the concentration year. The required foundation courses are as follows:

			Semester Hours
SWG	501	Human Behavior in the Social Environment I	3
SWG	502	Human Behavior in the Social Environment II	3
SWG	510	Direct Practice I	3
SWG	511	Direct Practice II	3
SWG	520	Practice Oriented Research	3
SWG	531	Social Policy and Services I	3
SWG	533	Ethnic Minorities and Social Work	3
SWG	541	Field Practicum I	3
SWG	542	Field Practicum II	3
SWG	580	Community and Organizational Change	3
Total			30

In the second year, students concentrate in either direct practice or planning, administration and community practice. Six to nine hours of electives are available for students either to take additional hours in their concentration or to increase knowledge and skill in such areas as health, mental health, family and child welfare, or aging.

The required concentration courses are as follows:

Direct Practice			Semester Hours
SWG	606	Psychopathology	3
SWG	611	Social Work with Families	3
SWG	620	Research Methods in Social Work	3
SWG	621	Integrative Seminar	3
SWG	632	Social Policy and Services II	3
SWG	641	Advanced Practicum. Direct Practice I	3
SWG	642	Advanced Practicum. Direct Practice II	3
One of the following five approved advanced courses			3
SWG	613	Social Work with Individuals (3	
SWG	614	Social Work with Families in Transition (3)	
SWG	616	Social Work with Chemically Dependent Families (3	
SWG	617	Assessment Treatment with Children and Adolescents (3)	
SWG	618	Family Violence 3)	
Electives			6
Total			30

Planning, Administration and Community Practice			Semester Hours
SWG	623	Agency Research in Social Work	3
SWG	632	Social Policy and Services II	3
SWG	643	Advanced Practicum: Planning, Social Work Administration and Community Practice I	3
SWG	644	Advanced Practicum Planning, Social Work Administration, and Community Practice II	3
SWG	680	Program Planning in Social Services	3
SWG	681	Social Work Administration	3
SWG	682	Community Participation Strategies	3
Electives			9
Total			30

Electives may be selected from offerings at the School of Social Work or courses offered through other instructional units with the recommendation of the advisor and approval by the director of the graduate program. The total semester hours for each concentration equal 30.

Field Education. Every student is assigned to a field education placement in both the foundation and concentration years. Field education requirements include 16 hours a week for a total of 240 per semester under the supervision of a School of Social Work approved social work professional. Field experiences are designed to be consistent with course work at the foundation and concentration levels.

Field education placements are made in what is considered to be the best educational interests of the student and may require a considerable amount of travel. For this reason, it is necessary that M.S.W. students have a car available for use for their field placement.

Social Work—Ph.D.

Completion of the program requires at least 36 semester hours of course work beyond the master's degree and a minimum of 24 semester hours in SWG 792 Research and SWG 799 Dissertation. Each student must complete all core requirements: statistics (six hours), research methods (six hours), social work seminars (12 hours), directed electives (12 hours), comprehensive examinations, and research and dissertation (24 hours). In addition, based on an educational assessment by the Doctoral Program Committee, a number of "leveling" courses may be required to bring the student to an acceptable level of specific knowledge.

			Semester Hours
SWG	720	Research Issues in Social Work	3
SWG	721	Empirical Social Work Practice	3
SWG	722	Integrative Research Seminar	3
SWG	740	Philosophy of Science Issues in Social Work	3
Research methods			6
Statistics			6
Total			24

The remaining 12 semester hours are negotiated by the student and her or his advisor and reflect the student's short and long term career interests. In most instances, these courses are taken in other instructional units within the university.

GRADUATION REQUIREMENTS

Each Social Work major must file an undergraduate program of study for graduation within the semester that he or she earns the 87th credit. A minimum of 126 semester hours, a minimum of 50 semester hours in upper-division courses, a minimum of 480 hours in field education, and a minimum GPA of 2.00 are required for graduation with a B.S.W. degree. To be acceptable as graduation credit, all course and field work in the major must show an earned grade of "C" (2.00) or higher.

In order to qualify for graduation from the M.S.W. or Ph.D. program, a student must have a minimum overall GPA of 3.00, with no grade below "C" in any required course.

Comprehensive Examinations. Arizona State University requires a comprehensive examination for graduation in all professional master's programs that do not have a thesis requirement. All Social Work students must pass a written comprehensive examination, administered by the School of Social Work, before graduation

ACADEMIC STANDARDS

In order to remain in good academic standing, the student must maintain a minimum overall GPA of 2.00 (B.S.W.) and 3.00 (M.S.W. and Ph.D.) at the end of each semester. Most courses in the program are sequential, successful completion of each course in the sequence is required to enroll in the following course. Students may not enroll in any second-year required courses until all foundation courses have been completed successfully.

Retention and Disqualification

The following policies govern retention and disqualification

Probationary Status. A student must maintain a minimum overall cumulative GPA of 2.00 (B.S.W.) and 3.00 (M.S.W. and Ph.D.) A student is placed on probationary status automatically when (1) the GPA is less than the minimum at the end of any semester or (2) a grade of "D" or "E" is received for any major core requirement, regardless of the GPA.

Students may also be put on probation for reasons other than grades.

Probationary status requires completion of a plan written and signed by the student and advisor, with copies for the student, advisor, program director, field director, and file that indicates when and how deficiencies will be made up. This plan must contain a provision to bring the GPA up to minimum standards by the end of the succeeding semester or at the completion of 12 hours of letter graded course work, whichever comes later. Probationary students may be denied registration in the absence of such a plan.

Once a Social Work student is on academic probation, the student remains in that status until the overall GPA reaches the retention level (2.00 [B.S.W.] and 3.00 M.S.W. and Ph.D.]) or until the student is disqualified from the university.

Termination from the Program. A student is terminated from the program under any one of the following circumstances:

1. A student fails to carry out the plan developed during a probationary semester.
2. A B.S.W. or M.S.W. student receives an "E" grade (failure) in field practicum.
3. A B.S.W. or M.S.W. student does not accept or is not accepted by three or more field agencies if, in the judgment of faculty and field staff, the placements can provide appropriate field experiences without undue inconvenience to the student.
4. The student does not adhere to professional expectations and standards (see the *Student Code of Conduct*, *NASW Code of Ethics*, and *CSWE Curriculum Policy Statement*).
5. A student appears to lack the degree of physical and/or mental health necessary to function successfully as a social worker. Such a student may be required to undergo a medical examination and make the results available to the Committee on Academic and Professional Standards of the School of Social Work. The responsibility for reviewing and determining the qualification of students whose behavior and/or performance are in question is vested in the Standards Committee. The committee's decision may require the dismissal or disqualification of a student from the program.

Reinstatement. A disqualified student who desires to be reinstated may submit an application for reinstatement. A disqualified student normally is not reinstated until at least one semester has elapsed from the date of disqualification. The burden of establishing fitness is on the disqualified student, who may be required to take aptitude tests and submit to other examinations before being readmitted.

Continuous Evaluation. While students are subject to the university's general retention policy, they are evaluated in the school on broader criteria than mere GPA. Students are reviewed for evidence of competency in social

work and are continuously evaluated as they progress in the program. Prospective Social Work candidates who do not meet the established criteria are guided toward a program that is compatible with their interests and abilities.

Appeal Procedures

Students who believe they have been unjustly treated in an arbitrary, capricious, or discriminatory fashion in academic or other matters relating to their career as students may appeal by following the guidelines set forth in the *Policy and Procedures Manual* for the School of Social Work, available in the Student Services Office, WHALL 133.

STUDENT RESPONSIBILITIES

Students are expected to support and maintain the highest professional standards as spelled out in the *Student Code of Conduct* and the *National Association of Social Workers Code of Ethics*

Regular attendance is expected in all classes and in field education and is a critical factor in evaluation of performance.

Students' rights are protected through appeal to the Committee on Academic and Professional Standards or through consultation with the departmental ombudsperson.

SPECIAL PROGRAMS

Tucson Component. The School of Social Work offers the full M.S.W. foundation year (30 hours) and some M.S.W. concentration year courses in Tucson. Students are required to commute to Tempe during both semesters of their concentration year. Every effort is made to schedule courses so that only one day per week is required for travel, but it is possible that two days of travel may be required to meet special ized student requests or needs

University Honors College. The School of Social Work participates with the University Honors College, which affords superior undergraduates opportunities for enhanced educational experiences. A description of the requirements and the opportunities offered by the University Honors College can be found on pages 79 81 of this catalog.

Social Work

Emilia E. Martinez-Brawley
Dean
(WHALL) 602/965–3304

PROFESSORS
COUDROGLOU DALEY, FIGUEIRA-McDONOUGH, HUDSON, KETTNER MacEACHRON MARTINEZ BRAWLEY MORONEY

ASSOCIATE PROFESSORS
ASHFORD FAUSEL LeCROY LEYBA, L E McMURTRY, MONTERO NICHOLS

ASSISTANT PROFESSORS
CARTER, PAZ R SLEY-CURT SS, ZORITA

FACULTY ASSOCIATE
ANGULO

PROFESSORS EMERITI
ALDRIDGE CRANMER, ENGELHARDT HARWARD HEPWORTH HILL, LUNDBERG, POLENZ, WOODMAN

SOCIAL WORK (SWU)

SWU 271 Introduction to Social Work. 3) F S
Ana ys s of contemporary soc a we fare ser v ces and profess ona soc a work Des gned for freshmen sophomores cons der ng th s major Prerequ s tes PGS 101 SOC 101.

291 Community Resources. 3 F, S
Genera st soc a work ro es nc ud ng case management n re at on to the purpose, structure and de very system of commun ty we fare agenc es nc udes 40 hours of observa t ona exper ence n oca agenc es Prerequ s tes SOC 101 PGS 101 Pre or corequ s te SWU 271

301 Human Behavior in the Social Environment I. 3 F S
Introduct on to nterre at on of b o-psycho so ciocu tura systems and the r effect on behav or focused on southwestern ethn c and cu tura groups Prerequ s tes PGS 101; SOC 101, Huma B o ogy course Pre or corequ sites SWU 271 291 *Genera stud es L2 SB*

310 Social Work Practice I. 3) F S
ntroduct on to soc al work methods empha s z ng the fo ow ng sk s· ro e p aying v deo tra n ng cross cultura nterv ew ng commun cat on patterns, and record ng Prerequ s tes. SWU 271 291 Pre or coreq s te SWU 301

331 Social Policy and Services I. (3 F S
H story, ph osophy and va ues of soc a wel fare· funct on and ro e of soc a we fare n soc ety deve opment of the soc al work profess on and practice Prerequ s tes ECN 111 POS 110 or 310 SWU 271 291 *General stud es. H*

402 Human Behavior in the Social Environment II. (3 F S
Seque comp eting study of fe span deve op ment and behav or whic forms base for so c a work pract ce Prerequ s te SWU 301 *General stud es. SB*

410 Social Work Practice II. (3) F S
Introduction to general st soc a work major areas of know edge va ues, and sk ls bas c to the soc a work he p ng process focused on n d v dua s and sma ! groups Prerequ s tes PHI 101 or 111 SWU 301 310 Soc a Work ma jor Corequ s tes SWU 412, 413

411 Social Work Practice III. 3) F S
App cat ons of theoret cal frameworks to so c a work pract ce at fam y and commun ty eve s Prerequ s tes SWU 410 412, 413; So c a Work maj r Corequ s tes SWU 414 415 Pre- or corequ s te SWU 420

412 Field Instruction I. 5) F S
S xteen hours a week of superv sed pract ce n an approved p acement. Prerequ site So c a Work major Corequ s tes SWU 410 413

413 Field Instruction Seminar I. 1) F S
F e d focused sem nar nc ud ng pract ce eva uat on 1 5 hours a week Prerequ s te Soc a Work major Corequ sites SWU 410, 412.

414 Field Instruction II. (5) F S
Sixteen hours a week of superv sed pract ce n an approved p acement. Prerequ sites SWU 410 412 413; Soc a Work major. Corequ s tes SWU 411 415

415 Field Instruction Seminar II. (1 F, S
Fie d focused sem nar nc ud ng pract ce eva uat on. 1 5 hours a week Prerequ s te Soc a Work major Corequisites SWU 411 414.

420 Practice-Oriented Research. (3 F S
App ıcat on of sc ent f c princ ples t field prac t ce, prob em formu at on, ntervent on proce dures and mpact assessment n soc a work Prerequ s tes SWU 310, an approved course n data ana ys s techn'ques or nstructor ap prova

432 Social Policy and Services II. (3) F, S
C ntemporary soc a , po ıt ca and economic ssues Spec a emphas s on poverty and ın equa ty n the Southwest Ana ysis and devel opment of soc a we fare po c es and pro grams Prerequ s te. SWU 331

474 Ethnic/Cultural Variables in Social Work. 3 F, S
A bas c conceptua approach to understand ng ethn c/cultura varıab es of southwestern eth n c m nor t es and how these factors ınf uence soc a work pract ce Prerequ s te SWU 331 or nstructor approva . *General studies C*

Omnibus Courses: See page 44 for omn bus courses that may be offered.

SOCIAL WORK (SWG)

SWG 501 Human Behavior in the Social Environment I. 3 F
Exp ores the sa ent features of human behav or theor es d scusses re evant research and appra ses the strengths and weaknesses of the theor es

502 Human Behavior in the Social Environment II. 3 S
Exam nes human deve opment through the fe span and the behav or of nd v dua s and fam es n transact ons w th the r env ron ments

510 Direct Practice I. (3 F
Bas c soc a work methods w th an emphas s on the prob em-so v ng process as t perta ns to nd v dua s, fam es and sma groups Pre requ site soc a work major

511 Direct Practice II. (3) S
Theory and methods of d rect pract ce w th groups and selected pract ce mode s Lecture lab Prerequ s te SWG 510

520 Practice-Oriented Research. (3) S
Acce erated course n app icat on of sc entif c prncip es to f e d pract'ce prob em formula t on, ntervent on procedures and mpact assessment Prerequ s tes Soc a Work major, an approved course in statist cs

531 Social Policy and Services I. (3) F
Conceptual, ana yt ca and h storical perspect ves on the social we fare nst tut on Empha s s on poverty and inequa ty Pr nc p es of po cy ana ys s

533 Ethnic Minorities and Social Work. (3 S
Exp ores ethn c cu tura var ables sign'f cant to southwestern ethn c m nor ty popu at ons and ways n wh ch these factors affect soc al work pract'ce

541 Field Practicum I. (3) F S
With SWG 542 two consecut ve semesters (480 hours) of superv sed soc a work pract ce n an approved p acement Pre or corequ s te· SWG 510

542 Field Practicum II. (3) F S
See SWG 541 Pre or corequ s te SWG 511

580 Community and Organizational Change. (3) F
Exam nes commun t es and human serv ce or ganizat ons as soc a systems ntroduces strategies for in t'at ng p anned change

605 Substance Abuse. (3) N
Psycho og cal and soc ocu tura determ nants of substance abuse Overv ew of socia po cies and treatment approaches Prerequ s te SWG 502 or nstructor approva

606 Psychopathology. (3) F
Theories and concepts of mental hea th and lness Attent on to the deve opment of envi-ronmenta nterpersona psychosoc a stress factors in human behav ora dynam cs Pre requ s te SWG 501 or instructor approva

611 Social Work with Families. (3) F
Pract ce app cat ons of major fam y system approaches to chang ng or prevent ng fam y dysfunct on. Prerequ s te SWG 511

612 Social Work with Groups. (3 N
Pract ce app cations of know edge and ski to soc a work w th groups Prerequis te· SWG 511

613 Social Work with Individuals. 3) S
Treatment of preva ent d sorders encountered by soc a workers se ected from the fo low ng anx ety d'sorders personal ty disorders de press on, and sch zophrenia Lecture, sem nar Prerequisites SWG 606, 611

614 Social Work with Families in Transition. 3) S
Ana yzes the psychosoc a dynam cs of fam - ies d srupted by d vorce, separation or death of a parent Offers d fferent a soc a work n-terventions Prerequ s'te: SWG 611 or nstructor approval

616 Social Work with Chemically Dependent Families. (3) S
The dynam cs of the chem cal y dependent fam ly are exam ned and cl n ca approaches for nterven ng n the fam y system and subsystems are presented. Lecture, ab Prerequi s te: SWG 511 or nstructor approval

617 Assessment and Treatment with Children and Adolescents. (3) S
Theory, research and ntervention that focus on ch ldren and ado escents Prerequisite SWG 511

618 Family Violence. 3 S
Theory, research ntervent on, and prevent on strateg es relevant to ch ld ma treatment, part ner abuse and e der abuse. Lecture sem nar Prerequ's'te: SWG 511

620 Research Methods in Social Work. (3) F
Conceptua foundat ons and methods of nomothet c research n socia work nc udes prob em dent f cat on, hypothesis formu at'on measurement sampl ng and exper menta des gn Prerequ'site: SWG 520

621 Integrative Seminar (3) S
Exp ores the f t between theoretica frameworks and pract ce w th c ents Requ res pre sentat on of emp rical stud es w th c ents Pre requ s te SWG 620 Corequ s te SWG 641 or 642

622 Community Research in Social Work. (3) N
App cat'on of research design techn ques to assess ng need and measuring eff c ency and effect veness of commun ty w de programs. Prerequ s te SWG 520 Corequ site: SWG 680

623 Agency Research in Social Work. (3) S
App cat on of research design techn ques to data co ect on in human serv ce agenc es, in-c ud ng use of statist ca ana ys s for program evaluat on Prerequisite SWG 622

624 Program Evaluation in the Human Services. (3) N
Development of understand ng and sk n the conduct of program and project eva uat on Prerequ s te SWG 620'or nstructor approval.

632 Social Policy and Services II. (3) S
Development of advanced know edge and ski s n soc a we fare po cy ana ysis po cy formu at on and advocacy and ntervent'on for po cy change. Prerequ s te SWG 531

641 Advanced Practicum: Direct Practice I. (3 F, S
W th SWG 642 two consecut ve semesters 480 hours) of superv sed soc a work practice n an approved p acement re ated to the student's career goa . Prerequis tes SWG 541 542 Pre or corequis te SWG 611

642 Advanced Practicum: Direct Practice II. 3) F, S
See SWG 641 Prerequ s tes SWG 541 542 611 Pre- or corequ s te SWG 614 or 616 or 617 or 618

643 Advanced Practicum: Planning, Social Work Administration, and Community Practice I. (3 F, S
W th SWG 644 two consecutive semesters (480 hours) n soc a work pract ce n an approved p acement re ated to the student s career goa Prerequ s tes SWG 541 542 Pre or corequ s te· SWG 680

644 Advanced Practicum: Planning, Social Work Administration, and Community Practice II. (3) F S
See SWG 643. Prerequ s te SWG 643 Pre- or corequ s te SWG 681 or 682.

680 Program Planning in Social Services. (3) S
The soc a services p ann ng process inc udes needs assessment, goa s and object ves program des gn budget ng, management nformat on systems and program evaluation Prerequisites SWG 681, 682. Corequisite. SWG 623.

681 Social Work Administration. (3) F
Administrat ve ski bui d ng and theory appl cation w thin human service nonprofit socia work sett ngs. Prerequ s te SWG 580

682 Community Participation Strategies. (3) F
Course reviews strateg es to nvolve cit zens and the consumers of soc a and human ser v ces n commun ty decis'on mak ng systems Part c patron s v ewed as means to fac itate the empowerment of oppressed peop es Prerequ s te SWG 580

683 Developing Grants and Fund Raising. (3) N
dentif cation of potential fund ng sources, techn ca and nterpersona pol t ca aspects of proposal deve opment and fund raising Pre requ s te SWG 580 or nstructor approva

720 Research Issues in Social Work. (3) F
Introduct on to research ssues n se ected fie ds of study n soc al work w th a focus on both substantive and methodolog ca ssues w th n each area of study

721 Empirical Social Work Practice. (3) S
App cat on of sc entif c princ ples to prob em formu at on assessment, and ntervention procedures w th an emphas s on the direct use of sc ent f c too s in the conduct and eva uat on of pract ce at a eve s

722 Integrative Research Seminar. (3) F
App cat on of research concepts and methods to spec fic nterests of students, integration of theory, research methods and stat stics as appl ed to soc a work topics

730 Social Policy Issues in Social Welfare. (3) F
H stor ca backgrounds of current po icy is sues aw as expression of social po cy; egis at ve execut ve and jud c a ro es n formulat ng po icy

731 Social Welfare Policy Analysis and Development. (3) F
Methods of po cy ana ys s, crit que of social we fare po c es aga nst proposed mode s and case stud es of po cy development emphas z ng southwestern popu at ons. Prerequisite: SWG 730

740 Philosophy of Science Issues in Social Work. (3) F
Ph osoph'ca assumptions of soc al science, soc al work pract ce and po cy are exam ned n conjunct on w th presuppos tions underly ng var ous frames of reference n the behaviora and soc a sc ences

741 Social Work Administration in a Systems Context. (3 S
Case studies of socia work admin strat on from n t a conceptual zat on of pol cy through mp ementat on at national, state and ocal leve s Prerequisite· SWG 740

Omnibus Courses: See page 44 for omn bus courses that may be offered.

College of Extended Education

Bette F. DeGraw, D.P.A.
Dean

The College of Extended Education was created in 1990 for the purpose of extending the resources of ASU throughout Maricopa County, the state, and the region. Through the various units of the college, the university's "extended campus" provides access to academic credit courses, noncredit continuing education, and research and special projects.

American Language and Culture Program

The American Language and Culture Program (ALCP) features an intensive, noncredit course of study designed for adult international students who want to become proficient in English as a second language for academic, professional, or personal reasons. Applicants must be at least 18 years of age and must have a high school diploma or its equivalent All conditions of the U.S. Immigration and Naturalization laws pertaining to full time study in the United States must be met by all applicants Beginning students are required to take an English placement test before the beginning of classes. Certificates of achievement are awarded on completion of the course. Admission to the program does not constitute regular admission to ASU.

Beginning, intermediate, and advanced courses provide instruction in listening, speaking, reading, and writing and structure. Academic advising and orientation to Arizona and the United States are integral parts of the program.

Program wide social activities each term include a major field trip, a dinner, a picnic, a cultural activity, visits to museums, historical sites, and musical presentations.

Advanced level ALCP students may be permitted to enroll concurrently in up to two ASU credit classes with the approval of the director. Several special classes are offered through the ALCP. Classes in conversation, speech improvement, and the Test of English as a Foreign Language (TOEFL) are offered during alternate terms.

The fall and spring semesters are divided into two eight week cycles. Students may enroll for one or more cycles. An eight week summer session of study is also offered. Inquiries concerning admission requirements, enrollment, and fee schedules should be sent to

AMERICAN LANGUAGE AND
CULTURE PROGRAM
ARIZONA STATE UNIVERSITY
BOX 873106
TEMPE AZ 85287 3106

For more information, call 602/965 2459.

Arizona Prevention Resource Center

The Arizona Prevention Resource Center (APRC) is a partnership between Arizona State University, the Governor's Office of Drug Policy, the Arizona Department of Education, and Arizona Department of Health Services.

APRC serves as a centralized source for individuals, schools, and communities throughout Arizona to support, enhance, and initiate prevention efforts focused primarily on prevention of alcohol and other drug abuses, including other areas such as gang and HIV prevention. The APRC operates in the following program areas:

1. clearinghouse: to provide accurate, timely, and personalized prevention information and materials through in house collection, access to national sources, and by providing linkages between prevention programs in Arizona.
2. training and technical assistance: to provide high quality, responsive training and technical assistance for organizations and individuals undertaking prevention programs in local communities and schools.
3. evaluation and research: to coordinate and provide leadership for a statewide evaluation strategy for alcohol and other drug prevention programs, to produce an annual inventory of substance abuse prevention, education, and treatment programs in Arizona, to design and conduct contracted evaluations of community-based prevention programs, and to promote quality and accountability in all aspects of APRC operations.
4. planning and development: to promote effective collaboration among prevention and treatment program leadership, to broaden the funding base for prevention programs, and to develop and strengthen partnerships.

If you are interested in prevention efforts in Arizona or would like more information about the Arizona Prevention Resource Center, please contact the APRC.

By mail:

ARIZONA PREVENTION RESOURCE CENTER
COLLEGE OF EXTENDED EDUCATION
ARIZONA STATE UNIVERSITY
BOX 871708
TEMPE AZ 85287–1708

In person.

Cornerstone Mall (Northeast corner of Rural and University)
725 S. Rural Road, Suite C207
Tempe, Arizona

By phone:

602/965 9666

By fax:

602/965 8198

Toll free in Arizona:

1 800–432 APRC (2772)
TDD 1 800–432 2772

Center for Lifelong Learning

The Center for Lifelong Learning at the ASU Sun Cities educational facility is located at the Bell Plaza Professional Building South, 17220 Boswell Blvd., Sun City, Arizona, in the nation's largest retirement community. The courses offered are predominantly noncredit and include a curriculum tailored specifically to the interests of the retirement community. Each year more than 150 courses from approximately 30 disciplines are taught. Weekly lectures also are available throughout the year in a variety of subjects.

The ASU on Wheels Educational Tours program provides more than 30 single day trips and 12 or more multiple day tours each year Travels are made throughout Arizona and bordering states with courses in Southwest history, geology, sociology, and economics offered en route Multiple day tours include stays at Lake Powell, Canyon de Chelly, northern Arizona and southern Utah areas, southern Arizona, New Mexico, and Durango, Colorado. Tour groups also travel to Alaska, Canada, Catalina Island, Florida, Northern California, Nova Scotia, Oregon, and Texas.

Programs for the retirement community are in the process of expansion throughout Maricopa County. For more information, call 602/965 5600 or 602/972 7398.

Division of Instructional Programs

As a convenience to students, courses are conducted off campus in locations throughout the state.

Credits earned off campus are recorded on a student's permanent record in the same manner as those earned on campus, and both are equivalent in all academic considerations. All academic standards of the university, including policies related to admission and registration, apply to off campus courses It is the responsibility of the student to be aware of all applicable policies before registering. It is the responsibility of each dean to determine what courses to offer off campus and to make faculty assignments.

The registration fees and tuition for off-campus courses are the same as on the main campus. (See resident and nonresident rates in the current *Schedule of Classes*). Before the 21st calendar day of each semester, any combination of on campus and off-campus resident credit courses resulting in a combined registration of seven or more semester hours requires that the student pay full-time, resident registration fees or full time nonresident registration fees and tuition. Off-campus credit courses and programs that commence on or after the 21st calendar day of the start of each semester require full time and part time students to pay registration fees and tuition separate from (in addition to) those courses starting before the 21st calendar day of the semester. For more information, call 602/965 9797.

Downtown Center

The Downtown Center, located at the Phoenix Mercado, is specifically designed to extend Arizona State University into the central Phoenix community, to help address urban challenges, to serve the governments of Arizona, and to enhance public policy making capacity.

The center provides instruction and community service, carries out applied research, and promotes economic and cultural development. Graduate and upper division courses of interest to government, business, and the professional community are offered. Interactive instructional television courses in engineering, business, liberal arts, and non-laboratory sciences are also offered.

The Joint Urban Design Program, located in the Downtown Center, is a collaborative effort of the ASU College of Architecture and Environmental Design, the Downtown Center, and the City of Phoenix. The program directs institutional and public resources toward developing an understanding of issues that affect the urban quality of Phoenix. The Joint Urban Design Studio conducts urban design research with the City of Phoenix. For more information, call 602/965 3046.

The Personal Computer Training Program is a microcomputing training center offering noncredit classes in the latest versions of software and courseware. A full range of short, streamlined courses in progressive levels is offered. Development of programs for new markets, such as executives, small business owners, retirees and youth, is ongoing. For more information, call 602/965 9200.

The Professional and Continuing Education unit offers a variety of noncredit programs for working professionals. Continuing education programs of high quality are offered to adult learners in collaboration with ASU colleges, other educational providers, professional associations, and public and private organizations. These ongoing educational experiences are intended to improve professional competence, meet current training and educational needs, and address current issues and trends For more information, call 602/965 3046.

The Urban Data Center serves as a resource for analysis and implementation of public policy in metropolitan Phoenix. The center works closely with ASU researchers and organizations such as the Morrison Institute for Public Policy, University Libraries, the Joint Urban Design Program, local government, state agencies and other independent organizations to build a comprehensive database on policy issues for urban planners and community leaders. For more information, call 602/965 3046.

The Advanced Public Executive Program of the ASU College of Public Programs is housed at the ASU Downtown Center. This program is designed to provide public managers and administrators with analytical approaches and skills through short courses and seminars to help mobilize ideas, people, and resources in support of public programs. For more information, call 602/965 3046.

PRIME (Project to Improve Minority Education) is housed at the Downtown Center with evaluation support services located at the Hispanic Research Center. The program is designed to increase the pool of college eligible minority students, who have historically been underrepresented in higher education, by providing instructional and support services to seventh through 12th grade students and their families at targeted Arizona schools. For more information, call 602/965 8510.

The ASU Downtown Center also serves as a meeting and conference site. It offers attractive rates, accommodations for small or large groups, beverage and food service, professional equipment, and secure, limited parking. The Downtown Center staff offers a wide range of services in logistics planning. The center is available for use by outside organizations, subject to the limits of university policies and procedures.

For more information, call the facility coordinator at 602/965 3046 (FAX 602/965 8515) or write to

ASU Downtown Center
502 E Monroe St
Phoenix AZ 85004–2337

ASU faculty, staff, and students may take advantage of computer lab facilities at the ASU Downtown Center. Equipped with IBM personal computers and Macintosh computers, the laboratory has access to VAX, FOCUS, WYLBUR, the libraries, electronic mail, and more. An assistant is also available.

Students at the ASU Downtown Center have access to ASU library information and resources through the Computer Lab. Students may order library books and return them; in addition, access to the libraries' online catalog is available.

Lab hours vary each semester. For more information, call 602/965 3046.

Independent Study by Correspondence

College credit correspondence courses are specifically designed for the student unable to attend classes in person. They are offered for students who seek to fulfill degree objectives and for those who wish to increase occupational, professional, and intellectual skills.

To enroll in correspondence study, request an enrollment form and a brochure of courses by writing to

Independent Study by Correspondence
Arizona State University
Box 871811
Tempe AZ 85287 1811

Students admitted to ASU must obtain the approval of their advisors and the deans or chairs of the standards committees of the colleges in which they are enrolled before enrolling in correspondence study. Approval is required of any continuing student whether or not enrolled for courses during the summer sessions or vacation periods. Student athletes must obtain approval from the faculty athletics representative in order for correspondence credit to be used to meet the NCAA "satisfactory progress" requirement. Unclassified undergraduate or graduate students are not required to obtain approval. Correspondence courses may not be utilized to change a grade or to make up for courses in which the student has previously received a grade such as "D," "E," or "I."

Correspondence courses generally consist of eight lessons per semester hour, which may include proctored tests, midterms, or special projects. Eight to 10 hours are normally required to prepare each assignment. All courses require a proctored final exam.

A student may not take a final exam fewer than seven days from date of registration for a one unit course, 14 days for a two unit course, and 21 days for a three unit course.

Students may take one correspondence course initially, with the expectation of completion within a calendar year. However, when one half the lessons are completed, enrollment in a second course is possible. Students not attending ASU on campus may be permitted to register for two correspondence courses concurrently. Students may not register for more than two correspondence courses at once.

A maximum of 60 semester hours earned in correspondence and/or by comprehensive examination may be applied toward the baccalaureate degree at ASU. Correspondence courses are not applicable as graduate credit.

A correspondence study registration fee is required of all students, including full-time students who have paid registration fees and tuition. Tuition waivers do not apply to correspondence study. Services and activities for on-campus students are not covered by Independent Study by Correspondence fees.

A student may enroll in an off campus or correspondence course without making formal application for admittance to the university or for degree candidacy. High school seniors may enroll in off campus or correspondence courses under the provisions stated in "Admission before Graduation from High School," pages 33 34. For more information, call 602/965–6563 or 1 800–533–4806.

Distance Learning Technology

The Distance Learning Technology office facilitates distance learning through technology. The office assists academic departments in the development, acquisition, production, scheduling, marketing, and delivery of televised courses. Delivery systems for the courses include public television, cable television, Instructional Television Fixed Service (ITFS), satellite, computer, and videotape.

Televised university courses ("TeleCampus") allow students to receive instruction at convenient locations, such as their places of employment or their homes. By attending these video classes, students can overcome problems of scheduling and commuting that might otherwise prevent them from seeking further education.

Use of the ASU satellite earth station facilities is coordinated by Distance Learning Technology. The satellite uplink is available for the transmission of courses and video conferences nationwide. The downlink is connected via the broadband to allow reception of nationally distributed teleconferences in various specially equipped classrooms on campus. For more information, call 602/965–6738.

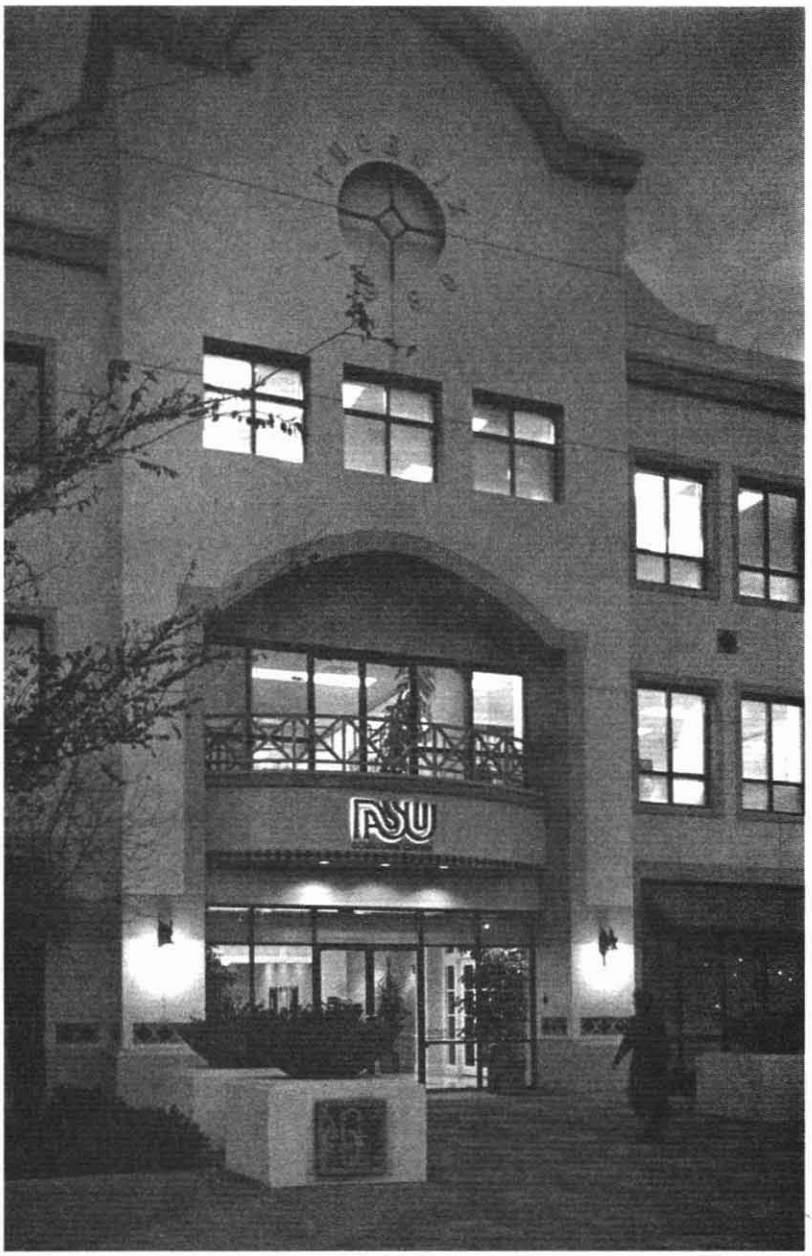
Office of Planning and Development

The Office of Planning and Development has as its mission the expansion of existing programs and the development of new programs for the College of Extended Education, the community, the state, and local governments.

The office works with college units, as well as community and statewide groups, to conceptualize new programs, to seek out potential funding sources, and to develop grant applications. The office also provides technical assistance to other college directors and statewide groups regarding program development and grant writing.

Facilitation of the statewide strategic planning and implementation process regarding substance abuse prevention, education and treatment has been a major focus of the office. In addition, three national leadership and policy development programs are coordinated by this office: the Education Policy Fellowship Program, in collaboration with the Washington, D.C.-based Institute for Educational Leadership; and the State Education Policy Seminars, in collaboration with the Education Commission of the States, and the Intergovernmental/Interagency Exchange in collaboration with Arizona's Family Action Network.

The Education Policy Fellowship Program is a year-long program that offers an opportunity for midcareer individuals from a variety of agencies, organizations, and disciplines throughout the state to think and learn about public policy and leadership. The State Education Policy Seminars program is developing the Arizona Policy Forum, an opportunity for key Arizona policy and decision makers to learn about and discuss leading edge policy issues. For more information, call 602/965–9777.



Graduate College

Brian L. Foster, Ph.D.
Dean

Through the faculty, the ASU Graduate College offers programs to meet the educational needs of those who already hold bachelor's degrees. While many students prepare for careers in research, the professions, and the arts, others work for personal enrichment. Both part time and full-time students are enrolled in 97 master's and 52 doctoral majors encompassing hundreds of concentrations and specialties. Other students explore new areas of interest or prepare for career advancements quite apart from formal degree programs.

The size, strength, and diversity of the graduate community reflect the university's commitment to high quality education. As a major center for graduate education, ASU supports cultural and intellectual activity as well as research in a broad range of arts and sciences and professional disciplines; in addition, the university conducts research addressing Arizona's social, cultural, and economic growth and development.

GRADUATE DEGREES AND MAJORS

The Graduate College enrolls students in programs leading to both professional and research oriented advanced degrees. The Master of Arts, Master of Science, and Doctor of Philosophy degrees are awarded to students completing programs that culminate in research. The Doctor of Philosophy degree is the highest university award, conferred on candidates who have proved their ability as scholars and original researchers.

Professional graduate programs emphasize training that leads to professional practice. In these degree programs, students develop a high order mastery of a comprehensive body of knowledge and the ability to organize and carry out significant investigations in their professional field. Professional degrees usually are named Master of (professional field) and Doctor of (professional field), although some Master of Arts and Master of Science degree programs have professional tracks. The professional doctoral degree is the highest university award to candidates completing academic preparation for professional practice. Professional degrees offered through the Graduate College are as follows:

- Master of Accountancy
- Master of Architecture
- Master of Business Administration
- Master of Computer Science
- Master of Counseling
- Master of Education
- Master of Environmental Planning
- Master of Fine Arts
- Master of Health Services Administration
- Master of Laws
- Master of Mass Communication
- Master of Music
- Master of Natural Science
- Master of Public Administration
- Master of Science in Design
- Master of Science in Engineering
- Master of Social Work
- Master of Taxation
- Master of Teaching English as a Second Language
- Master of Technology
- Doctor of Education
- Doctor of Musical Arts
- Doctor of Public Administration

Faculty members offering a specific graduate degree program may be members of a single academic unit (such as a department, school, or college), or they may form an interdisciplinary committee consisting of faculty from various academic units. The Graduate College awards degrees upon the recommendation of the faculty offering the graduate degree programs. For the lists of graduate degrees offered at ASU Main and ASU West, see pages 375 377.

Interdisciplinary Study

Although most graduate programs are administered by academic units, a diverse group of interdisciplinary programs falls directly under the supervision of the Graduate College. Many majors are in fields that are still emerging as recognized academic disciplines and, therefore, do not customarily form the academic basis for departments. Other fields of study are inherently interdisciplinary and do not fit well with conventional disciplines around which departments are formed. Curricula must reflect intrinsically broad disciplinary affinities, and faculty must be drawn from more than one department.

The Graduate College oversees eight interdisciplinary/intercollegiate graduate programs and has joint responsibility with the College of Education for another. These include the following:

Adult Development and Aging Program (Certificate in Gerontology)
Creative Writing (M.F.A)
Curriculum and Instruction (Ph.D.) (jointly administered with the College of Education)
Exercise Science (Ph.D.)
Justice Studies (Ph.D.)
Public Administration (D.P.A.)
Science and Engineering of Materials (Ph.D.)
Speech and Hearing Science (Ph.D.)
Statistics (M.S.)

Each of these programs uses resources and faculty from more than one discipline. The programs promote cooperative research and instruction among faculty who share common interests but are housed in different academic units. They allow students to pursue degrees that are intellectually coherent but that bring together diverse strengths of the university. See the "Interdisciplinary Graduate Degrees, Majors, and Concentrations Overseen by the Graduate College" table below.

Adult Development and Aging Program

An interdisciplinary, 24 semester hour Certificate in Gerontology may be earned by graduate students who wish to study the biological, psychological, sociological, and policy-related aspects of aging and the economic, health, and social concerns of older people. Students enrolled in the certificate program may simultaneously pursue a major in an academic unit offering a graduate degree or may enter the program as nondegree graduate students. The Certificate in Gerontology provides a broad academic foundation for students who wish to apply the knowledge and skills acquired in their major to a variety of aging related pursuits. For further details of this program, see the *Graduate Catalog*.

For information on the undergraduate minor in Gerontology, see page 21, "Adult Development and Aging."

GERONTOLOGY

GRN 494 Undergraduate Special Topics. (3) F, S
498 Undergraduate Pro-Seminar. (3) S
499 Undergraduate Independent Study. (3) F, S SS
580 Graduate Practicum. (3) F, S
590 Graduate Reading and Conference. (3) F, S, SS
591 Graduate Seminar. (3) F S
Omnibus Courses: See page 44 for omnibus courses that may be offered

Creative Writing (M.F.A.)

The interdisciplinary Master of Fine Arts degree program with a major in Creative Writing is administered by the Creative Writing Committee. This studio/academic program involves the research, creative activity, and teaching interests of faculty of the Departments of English and Theatre to provide students with the opportunity to tailor a course of study to fit individual needs, talents, and goals. Students work under the direction of faculty who are practicing, published writers. For details of this program, see the *Graduate Catalog*.

Interdisciplinary Graduate Degrees, Majors, and Concentrations Overseen by the Graduate College

Major	Degree	Administered by
Creative Writing	M.F.A.	Creative Writing Committee
Curriculum and Instruction Concentrations: curriculum studies, early childhood education, educational media and computers, elementary education, English education, exercise and wellness education, music education, physical education, reading education, science education, special education	Ph.D.	Interdisciplinary Committee on Curriculum and Instruction
Exercise Science Concentrations: biomechanics, motor behavior/sport psychology, physiology of exercise	Ph.D.	Committee on Exercise Science
Justice Studies Concentrations: criminal and juvenile justice; dispute resolution; law, justice and minority populations; law, policy, and evaluation; women, law, and justice	Ph.D.	Committee on Law and Social Sciences
Public Administration	D.P.A.	Committee on Public Administration
Science and Engineering of Materials	Ph.D.	Committee on the Science and Engineering of Materials
Speech and Hearing Science Concentrations: developmental neurolinguistic disorders, neuroauditory processes, neurogerontologic communication disorders	Ph.D.	Committee on Speech and Hearing Science
Statistics	M.S.	Committee on Statistics

Curriculum and Instruction (Ph.D.)

The interdisciplinary Doctor of Phi losophy degree program with a major in Curriculum and Instruction is admin istered by the Interdisciplinary Com mittee on Curriculum and Instruction and overseen jointly by the Graduate College and the College of Education. Areas of concentration are available in curriculum studies, early childhood education, educational media and com puters, elementary education, English education, exercise and wellness educa tion, music education, physical educa tion, reading education, science educa tion, and special education. For details of this program, see the *Graduate Cat alog*.

Exercise Science (Ph.D.)

The interdisciplinary Doctor of Phi losophy degree program with a major in Exercise Science is administered by the Committee on Exercise Science The degree is an individualized inter disciplinary degree that integrates graduate courses from a variety of aca demic units to provide a sound founda tion for research leading to a disserta tion in biomechanics, motor behavior/ sport psychology, or physiology of ex ercise. For details of this program, see the *Graduate Catalog*.

Justice Studies (Ph.D.)

The interdisciplinary Doctor of Phi losophy degree program with a major in Justice Studies is administered by the Committee on Law and Social Scien ces. The central focus of the program is the conceptualization and implemen tation of law and justice in society. The degree program integrates histori cal, legal, and philosophical approaches with social science training. Areas of interest include criminal and juvenile justice, dispute resolution; law, justice, and minority populations; law, policy, and evaluation; and women, law, and justice. For details of this program, see the *Graduate Catalog*.

Public Administration (D.P.A.)

The interdisciplinary Doctor of Pub lic Administration degree program is administered by the Committee on Pub lic Administration. The purpose of the degree is to prepare skilled professiona public administrators for positions in the public sector and for university teaching. Ethics, modes of decision making, policy analysis, problem solv ing skills in budgeting, program evalua tion, public personnel management, theoretical assumptions, and value as sessments are some of the areas of study available For details of this pro gram, see the *Graduate Catalog*

Science and Engineering of Materials (Ph.D.)

The interdisciplinary Doctor of Phi losophy degree program with a major in Science and Engineering of Materi als is administered by the Committee on Science and Engineering of Materi als Emphasis is placed on the applica tions of chemical thermodynamics, the mechanics of solids, quantum mechan ics and transport theory for investiga tion of the relationships between micro structure and properties of solids, and the dependence of microstructures on processing For details of this program, see the *Graduate Catalog*.

SCIENCE AND ENGINEERING OF MATERIALS

SEM 556 Electron Microscopy Laboratory. (3) F
Laboratory to support SEM 558 Cr ss sted as MSE 556 Pre or corequ s te SEM 558 or MSE 558

557 Electron Microscopy Laboratory. 3 S Laboratory support for SEM 559. Cross sted as MSE 557. Pre or corequ s te SEM 559 or MSE 559

558 Electron Microscopy I. (3 F
M croana ys s of the structure and compos t on of mater a s us ng mages d ffract'on and X ray and energy loss spectroscopy Know edge of e ementary crystal ography rec proca at t ce stereograph c project ons, and comp ex var ab es s requ red Cross sted as MSE 558 Prerequis te: nstructor approva

559 Electron Microscopy II. (3) S
M roana ys s of the structure and compos tion of mater a s us ng mages d ffraction and X-ray and energy loss spectroscopy. Know edge of e ementary crystal ography rec proca lat tice stereograph c project ons, and comp ex var ab es s requ red Cross- sted as MSE 559 Prerequisite nstructor approva

Omnibus Courses: See page 44 for omn'bus courses that may be offered

Speech and Hearing Science (Ph.D.)

The interdisciplinary Doctor of Phi losophy degree program with a major administered by the Committee on Speech and Hearing Science. The pur pose of the program is to prepare schol ars for careers of basic and applied re search in academia or in health care de livery environments. The unifying theme of the program is the influence of aging and changes in neurologic condition on human communication and its disorders. The program empha sizes this theme across all subdisci plines of speech, language, and hearing. For details of this program, see the *Graduate Catalog*.

Statistics (M.S.)

The interdisciplinary Master of Sci ence degree program with a major in Statistics is administered by the Com mittee on Statistics The program in volves faculty and resources from the Department of Decision Information Systems and the Department of Math ematics. Areas of emphasis include ap plied statistics, mathematical statistics, statistical computing, statistical model ing, and statistical sampling and survey research. For details of this program, see the *Graduate Catalog*

ADMISSION TO THE GRADUATE COLLEGE

Arizona State University is one uni versity with two campuses that are separately accredited by the North Cen tral Association, a regional accrediting body, and by the professional accredit ing agencies. Graduate programs on both campuses are served by the Grad uate College.

The Graduate College has offices at both ASU Main and ASU West. Appli cations can be submitted for admission as a nondegree student or degree seek ing student at either office. Application for admission to a specific academic program must be reviewed by the de sired campus and program.

For ASU Main
GRADUATE COLLEGE
ARIZONA STATE UNIVERS TY
BOX 871003
TEMPE AZ 85287 1003

For ASU West
GRADUATE COLLEGE
ASU WEST
PO BOX 37100
PHOEN X AZ 85069–7100

For more information, call the Grad uate College Admissions office at ASU Main at 602/965–6113 or at ASU West at 602/543–4567. Refer to the *Gradu ate Catalog* for further information.

Eligibility

Anyone who holds a bachelor's (or equivalent) or graduate degree from a college or university of recognized standing is eligible to apply for admis sion to the Graduate College. Under graduate deficiencies may be assigned

if the undergraduate degree is based on credits not accepted by ASU, such as life experience or noncredit workshops and seminars.

Graduate College Requirements

Generally, an applicant must have a GPA of 3.00 (4.00 A scale) or the equivalent in the last two years of work leading to the bachelor's degree. A student who enters a graduate degree program is expected to have undergraduate educational experiences, including general education studies, that are similar to those required for the baccalaureate degree at ASU.

Requirements of the Academic Unit

Academic units (such as departments or colleges) may have admission requirements in addition to those of the Graduate College. Many graduate programs require scores from a national admissions test such as the Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), or the Miller Analogies Test (MAT). Some programs require the submission of a portfolio, letters of recommendation, or a statement of goals. Applicants should contact the academic unit regarding specific admission and application requirements

Submission of an Application

U.S. citizens and permanent residents should submit the following *in one envelope* (clearly labeled "application") to

For ASU Main
GRADUATE COLLEGE
ARIZONA STATE UNIVERSITY
BOX 871003
TEMPE AZ 85287 1003

For ASU West
GRADUATE COLLEGE
ASU WEST
PO BOX 37100
PHOENIX AZ 85069 7100

1. application;
2. application fee;
3. two transcripts from every college and university in which the applicant was previously enrolled;
4. appropriate test score reports (e.g., GRE, GMAT); and
5 a domicile affidavit if the applicant is a resident of Arizona.

If all materials are not available, what is available ought to be submitted with the application and fee. The rest of the materials should be submitted as soon as possible.

To facilitate the application process, ASU accepts personal photocopies of transcripts and test scores. Before registering for classes, every student must submit *official* transcripts and test scores.

The Graduate College accepts as *official* all transcripts submitted in sealed envelopes, stamped and verified by the issuing institution *or* transcripts sent directly from another college or university. The applicant must ask Educational Testing Service to send the test results directly to the Graduate Admissions Office. The process of providing all necessary records may take two months or longer.

Portfolios, letters of recommendation, and statements of goals should be sent directly to the academic unit.

International applicants should submit the following *in one envelope* (clearly labeled "application") to

For ASU Main
GRADUATE COLLEGE
ARIZONA STATE UNIVERSITY
BOX 871003
TEMPE AZ 85287–1003

For ASU West
GRADUATE COLLEGE
ASU WEST
PO BOX 37100
PHOENIX AZ 85069–7100

1. application;
2. application fee;
3 two copies of all college and university academic records;
4. translation of all college and university academic records;
5. TOEFL score;
6. appropriate test score report (e.g., GRE, GMAT); and
7. Financial Guarantee form. (This item may be submitted at a later time.)

Application Fee

Each application for entry to ASU graduate programs must be accompanied by a nonrefundable application fee. The fee is $35.00 to apply for admission to a degree program and $10.00 to apply for nondegree studies.

For details concerning re entry, multiple applications, and other matters relating to the application fee, see the *Graduate Catalog*.

International Applicants

Applicants who will attend the university while holding F 1 or J 1 visas must meet the regulations of the Immigration and Naturalization Services in addition to the requirements of the Graduate College and the academic units to which they apply.

International applicants are also required to submit additional materials and should follow the procedures described in the Graduate College brochure *Admission Information for New International Students* International applicants should read this brochure carefully to become familiar with all the requirements they must meet. Applicants can also consult the ASU listings in *Peterson's Graduate Education Directory* and in the *Directory of Graduate Programs* (published by the Educational Testing Service).

Among the additional materials required of international students are scores from English language examinations. All applicants whose native language is not English must submit a score from the Test of English as a Foreign Language (TOEFL). All international applicants who do not speak English as a primary language and who wish to apply for teaching assistantships must pass an examination that certifies their skill in speaking English—either the Test of Spoken English (TSE), which may be taken in the student's home country, or the SPEAK test, which is administered at ASU. Some degree programs (e.g., Business Administration) also require TSE or SPEAK scores of all applicants whose native language is not English. For specific information about TSE requirements, contact the head of the academic unit.

As required by the U.S. Immigration and Naturalization Service, international applicants must also verify that they have the financial resources to cover their expenses during graduate study at ASU. The Graduate Admissions Office provides the Financial Guarantee form to international applicants, who then must see that the form, with a verification from a bank or sponsoring organization, is completed and returned to Graduate Admissions. The

I 20 and the IAP66 (documents needed to obtain a student visa) are issued only after the completed, properly verified Financial Guarantee form has arrived. International students may enroll at ASU only if they have been admitted to a degree program and therefore may not pursue nondegree studies. They must meet all appropriate immigration standards and requirements.

Applications are processed when they are received. However, international applicants should submit all materials in December or January in order to begin study the following fall semester and in August or September in order to begin study the following spring semester. An application fee of $35.00 (in U.S. funds) must accompany the formal application, which otherwise will not be evaluated. (For details concerning multiple applications and other matters relating to the application fee, see the *Graduate Catalog*.)

All F 1 or J 1 visa students must have insurance coverage against illness and accident before being permitted to register. Insurance must be maintained throughout the student's enrollment in the university and may be obtained at the time of registration.

Upon arrival on campus, students must report to the International Student Advisor in the Student Life Office.

Application Deadlines

The Graduate College does not have deadlines. Applications are processed as they are received. However, many academic units have specific and early deadlines; many units review applications once a year, usually in January or February for fall admission. Applicants are urged to contact the academic units regarding deadlines

Application Procedures

When the Graduate Admissions Office has a complete file (the application, Domicile Affidavit (if required), TOEFL (if required), application fee, transcripts and transcript translations (if required), and applicable admissions test scores) for an applicant, one copy is forwarded to the academic unit. A second copy is kept in the Graduate College. Academic units review the file and the supporting materials (such as applicable test scores, portfolios, and letters of recommendation) and, following admission policies established by the Graduate College and the faculty of the academic unit, make a recommendation (regular admission, provisional admission, or denial) to the Graduate College. All recommendations are reviewed and approved by admissions officers in the Graduate College.

If there are questions about the likelihood of a student succeeding in the designated program, the Graduate College admissions officers communicate with the academic unit, perhaps agreeing on a provisional admission or arranging for the student in question to have a special faculty advisor or an advanced graduate student assigned as a mentor. Other times they may suggest that the student take some preliminary courses as a nondegree student.

Academic units, which must indicate their willingness to admit applicants, frequently set higher standards than those established by the Graduate College. Denial decisions may be based on the limitations of departmental resources as well as on the relative qualifications of those competing for admission in a particular semester.

Notice of Admission Decisions

Only the dean of the Graduate College can make formal offers of admission. The Graduate College notifies all applicants in writing of the admission decision.

All documents received by the university in connection with an application for admission become the property of Arizona State University. If the applicant does not enroll in the university within one year, the admission documents may be destroyed.

The date (month/day/year) on the graduate dean's letter of admission is the actual date of admission. If the student is enrolled in courses on the admission date, those courses if applicable may be considered part of a program of study. Courses taken the semester before this date are nondegree hours.

Admission Classifications

Regular Admission. Applicants who fulfill all requirements for admission and are acceptable to both the academic unit and the Graduate College are granted regular admission.

Provisional Admission. A student who does not meet minimum academic standards but has counterbalancing evidence to suggest the potential for success may be admitted on a provisional basis. Provisional admission provides an academic unit with more evidence on which to base its decision. Normally, the academic unit reviews the student's status following completion of 12 semester hours of approved graduate study. At that time, the academic unit recommends to the Graduate College a change in status to either regular admission or withdrawal from the program. When students have completed their provisional requirements, they should check with their advisors to make sure that the change of status has been recommended.

A student whose grades and test scores are at an acceptable level but who does not have the undergraduate background expected by the academic unit and the university may be assigned deficiency courses with regular or provisional status. The letter of admission specifies the deficiencies that must be completed before the student is awarded a graduate degree. Deficiency courses are taken in addition to those normally required for a degree.

Nondegree Admission. A student not interested in earning a degree or not yet ready to apply to a particular degree program may enroll as a nondegree student. The application process is streamlined, does not require submission of transcripts or test scores, and can be completed during a single visit to the Graduate Admissions Office. This process may also be completed by mail. A maximum of nine hours taken while in this category at ASU may be applied toward a master's degree if appropriate for the student's program of study.

The six year maximum time limit applies to nondegree semester hours appearing on a master's program of study. In addition, because of limited class size and resources, certain academic units may limit the enrollment of nondegree students.

Recognition of a Degree

Recognition of a degree is acknowledgment that the program leading to the degree is equivalent to a program offered by ASU or is an acceptable program for the proposed graduate major at ASU. A student who enters a graduate degree program at Arizona State University is expected to have undergraduate educational experiences, including general education studies, that are appropriate for the program.

Definition of a Unit of Credit

See page 45 of this catalog.

GRADUATE COLLEGE PROCEDURES

Change in Graduate Degree Program

A change from one graduate degree program to another requires a new application to the Graduate College. The usual admission procedures are followed. For details on matters relating to the application fee, see the *Graduate Catalog*.

Re-entry to the Graduate College

Any former graduate student who has not been in attendance at the university for one or more semesters must submit an application for re entry to the Graduate Admissions Office. The application should be submitted at least one month before the beginning of the semester in which the student plans to re-enter. For details on re entry and other matters relating to the application fee, see the *Graduate Catalog*.

Determination of Catalog Requirements

The *Graduate Catalog* is published biennially. Requirements for an academic unit or college, campus, or the university as a whole, may change and are often upgraded.

In determining graduation requirements, a student may use only one edition of the Graduate Catalog.

A student graduates under the curriculum, course requirements, and regulations for graduation in effect at the time of admission to a degree program at the university. A student may choose to graduate under any subsequent catalog issued

Some changes in policies and procedures affect all students regardless of the catalog used by the student. These policies and procedures may appear in the catalog or in other university publications.

Registration

See pages 42–43 of this catalog.

Audit Enrollment

Graduate students may register as auditors in one or more courses with the approval of the supervisory committee chair and the consent of the instructor involved The student must be registered properly and pay the fees for the course. An audited course is counted in the student's maximum course load. It does not count for students who must take a minimum number of credits, e.g., teaching assistants or students receiving financial assistance. The mark of "X" is recorded for completion of an audited course, unless the instructor determines that the student's participation or attendance has been inadequate, in which case a "W" may be recorded.

Enrollment Verification

General guidelines on page 43 of this catalog are used only to verify enrollment for the purpose of loan deferments and eligibility. The registrar is responsible for such verifications.

Course Withdrawal

During the first four weeks of a semester, a student may withdraw with a mark of "W." From the fifth week to the end of the 10th week of a semester, a student may withdraw with a mark of "W" only from courses in which the instructor certifies the student is passing at the time of withdrawal.

Failure to withdraw officially from a course will result in a grade of "E," which is used in the computation of the GPA. The *Schedule of Classes* lists the procedures for withdrawal.

An instructor may withdraw a student from a class for disruptive classroom behavior with a mark of "W" or a grade of "E." A student may appeal an instructor initiated withdrawal to the Standards Committee of the college in which the course is offered. The decision of the committee is final.

Course Load

The course load is determined by the supervisory committee but is not to exceed 15 semester hours of credit during each of the two semesters, six semester hours during each five week summer session, or nine semester hours of credit during an eight week summer session. An audited course is counted in the student's maximum load.

All graduate assistants and associates must enroll for a minimum of six semester hours during each semester (fall and spring) of their appointment. The six hours cannot include audit enrollment. Enrollment in continuing registration (595, 695, or 795) does not fulfill the six hour requirement. A half-time (50%) graduate assistant or associate working 20 clock hours per week may not register for more than 12 hours of course work each semester; a third time (33%) assistant or associate for more than 13 hours; and a quarter time (25%) assistant or associate for more than 15 hours.

During the summer sessions, graduate assistants and associates employed 100% time may enroll for a maximum of three hours during a five week session or four hours during the eight week session; those employed 50% time may enroll for a maximum of five hours during a five week session or seven hours during the eight week session; and those employed 25% time may enroll for a maximum of six semester hours during a five week session or *nine hours during the eight* week session.

All graduate students doing research, working on theses or dissertations, taking comprehensive or final examinations, or using university facilities or *faculty time must be registered for a* minimum of one hour of credit, not audit, which appears on the program of study or which is an appropriate graduate level course, such as continuing registration (595, 695, or 795).

Assistantships and Commercial Services

All graduate students who are hired for class/course support or who hold assistantships or associateships *for a specific course* including teaching assistants, research assistants, and graduate assistants may not take or provide notes for *that* course to commercial notetaking services or students. An exception may be made by the course instructor(s) on a case by-case basis as an authorized support service for a disabled student. This policy covers all commercial activities (e.g., notetaking or paid review sessions) that might be associated with a course for which the assistant or associate has assigned responsibilities.

GRADUATE COLLEGE DEGREE REQUIREMENTS

Graduate Advisement

Advising is much more than technical support; it is an integral part of graduate education. Students' programs of study are generally tailored to meet individual needs, and students should seek advice from faculty or advisors as they plan their course work, examinations, and other degree requirements

Graduate College Advising Office. The Graduate College provides advising service to prospective and enrolled students. Information is provided concerning Graduate College admissions, nondegree status, programs of study, and policies and procedures. Academic and professional advisement is available to nondegree students. Advisors assist nondegree or prospective students in contacting appropriate faculty and advisors. Students may call 602/965-3521 for an appointment or stop by the lobby of Wilson Hall.

Grading

The "Grades" table defines grades and gives their values.

A grade of "P" (pass) in a 400 level course may not appear on a program of study. Grades on transfer work or ASU law credit are not included in computing GPAs.

Grades of "D" and "E" cannot be used to meet the requirements for a graduate degree, although they are used to compute the GPAs. A student receiving a grade of "D" or "E" must repeat the course in a regularly scheduled (not an independent study) class if it is to be included in the program of study. However, both the "D" or "E" and the new grade are used to compute the GPAs.

Graduate course work (500, 600, or 700 level courses) reported as an "I" (incomplete) must be completed within one calendar year. At the time the "I" grade is given, the student must complete the "Request for Grade of Incomplete" form. The form first serves as a record of the "I" grade and the work required to complete it. When the student has completed the work, the form then serves as a change of grade authorization.

If the work specified on the form is not completed within one calendar year, the "I" grade becomes part of the student's permanent transcript. The student is not allowed to complete the course work as specified on the "Incomplete" form. The student may, however, repeat the course after the "I" has become permanent by reregistering, paying fees, and fulfilling all course requirements. The grade for the repeated course appears on the transcript but does not replace the permanent "I."

Grades

Grade	Definition	Value	Notes
A	Excellent	4.00	
B	Good	3.00	
C	Passing	2.00	
D	No graduate credit	1.00	
E	Failure	0.00	
W	Withdrawal		This grade is given whenever a student officially withdraws from a class
I	Incomplete		
X	Audit		
Y	Satisfactory		
Z	Course in progress		This grade is usually given pending completion of courses.

Scholarship

To be eligible for a degree in the Graduate College, a student must achieve two GPAs of "B" (3.00) or better. The first GPA is based on all courses numbered 500 or higher that appear on the transcript. (Courses noted as deficiencies in the original letter of admission are not included.) The second GPA is based on all courses that appear on the program of study.

The designation of honors (*summa cum laude, magna cum laude,* and *cum laude*) is reserved for undergraduates. The Graduate College does not use these academic distinctions.

Academic excellence is expected of students doing graduate work. Upon recommendation from the head of the academic unit, the dean of the Graduate College can withdraw a student who is not progressing satisfactorily.

A graduate student who does not enroll for three calendar years is considered withdrawn and must reapply for admission to a degree program.

Graduate Credit Courses

Courses at the 500, 600, and 700 levels are graduate credit courses. Courses at the 400 level apply to graduate degree requirements when appearing on an approved program of study. However, 400 level courses are not graduate courses by definition and cannot be certified as such for purposes of employment or transferring to other institutions.

Reserving of Course Credit by Undergraduates. See page 42.

Transfer Credit. Transfer of credit is the acceptance of credit from another institution or campus for inclusion in a program of study leading to a degree awarded by ASU. The number of hours transferred from other institutions may not exceed 20% of the total minimum semester hours required for a master's degree unless stated otherwise for a specific degree program.

Transfer credit taken before admission to a graduate degree program at ASU is nondegree credit. Nondegree credit taken at ASU combined with nondegree credit taken at another institution may not exceed nine hours on the master's program of study. The date (month/day/year) on the Graduate College dean's letter of admission is the actual date of admission. If the student is enrolled in courses on the admission date, those courses if applicable may be considered part of a program of study. Courses taken the semester before this date are nondegree hours. The nine hour limit does not apply to the doctoral programs.

Transfer credits must be acceptable toward graduate degrees at the institution where the courses were completed. Certain types of graduate credits cannot be transferred to ASU, including the following:

1. credits awarded by postsecondary institutions in the United States that lack candidate status or accreditation by a regional accrediting association;
2. credits awarded by postsecondary institutions for life experience;
3. credits awarded by postsecondary institutions for courses taken at noncollegiate institutions (e.g., government agencies, corporations, and industrial firms);

4. credits awarded by postsecondary institutions for noncredit courses, workshops, and seminars offered by other postsecondary institutions as part of continuing education programs; and
5. credits given for extension courses.

Acceptable academic credits earned at other institutions that are based on a different unit of credit than the ones prescribed by the Arizona Board of Regents are subject to conversion before being transferred to ASU.

Only resident graduate courses with an "A" or "B" grade may be transferred. A course with the grade of pass, credit, or satisfactory may not be transferred.

Official transcripts of any transfer credit to be used on a program of study must be sent directly to the Graduate Admissions Office from the office of the registrar at the institution where the credit was earned

Correspondence and Extension Courses. Correspondence and extension courses cannot be used to meet the requirements for a graduate degree.

Graduate Supervisory Committees

When the program of study is filed, upon the recommendation of the head of the academic unit, the dean of the Graduate College appoints a graduate student's supervisory committee, consisting of a chair and other resident faculty members. The number of members serving on this committee depends on the degree program. Academic professionals (e.g., research scientists, research engineers), nontenure track faculty (e.g., adjunct professors, research professors), and individuals granted affiliated faculty status through established university procedures may serve as co-chairs or members or extra members of thesis and dissertation committees upon approval by the Graduate College. Individuals who are recommended by an academic unit as eligible to serve as a co chair must meet the criteria established by the academic unit and be approved by the Graduate College.

Upon the recommendation of the committee chair and head of the academic unit, ASU West tenured (or tenure track) faculty may serve as committee members for master's and doctoral committees at ASU Main. ASU West tenured (or tenure track) faculty may serve as co chairs for theses/dissertations at ASU Main upon the recommendation of the head of the academic unit and approval of the dean of the Graduate College. Co-chairs must meet the academic unit's criteria for chairing theses/dissertations.

Qualified individuals outside the university, upon the recommendation of the head of the academic unit and approval of the Graduate College, may serve as members of thesis and dissertation committees; however, such individuals may not serve as chairs or co chairs (unless they have affiliated faculty status). Former ASU faculty with students completing their degrees may continue to serve as co-chairs pending the approval of the academic unit and the dean of the Graduate College. At least 50% of the committee must be made up of faculty from ASU Main.

Foreign Language Requirements

A graduate degree program may require proficiency in a foreign language. If a foreign language is required, students must demonstrate at least a reading knowledge in the area of study required by the supervisory committee and consistent with the requirements for the graduate degree program. Normally, the language is selected from French, German, Russian, or Spanish, although other languages may be recommended when there is adequate justification.

Students must pass a foreign language examination specific to their particular graduate programs. The examinations are administered three times each year by the Department of Languages and Literature, which certifies language competency. Students planning to take the examination must register in the Graduate College by the deadline. The chair of the student's supervisory committee is responsible for providing the Department of Languages and Literature with materials from which the examination is prepared. The chair should submit or recommend relevant books and/or journals of approximately 200 pages in length in the desired foreign language.

Following a failure in the foreign language examination, the student must petition the Graduate College for permission to retake the examination. A student must pass the examination in no more than three attempts.

Theses and Dissertations

The student through the master's thesis or equivalent must demonstrate an introduction to research. All doctoral degree candidates must submit a dissertation, with the exception of the Doctor of Musical Arts in Solo Performance, which requires three recitals and a research paper. The Doctor of Philosophy dissertation should be a valuable educational experience that demonstrates the candidate's mastery of research methods, theory, and tools of the discipline. The dissertation should demonstrate the candidate's ability to address a major intellectual problem and to propose meaningful questions and hypotheses It should be a contribution to knowledge that is worthy of publication by an established press as a book or monograph or as one or more articles in a reputable journal.

For format, the Graduate College must review the final copy of the master's thesis, doctoral dissertation, and other final documents that are required to be placed in the library. Copies of the *Format Manual* are available in the Graduate College. The student is required to submit a complete copy of the thesis or dissertation for format review at least 10 working days before the oral defense (two weeks if there are no holidays during the time period). Doctoral students must submit a completed Survey of Earned Doctorates Awarded in the United States, conducted by the National Research Council.

Graduate students and their supervisory committee chairs jointly select a style guide or journal format representative of the field of study. The Graduate College allows some flexibility in the format of the manuscript, but Graduate College and library guidelines must be followed.

The student must submit two final copies of a thesis or dissertation to the ASU Bookstore for binding. Bound copies are placed in the Hayden Library and Archives. Doctoral candidates should also submit one copy of the title

page, approval page, and abstract (which must not exceed 350 words). The student is responsible for the bind ing fees; in addition, doctoral students must pay to have their dissertations mi crofilmed by University Microfilms In ternational (UMI). The fee covers the expense of having the document sent to UMI, where it is microfilmed and cata loged Information on the dissertation appears in various publications, such as *Dissertation Abstracts International* and the annual supplement of the *Comprehensive Dissertation Index*.

Application for Graduation

Students should apply for graduation no later than the date specified in the *Graduate Catalog* calendar. All fees are payable at that time. Students ap plying for graduation after the deadline listed in the *Graduate Catalog* calendar are required to pay a late fee. At the end of the semester in which they apply for graduation, students are officially notified of any degree requirements they have not yet completed. Students who do not complete all degree require- ments by their anticipated graduation date are required to pay a refiling fee.

Withdrawal from the University

See page 46 of this catalog

A master's or doctoral degree stu dent who does not enroll for three cal endar years is considered withdrawn and must reapply for admission to a de gree program.

Summer Sessions

See page 378 of this catalog.

Dates and Deadlines

The university calendar found in the current *Graduate Catalog* lists dead lines for the submission of theses and dissertations to the Graduate College, the last day to apply for graduation, the last day to hold an oral defense of a thesis or dissertation, and the last day to submit theses and dissertations to the ASU Bookstore for binding.

Student Responsibility

It is the responsibility of the graduate student to know and observe all proce dures and requirements of the Graduate College as defined in the *Graduate Catalog*, the *Schedule of Classes*, and the *Format Manual* Students should also be informed about the require ments concerning their degree pro- grams and any special requirements within their academic units.

The highest standards of academic integrity are expected of all students. The failure of any student to meet these standards may result in suspension or expulsion from the university and/or other sanctions as specified in the aca demic integrity policies of the indivi dual colleges Violations of academic integrity include, but are not limited to, cheating, fabrication, tampering, pla giarism, or facilitating such activities. The university and college academic integrity policies are available in the Office of the Senior Vice President and Provost and the offices of the deans of the individual colleges.

Misconduct in Scholarly Research and Creative Activities

Students are expected to maintain the highest standards of integrity and truth fulness in scholarly research and cre ative activities Misconduct in schol arly research and creative activities in cludes, but is not limited to, fabrication, falsification or misrepresentation of data, and plagiarism Misconduct by any student may result in suspension or expulsion from the university and other sanctions as specified by the individual colleges. Policies on misconduct are available in the Office of the Senior Vice President and Provost

Graduate College Policies and Procedures

For more detailed information on Graduate College policies and proce dures of particular interest to students, please refer to the current *Graduate Catalog*.

Policies and Procedures of the Graduate Council Appeals Board

The Appeals Board of the Graduate Council acts as the appeals body for graduate students seeking redress on academic decisions regarding their graduate program. The board is com posed of five members of the Graduate Council, excluding ex officio council members who hold administrative posi tions in the Graduate College. The members and chair of the board are ap pointed by the dean of the Graduate College.

An appeal by a student previously admitted to a graduate degree program may result from an academic decision the student considers adverse Deci sions involving Graduate College policy as stated in the *Graduate Cata log* are within the jurisdiction of the Appeals Board. Decisions involving policies of the academic unit (center, department, school, or college) are not normally heard by the Graduate Coun cil Appeals Board

A student may seek redress by writ ing a letter to the dean of the Graduate College or the chair of the Appeals Board of the Graduate Council. Upon receipt of the letter, the dean or chair informs the student whether the appeal concerns a policy of the academic unit or of the Graduate College, placing it within the jurisdiction of the board.

A student may request an opportu nity to appear before the Appeals Board or waive this right. The board may choose to interview faculty and admin istrators involved in the case and re view the student's complete academic record and all documents pertaining to the case Such reviews are primarily concerned with the observance of sta ted procedures and policies but may consider extenuating circumstances as related to policy.

In the event that a member of the Appeals Board has been involved in a case as a member of the student's com mittee or as a member of the faculty of fering the graduate program, that mem ber is replaced for the duration of the case, and the dean of the Graduate Col lege or chair of the Appeals Board may select an alternate member from the re maining membership of the Graduate Council A member of the Appeals Board may request to be excused from a case or may be temporarily replaced whenever there is a potential for con flict of interest. The presence of three members of the board at a meeting is considered a quorum.

Only summary notes, not verbatim transcripts, of the board's proceedings are kept All written documentation presented in each case is retained in the board's files for a period of one year. Such files are available only to the complainant and respondent in the hearing and do not become part of the student's official university file. The decision of the Appeals Board is re ported to members of the Graduate Council for their information. The de cision is then communicated to the stu dent in writing by the dean of the Grad uate College, and a copy is sent to each member of the Appeals Board.

Graduate Degrees, Majors, and Concentrations Offered at ASU Main

Master of Accountancy

Master of Architecture
- Building Design

Master of Arts
- Anthropology
  - Archaeology
  - Bioarchaeology
  - Linguistics
  - Museum studies
  - Physical anthropology
  - Social cultural anthropology
- Art
  - Art education
  - Art history
- Communication
- Educational Administration and Supervision[1]
- Educational Psychology[1]
- Elementary Education[1]
  - Bilingual education
  - Child development
  - Communication arts
  - Curriculum
  - Early childhood education
  - Indian education
  - Mathematics
  - Multicultural education
  - Reading
  - Science
  - Social studies
- English
  - Comparative literature
  - English linguistics
  - Literature and language
  - Rhetoric and composition
- French
  - Comparative literature
  - Language and culture
  - Literature
- Geography
- German
  - Comparative literature
  - Language and culture
  - Literature
- History
  - Asian history
  - British history
  - European history
  - Latin American history
  - Public history
  - U.S. history
  - U.S./Western history
- Humanities
- Learning and Instructional Technology[1]
- Mathematics
- Music History and Literature
- Music Theory
- Philosophy
- Political Science
  - American politics
  - Comparative politics
  - International relations
  - Political theory
- Religious Studies
- School Library Science[1, 2]
- Secondary Education[1]
- Social and Philosophical Foundations of Education
- Sociology
- Spanish
  - Comparative literature
  - Language and culture
  - Linguistics
  - Literature
- Special Education[1]
- Theatre

Master of Business Administration

Master of Computer Science[1]

Master of Counseling

Master of Education
- Counselor Education
  - Counseling and student personnel
- Educational Administration and Supervision[1]
- Educational Media and Computers
  - Business education[3]
- Educational Psychology[1]
- Elementary Education[1]
  - Bilingual education
  - Child development
  - Communication arts
  - Curriculum
  - Early childhood education
  - Indian education
  - Mathematics
  - Multicultural education
  - Reading
  - Science
  - Social studies
- Higher and Adult Education
  - Adult education[2]
  - Higher education
- Learning and Instructional Technology[1]
- School Library Science[1, 2]
- Secondary Education[1]
  - Bilingual education
  - English as a second language
  - Indian education
  - Subject matter fields
- Special Education[1]
  - Gifted
  - Mildly handicapped
  - Multicultural exceptional
  - Severely/multiply handicapped

Master of Environmental Planning
- Environmental Planning
  - Urban planning

Master of Fine Arts
- Art
  - Ceramics
  - Drawing
  - Fibers
  - Intermedia
  - Metals
  - Painting
  - Photographic studies
  - Photography
  - Printmaking
  - Sculpture
  - Wood
- Creative Writing
- Dance
- Theatre
  - Acting
  - Scenography
  - Theatre for youth

Master of Health Services Administration

Master of Laws[2]

Master of Mass Communication

Master of Music
- Choral Music
  - Choral music
  - General music
- Composition
- Instrumental Music
- Performance
  - Music theatre musical direction
  - Music theatre performance
  - Performance pedagogy
  - Piano accompanying
  - Solo performance (instrumental)
  - Solo performance (keyboard)
  - Solo performance (voice)

Master of Natural Science
- Natural Science
  - Botany
  - Chemistry
  - Communication disorders
  - Geology
  - Mathematics
  - Microbiology
  - Physics
  - Zoology

Master of Public Administration
- Public Administration
  - Public information management
  - Public management
  - Public policy analysis and evaluation
  - Urban management and planning

[1] Major offered toward more than one degree at the same level

[2] Not accepting applications

[3] The major has only one formalized concentration; other areas of study are available.

[4] Students apply to this degree program through the College of Law, not the Graduate College.

Graduate Degrees, Majors, and Concentrations Offered at ASU Main (continued)

Master of Science
- Aerospace Engineering[1]
- Agribusiness
  - Agribusiness management and marketing
  - Food quality assurance
- Bioengineering
- Biological Sciences
- Botany
  - Ecology[3]
- Building Design
  - Building energy performance
  - Climate responsive architecture
  - Computer aided design
  - Facilities development and management
- Chemical Engineering[1]
  - Biomedical and clinical engineering
  - Chemical process engineering
  - Chemical reactor engineering
  - Energy and materials conversion
  - Environmental control
  - Solid state processing
  - Transport phenomena
- Chemistry
  - Analytical chemistry
  - Biochemistry
  - Geochemistry
  - Inorganic chemistry
  - Organic chemistry
  - Physical chemistry
  - Solid state chemistry
- Civil Engineering[1]
  - Environmental sanitary
  - Geotechnical soil mechanics
  - Structures
  - Transportation
  - Water resources/hydraulics
- Communication Disorders
- Computer Science[1]
- Construction
  - Construction science
  - Facilities
  - Management
- Decision and Information Systems
- Economics
- Electrical Engineering[1]
- Engineering Science[1]
- Environmental Resources in Agriculture
- Exercise Science/Physical Education
- Family Resources and Human Development
  - Family studies
  - General family resources and human development
- Geology
- Industrial Engineering[1]
  - Computer aided processes
  - Computer integrated manufacturing
  - Human factors
  - Information systems
  - Operations research
  - Organization control
  - Quality control reliability
- Justice Studies
- Mechanical Engineering[1]
- Microbiology
- Molecular and Cellular Biology
- Nursing
  - Adult health nursing
  - Community health nursing
  - Community mental health/psychiatric nursing
  - Nursing administration
  - Parent child nursing
- Physics
- Recreation
  - Outdoor recreation
  - Recreation administration
  - Social/psychological aspects of leisure
  - Tourism and commercial recreation
- Statistics
- Zoology
  - Ecology[3]

Master of Science in Design
- Industrial Design
  - Design methodology, theory, and criticism
  - Facilities planning and management
  - Human factors in design
- Interior Design
  - Design methodology, theory, and criticism
  - Facilities planning and management
  - Human factors in design

Master of Science in Engineering
- Aerospace Engineering[1]
- Chemical Engineering[1]
  - Biomedical and clinical engineering
  - Chemical process engineering
  - Chemical reactor engineering
  - Energy and materials conversion
  - Environmental control
  - Solid state processing
  - Transport phenomena
- Civil Engineering[1]
  - Environmental sanitary
  - Geotechnical/soil mechanics
  - Structures
  - Transportation
  - Water resources/hydraulics
- Electrical Engineering[1]
- Engineering Science[1]
- Industrial Engineering[1]
  - Computer aided processes
  - Computer integrated manufacturing
  - Human factors
  - Information systems
  - Operations research
  - Organization control
  - Quality control/reliability
- Mechanical Engineering[1]

Master of Social Work

Master of Taxation

Master of Teaching English as a Second Language

Master of Technology
- Technology
  - Aeronautical engineering technology
  - Aeronautical management technology
  - Electronics engineering technology
  - Graphic communications technology
  - Industrial management and supervision
  - Manufacturing engineering technology
  - Mechanical engineering technology
  - Welding engineering technology

Doctor of Education
- Counselor Education[2]
- Educational Administration and Supervision
- Elementary Education[1]
  - Bilingual education
  - Child development
  - Communication arts
  - Curriculum
  - Early childhood education
  - Indian education
  - Mathematics
  - Multicultural education
  - Reading
  - Science
  - Social studies
- Higher and Adult Education
  - Adult education[2]
  - Higher education
- Learning and Instructional Technology[1]
- Secondary Education
  - Art education
  - Business education
  - Curriculum and instruction
  - Mathematics education
  - Music education
  - Physical education
  - Science education

Doctor of Musical Arts
- Choral Music
- General Music
- Instrumental Music
- Solo Performance

[1] Major offered toward more than one degree at the same level.

[2] Not accepting applications

[3] The major has only one formalized concentration; other areas of study are available.

[4] Students apply to this degree program through the College of Law, not the Graduate College.

Graduate Degrees, Majors, and Concentrations Offered at ASU Main (continued)

Doctor of Philosophy
- Aerospace Engineering
- Anthropology
  - Archaeology
  - Physical anthropology
  - Social cultural anthropology
- Bioengineering
- Botany
  - Ecology[3]
- Business Administration
  - Accountancy
  - Decision and information systems
  - Finance
  - Health services research
  - Management
  - Marketing
  - Purchasing and logistics management
- Chemical Engineering
  - Biomedical and clinical engineering
  - Chemical process engineering
  - Chemical reactor engineering
  - Energy and materials conversion
  - Environmental control
  - Solid state processing
  - Transport phenomena
- Chemistry
  - Analytical chemistry
  - Biochemistry
  - Geochemistry
  - Inorganic chemistry
  - Organic chemistry
  - Physical chemistry
  - Solid state chemistry
- Civil Engineering
  - Environmental sanitary
  - Geotechnical soil mechanics
  - Structures
  - Transportation
  - Water resources/hydraulics
- Communication
  - Communicative development
  - Intercultural communication
  - Organizational communication
- Computer Science
- Counseling Psychology
- Curriculum and Instruction
  - Curriculum studies
  - Early childhood education
  - Educational media and computers
  - Elementary education
  - English education
  - Exercise and wellness education
  - Music education
  - Physical education
  - Reading education
  - Science education
  - Special education
- Economics
- Educational Leadership and Policy Studies
- Educational Psychology
  - Lifespan developmental psychology
  - Measurement, statistics, and methodological studies
  - School psychology
- Electrical Engineering
- Elementary Education[1,2]
- Engineering Science
- English
- Exercise Science
  - Biomechanics
  - Motor behavior sport psychology
  - Physiology of exercise
- Geography
- Geology
- Health Services Administration
- History
  - Asian history
  - British history
  - European history
  - Latin American history
  - U S history
- Industrial Engineering
  - Computer aided processes
  - Computer integrated manufacturing
  - Human factors
  - Information systems
  - Operations research
  - Organization control
  - Quality control/reliability
- Justice Studies
  - Criminal and juvenile justice
  - Dispute resolution
  - Law, justice, and minority populations
  - Law, policy, and evaluation
  - Women, law, and justice
- Learning and Instructional Technology[1]
  - Instructional technology
  - Learning
- Mathematics
- Mechanical Engineering
- Microbiology
- Molecular and Cellular Biology
- Physics
- Political Science
  - American politics
  - Comparative politics
  - International relations
  - Political theory
- Psychology
  - Clinical psychology
  - Developmental psychology
  - Environmental psychology
  - Experimental psychology
  - Physiological psychology
  - Social psychology
- Science and Engineering of Materials
- Social Work[2]
- Sociology
- Spanish
- Special Education[2]
- Speech and Hearing Science
  - Developmental neurolinguistic disorders
  - Neuroauditory processes
  - Neurogerontologic communication disorders
- Theatre
  - Theatre for youth
- Zoology
  - Ecology[3]

Doctor of Public Administration

Juris Doctor[4]

[1] Major offered toward more than one degree at the same level.

[2] Not accepting applications.

[3] The major has only one formalized concentration; other areas of study are available.

[4] Students apply to this degree program through the College of Law, not the Graduate College.

Graduate Degrees, Majors, and Concentrations Offered at ASU West

Master of Business Administration

Master of Education
- Educational Administration and Supervision
- Elementary Education
- Secondary Education

Summer Sessions

Leon W. Kemper, Ph.D.
Director

The summer sessions, offering more than 2,000 fully accredited courses, provide an opportunity for students to begin or continue academic work on a year-round basis. Summer courses are equivalent to fall and spring courses in content, credit awarded, and expected standard of performance and as a general rule are taught by ASU faculty. All ASU Main courses (except some EPE courses) are held in air-conditioned classrooms or laboratories. A limited number of courses are offered at off-campus locations.

There are three regular sessions, one of eight weeks and two of five weeks. The eight-week session and the first five-week session begin the same date.

In addition to the regular five-week sessions, the College of Education courses are offered in two supplemental five-week sessions that begin and end one week later than the two regular five-week sessions.

During the summer, ASU also offers students the opportunity to earn graduate or undergraduate credit while studying in foreign countries through various Summer International Study Programs. These programs are directed by ASU faculty and have been approved by the appropriate academic unit.

Admission and Registration. The admission and registration process for summer sessions begins when the *Summer Sessions Bulletin* is distributed.

Admission. All students must be admitted for the summer as a nondegree student to ASU before enrolling, except for continuing students attending ASU during the spring semester preceding the current summer. New ASU students admitted for the fall semester following the current summer must process the summer nondegree admission form before enrolling.

Nondegree graduate or undergraduate. Application form is provided in the *Summer Sessions Bulletin*. The submission of transcripts or test scores is not required for this status.

Readmission. ASU students not enrolled during the spring semester preceding the current summer must be readmitted. See "Readmission to the University," page 41.

Conditional admission before graduation from high school may be granted. See "Admission before Graduation from High School," page 33.

Advisement. All students are strongly encouraged to seek academic advisement before enrolling in summer courses. See "Academic Advisement," page 41.

Fees and Expenses. Summer Sessions students pay for the actual number of semester hours enrolled, the Financial Aid Trust Fee, and the Student Recreation Complex fee. See the current *Summer Sessions Bulletin*.

Food Services. Meal plans are available. For more information, phone 602/965–3464 or write to

MARRIOTT FOOD SERVICE
ARIZONA STATE UNIVERSITY
BOX 870901
TEMPE AZ 85287–0901

Housing. Air-conditioned dormitories are available for ASU Main students. For more information, phone 602/965–3515 or write to

RESIDENCE LIFE
ARIZONA STATE UNIVERSITY
BOX 870801
TEMPE AZ 85287–0801

Immunization. Students born after December 31, 1956, are not permitted to register without proof of measles (rubeola) immunity or immunization given after January 1, 1980. See "Immunization," page 31.

Parking. A decal is required. For more information, phone 602/965–6124 or write to

PARKING SERVICES
ARIZONA STATE UNIVERSITY
BOX 870704
TEMPE AZ 85287–0704

Registration. May be completed in person or by using InTouch. See the current *Summer Sessions Bulletin*.

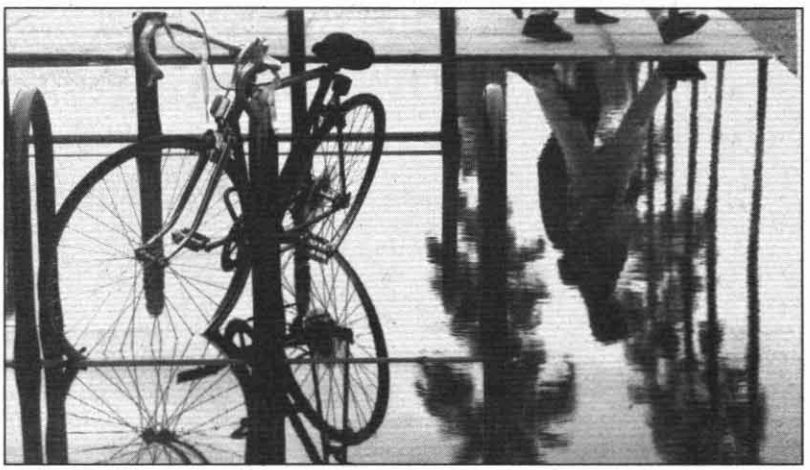
A maximum of six semester hours each five-week session or nine semester hours in the eight-week session may be taken. Hours of enrollment in any other institution or correspondence course are included in the maximum allowable course load during any given session. See the current *Summer Sessions Bulletin* for possible course load combinations.

Summer Sessions Bulletin. The *Summer Sessions Bulletin*, which contains the class schedule, the nondegree admission form, and the registration procedure, is available after the first week of February at the Office of Summer Sessions, ASB 109, and all registrar sites.

To request the *Summer Sessions Bulletin*, summer study abroad brochures, or other summer information, phone 602/965–6611 or write to

OFFICE OF SUMMER SESSIONS
ARIZONA STATE UNIVERSITY
BOX 873003
TEMPE AZ 85287–3003

International Programs



Knowledge and appreciation of other nations and cultures are essential in this increasingly interdependent world, and Arizona State University is committed to helping build the international competence of the university community. This commitment is evidenced in a wide variety of student programs and faculty teaching, research, and service programs.

Office of International Programs

Located administratively within the Office of the Senior Vice President and Provost, the Office of International Programs develops, coordinates, and administers university programs abroad. Activities include establishing interuniversity faculty exchange and research agreements, developing and administering student programs, and coordinating university relationships with governments, foundations, and other agencies involved in international affairs.

Academic Programs

ASU Programs. Arizona State University offers a select set of exchange and study abroad programs for students. In cooperation with the various ASU colleges and with universities abroad, the Office of International Programs coordinates semester and/or full-year programs in Bolivia, England, France, Germany, Israel, Italy, Japan, Macedonia, Mexico, Netherlands, Norway, Portugal, Spain, and Wales. Several of the programs offer intensive language tracks in which students may receive four semesters of foreign language credit in one semester. Other programs require prior command of a foreign language. Still other programs offer courses taught in English. Information about ASU study abroad and exchange offerings for students may be obtained from the Office of International Programs, MOEUR 124 (602/965–5965). For several programs, the Office of International Programs refers students to the appropriate academic coordinators in departments or centers.

Success in any international program depends upon careful advance planning. A student should confer with his or her academic advisor to determine how courses taken overseas on one of the ASU programs apply to the student's program of study. Generally, students who participate in an official ASU program remain under the degree requirements of the catalog in force when they entered ASU. The students retain and may apply most of their financial aid to the program and receive resident credit on their ASU transcripts.

All students who participate in ASU programs are subject to the *Student Code of Conduct* and to the authority of the resident directors of their programs. Students are also required to sign appropriate waivers of responsibility before leaving campus on a program.

It should be noted that, because of ASU commitments to foreign universities, cancellation and refund schedules vary by program and are not related to the general ASU refund schedule. Specific information on each program is available from the Office of International Programs.

Non-ASU Programs. ASU cannot offer students official resident credit programs in all countries of potential interest, and students often choose to participate in international study programs offered by other universities or agencies not affiliated with ASU. By definition, these programs fall outside the purview and responsibility of the Office of International Programs. Students interested in these programs should contact Undergraduate Admissions for accurate information on overseas study and transfer credit requirements.

Upon request, Undergraduate Admissions informs students by letter of the accreditation status of foreign institutions. The student is responsible for consulting with his or her ASU academic advisor before leaving ASU.

It is strongly advised that a student planning to enroll independently in a non-ASU program abroad complete the necessary readmission and catalog petition forms before leaving ASU. The student should check with the ASU registrar to assure that he or she is following ASU readmission and graduation policies. If the student wishes to follow the degree requirements of the catalog in force when he or she entered the university, the student must file the appropriate petition with the college of his or her major.

Area Studies

Special area studies programs are coordinated through the Center for Asian Studies (pages 91 and 123), the Center for Latin American Studies (pages 91 and 123), the Consortium for Atlantic Studies, and the Russian and East European Studies Consortium (pages 91 and 123). These groups publish journals, research reports, scholarly monographs, and books in addition to coordinating educational programs within the university and abroad.

Faculty and Academic Professionals

The faculty and academic professionals listed are involved in undergraduate and graduate instruction and research. The year of first appointment follows the name. Emeriti are included.

Aannestad, Per 1975 , Associate Professor of Physics and As tronomy; B.S., University of Oslo (Norway); Ph.D., University of California, Berkeley

Abele, Deborah (1990), Faculty Associate of Planning and Land scape Architecture; B.A , Vassar College

Aberbach, Anne-Rachel (1993 , Visiting Clinical Professional, College of Law; B A., Cornell University; J.D , Georgetown Univer sity

Aberle, James T. (1989), Assistant Professor of Engineering, B S , M.S , Polytechnic Institute of New York; Ph D., University of Mas sachusetts, Amherst

Abraham, Willard 1953 , Professor Emeritus of Special Educa tion, B S , Illinois Institute of Technology, M Ed , Chicago Teachers College, Ph.D , Northwestern University

Abston, Deborah (1990 , Assistant Librarian, Access Services, B.S., M.S.L.S., Wayne State University

Acevedo, Roberto M. (1964), Professor Emeritus of Languages and Literatures, B.A , University of California, Berkeley; M.A , Ph D., University of Arizona

Acharya, Raghunath (1976), Associate Professor of Physics and Astronomy; B.Sc., M.Sc., University of Delhi India); Ph.D., Univer sity of Rochester

Acker, Barbara (1991), Assistant Professor of Theatre; B.F.A , University of Texas, Austin; M.A., Case Western Reserve Univer sity; Ph D., Wayne State University

Acker, William J. (1970 , Professor Emeritus of Geography, B S , Purdue University; M.S., University of Kansas; M A , Ph D , Syra cuse University

Adams, Donna 1983), Assistant Professor of Nursing B S N , Uni versity of Missouri, Columbia, M S., Arizona State University, D.N.Sc., University of San Diego

Adams, Karen L. (1984), Associate Professor of English; B A., M.A , Ph.D., University of Michigan

Adelson, Roger D. (1974 , Associate Professor of History; B.A., George Washington University; B Litt , University of Oxford (En gland), M A., Ph.D , Washington University

Aguilar, John L. (1976), Associate Professor of Anthropology, B A., University of California, Los Angeles; M.A , California State University, Los Angeles; Ph.D., University of California, San Diego

Ahn, Seung C. 1990), Assistant Professor of Economics, B A , Sogang University; M.A , Ph.D , Michigan State University

Aiken, Leona S. 1985), Professor of Psychology; B.S., Virginia Commonwealth University, M.S , Ph.D., Purdue University

Akers, Lex A. (1980), Professor of Engineering; Director, Center fo Solid State Electronics Research; B.S.E.E., M.S.E.E., Ph.D., Texas Tech University

Akins, William H. (1975), Professor of Theatre, B.A., Duke Unive sity; M.A., Ph.D., University of Denver

Aksentowitz, Gloria J. (1992), Assistant Learning Resources Spe cialist, B F A., University of Nebraska, M.Ed , Arizona State Uni versity

Alarcon, Justo 1968), Professor of Languages and Literatures, B.A., M.A., Serafica (Spain), M A., Laval University (Canada , Ari zona State University; Ph D , University of Arizona

Alarcon, Ricardo O. (1989), Assistant Professor of Physics and As tronomy; B S , M S , University of Chile (Chile), Ph D., Ohio Uni versity

Alberts, Jess K. (1989), Associate Professor of Communication, B.S.Ed., M A., Abilene Christian University, Ph D., University of Texas, Austin

Alcock, John (1972 , Regents' Professor of Zoology, B A , Amherst College; Ph D., Harvard University

Alcorn, Marianne S. (1981), Law Librarian, Reference; B.A., Uni versity of Washington; M.L.S., University of Southern California

Aldrich, Frank T. 1969), Associate Professor of Geography, B A , University of Texas, Austin, M S , Ph D., Oregon State University

Aldridge, Gordon 1978), Professor Emeritus of Social Work; B A , M A , M S W , Univers ty of Toronto (Canada), Ph D , University of Michigan

Alexander, Robert J. (1975 , Professor of German; B.A., Macalester College; M.A., Ph D., University of Wisconsin, Madison

Alford, Terry L. 1993 , Assistant Professor of Engineering; B S., M.S., North Carolina State University, Raleigh; Ph D , Cornell Uni versity

Alisky, Marvin (1957), Professor Emeritus of Political Science, B A , M.A , Ph D , University of Texas, Austin

Allee, David R. (1991) Assistant Professor of Electrical Engineer ing, B.S.E , University of Cincinnati; M S.E E , Ph D., Stanford Uni versity

Allen, Craig M. (1991), Assistant Professor of Journalism and Tele communication, B.A., Linfield College; M.S., University of Oregon; Ph.D , Ohio University

Allen, James (1989), Assistant Professor of Chemistry, B.S , Saint Joseph's University; M.S., Ph D , University of Illinois

Allen, Stephen G. (1988), Adjunct Assistant Professor of Botany; B S , M S., Montana State University, Ph D , University of Arizona

Allison, Maria T. 1984), Professor of Recreation Management and Tourism; Chair, Department of Recreation Management and Tour ism; B.S., M.S., University of New Mexico; Ph D., University of Illi nois

Alozie, Nicholas O. (1991), Assistant Professor of Public Affairs, B A , M P A , Texas Southern University, M A , Ph D , University of Texas, Dallas

Alquist, Lewis R. 1984 , Professor of Art, B F A., Florida Atlantic University, M.F.A , Cranbrook Academy of Art

Altheide, David L. (1973), Regents' Professor of Justice Studies, B A , Central Washington State College, M A , University of Wash ington, Ph D., University of California, San Diego

Alvarado, Ronald H. (1974), Professor of Zoology, B A , Univer sity of California, Riverside, M.S., Ph.D., Washington State Univer sity

Alvarez, Robert R. Jr. (1989), Associate Professor of Anthropol ogy; B.A., Northern Arizona University; M.A., San Diego State Uni versity; M A , Ph D , Stanford University

Ames, James G. (1985), Senior Research Associate, Computer Inte grated Manufacturing Systems Research Center; B.S., San Diego State University

Anderson, Bruce A. (1966), Professor of Mathematics; B.A., M.S , Ph D , University of Iowa

Anderson, Douglas A. (1979), Professor of Journalism and Tele communication, Director Walter Cronkite School of Journalism and Telecommun cation, B A , Hastings College; M.S., Kearney State College, Ph D., Southern Illinois University, Carbondale

Anderson, Gary 1975), Associate Professor of Reading and Li brary Science B S , M Ed , Edinboro State College; Ph D , Univer sity of Pittsburgh, Pittsburgh

Anderson, James R. 1984 , Associate Research Scientist, Chemis try; B A , Williams College; Ph D , California Institute of Technol ogy

Anderson, Karen (1987 , Faculty Associate of Nursing, B.S., M.S., Arizona State University

Anderson, Marcia L. (1986 , Librarian Head, Acquis tions/Biblio graphic Records, A.B , University of M chigan M.S , Wayne State University

Anderson, Mary R. (1974), Ass ciate Professor of Eng neering; Associate Interim Dean, Business and Student Affairs· B A., Hope College, M S , Ph D , University of Iowa

Anderson, Melvin S. (1967), Professor Emeritus of Finance, B S., M.S., Oklahoma State University; Ed D , University of Arkansas

Andrade, Edna W. (1986), Adjunct Professor of Art; B.F.A , Penn sylvania Academy of the Fine Arts and University of Pennsylvania

Andress, Barbara L. 1972 , Professor Emeritus of Music; B A., M A , Arizona State University

Angell, C. Austen (1989), Professor of Chemistry, B S , M S , Melbourne University (Australia), Ph D , University of London (En gland)

Angulo, Julio (1981), Faculty Associate of Social Work; B A., Uni versity of Houston; M.S.W., University of Cal fornia, Los Angeles, Ph.D., Kansas State University

Appleton, Nicholas R. 1972 , Professor of Educational Policy Studies; Interim Associate Dean, Teacher Preparation Programs; B A., San Francisco State University, M A., California State Univer sity, Northridge; Ed.D., University of Massachusetts, Amherst

Aranda, Luis (1975), Associate Professor of Legal and Ethical Studies; B.M , M Ed., University of Arizona; J D , Arizona State University

Arciniega, G. Miguel 1979 , Associate Professor of Counselor Education; B S., M.A , New Mexico State Univ ersity; Ph.D., Univer sity of Arizona

Arias, M. Beatriz (1989), Associate Professor of Multicultural Edu cation, Director, Center for Biling ial and Bicultural Education; B A., M.A., Occidental College, Ph.D , Stanford University

Armbruster, Dieter (1989), Professor of Mathematics, Abitur, Zep pelin Gymnasium (West Germany); Diplom, Ph.D , University of Tübingen (West Germany

Armendt, Brad (1989), Assistant Professor of Philosophy, B A., M S , William Marsh Rice University, Ph D , University of Illinois

Armstrong, Robert L. 1967 , Professor Emeritus of Secondary Education; B A , State Teachers College of Iowa; M S., University of Iowa, Ed D , University of Arizona

Arner, Douglas G. (1959), Professor Emeritus of Philosophy, B S., Creighton University, M A , Ph D., University of Michigan

Arnold, William E. 1973 , Professor of Communication, B S , M A., Northern Illinois University, Ph D., Pennsylvania State Uni versity

Aronson, Jerome M. (1966), Professor of Botany Acting Chair, Department of Botany, B A Ph D University of California, Berke ley

Arreola, Daniel (1990), Associate Professor of Geography, B A., University of California, Los Angeles, M A Cal forn a State Uni versity, Hayward, Ph D , University of Californ a, Los Angeles

Arterian, Hannah (1979), Professor of Law; B.A , Elmira College, J.D., University of Iowa

Ashcroft, Edward A. 1988 Professor of Computer Science and Engineering; B A Cantab Eng and , Ph D , Imperial College of London (England

Ashe, Robert W. (1955), Professor Emeritus of Education, A.B., M A , Arizona State University, Ed D , University of Southern Cali fornia

Ashford, Jose (1984), Associate Professor of Social Work, B A , Loyola University, New Orleans; M S W , Ohio State University, Ph.D , Bowling Green State University

Ashley, Richard (1981), Associate Professor of Political Science; B.A., University of California, Santa Barbara; M.A., Ph D , Massa chusetts Institute of Technology

Askin, Walter M. (1986), Adjunct Professor of Art; B.A , M.A., University of California, Berkeley

Ater, Steven (1992), Assistant Professor of Art; B A , Central Washington University; M.F.A., University of Illinois

Atsumi, Takayori P. (1968), Professor of Music; B.F A., Kunitachi Music College (Japan); M M., New England Conservatory of Music

Atwood, Jerry L. (1992), Visiting Associate Professor of Construc tion; B.Arch., M.S., Arizona State University

Au, Chih-Chun (1970), Law Librarian, Head, Technical Services, LL.B , National Taiwan University (Taiwan); M.A., University of Chicago

Aulerich, Chris E. (1989), Faculty Associate, Del E Webb School of Construction

Autore, Donald D. (1959), Professor Emeritus of Technology; B.S.E., University of Michigan; M.S.E., Arizona State University

Avery, James P. (1960), Professor Emeritus of Engineering; B.S.M E., M.S.M.E., University of Michigan; Ph.D., Purdue Univer sity

Ax, Leland S. (1959), Professor Emeritus of Engineering, B.S.E , B S.R E , Tri State College; M.S., Kansas State College

Axelrod, Morris (1972), Professor Emeritus of Sociology; B.A., Ph.D., University of Michigan

Axford, Roger W. (1975), Professor Emeritus of Secondary Educa tion; B.A., Nebraska Wesleyan University, M.A , Ph.D , University of Chicago

Ayres, James E. (1982), Adjunct Professor of Anthropology; B.A., Fresno State University; M.A., University of Arizona

Baaj, M. Hadi (1990), Assistant Professor of Civil Engineering, B S., American University of Beirut (Lebanon), M.S , Ph.D., Univer sity of Texas, Austin

Backhaus, Ralph A. (1977), Professor of Botany; B S , Rutgers, The State University; M.S., Ph.D , University of California, Davis

Backus, Charles E. (1968), Professor of Engineering; Associate Dean, Industrial and Professional Development, College of Engi neering and Applied Sciences, B.S M.E., Ohio University; M.S., Ph.D., University of Arizona

Bacon, Sid P. (1988), Professor of Speech and Hearing Science; B G S , M A., University of Kansas; Ph.D., University of Minnesota, Twin Cities

Bacon, Thomas (1993), Assistant Professor of Dance; B.S., Oakland University

Badger, William W. (1985), Professor of Construction; Director, Del E Webb School of Construction, B.S M.E., Auburn University; M.S C.E., Oklahoma State University, Ph.D , Iowa State University

Baer, Steven M. (1988), Assistant Professor of Mathematics, B.S., M.S., Ph.D., University of Illinois

Bagwell, Marilyn (1972), Associate Professor of Nursing, B.S.N., University of California, Los Angeles; M.A , Arizona State Univer sity, Ph D , Texas Woman's University

Bahr, Donald M. (1967), Professor of Anthropology; A B., M.A., Ph.D., Harvard University

Bailey, James E. (1974), Professor of Engineering; B.S.I.E., M.S.I.E., Ph D , Wayne State University

Baier, Leslie (1990), Assistant Research Professor, Microbiology; B.A , Lawrence University; Ph D , University of Michigan

Baker, Dale R. (1989), Associate Professor of Secondary Education; B A , University of Oklahoma; M.A.T., Trenton State College; Ed.D , Rutgers, The State University

Baker, Georgianne R. (1971), Associate Professor of Family Re sources and Human Development, B S , Marygrove College, M S., Ohio State University; Ph.D., Michigan State University

Baker, Lawrence A. (1992), Assistant Professor of Civil Engineer ing, B.S., Pennsylvania State University; M S , Utah State Univer sity, Ph.D., University of Florida

Baker, Marc A. (1988), Adjunct Assistant Professor of Botany; B.A , San Jose State University, M A., Humboldt State University; Ph D , Arizona State University

Balanis, Constantine A. (1983), Professor of Engineering, Director, Telecommunications Research Center; Regents' Professor of Electri cal Engineering, B.S.E.E., Virginia Polytechnic Institute and State University, M S.E., University of Virginia; Ph.D., Ohio State Uni versity

Balasubramanian, Krishnan (1983), Professor of Chemistry; M Sc., Birla Institute of Technology Science (India); M A., Ph D , Johns Hopkins University

Balcazar, Hector (1989 , Assistant Professor of Family Resources and Human Development, B.S., Iberoamericana University (Mexico); M S., Ph D., Cornell University

Balcena, Antony (1993), Assistant Professor of Dance, B F A., The Juillard School, M.A., University of California, Los Angeles, M.F.A., Arizona State University

Baldini, Pier Raimondo (1978), Professor of Italian; Chair, Depart ment of Languages and Literatures; B.A., San Francisco State Uni versity; M.A., University of British Columbia (Canada); Ph.D., Uni versity of California, Los Angeles

Balling, Robert C. (1987), Associate Professor of Geography; Di rector, Climatology Laboratory; A.B., Wittenberg University; M A , Bowling Green State University; Ph.D., University of Oklahoma

Ballon-Aguirre, Enrique (1992), Associate Professor of Languages and Literatures, Bachiller en Letras, Bachiller en Derecho, Univer sity of Arequipa Peru); Doctor en Literatura, The National Univer sity of San Marcos (Peru), Doctorat en Études Iberiques, University of Paris III (France)

Bantz, Charles R. (1986), Professor of Communication; Chair, De partment of Communication; B.S., M.A., University of Minnesota, Twin Cities, Ph D., Ohio State University

Bao, Qingcheng (1988), Associate Research Specialist, Chemistry; B S., Tsinghua University (China); M.S., Semiconductor Institute, C A S. (China); Ph.D , Chinese University of Science and Technol ogy (China)

Barcelo, Héléne (1990), Assistant Professor of Mathematics; Ms.C , University of Quebec (Canada); Ph.D , University of California, San Diego

Barchilon, Marian G. (1989), Assistant Professor of Manufacturing and Industrial Technology, B S , State University of New York, Binghamton; M S., Northeastern University

Bardewyck, Loretta A. (1957), Professor Emeritus of Nursing; Dean Emeritus, College of Nursing; P.H.N., B.S., University of Min nesota, Twin Cities; M.S., Cornell University

Bardrick, Richard A. (1956), Professor Emeritus of Psychology; A.B., Ph.D., University of California, Los Angeles

Barker, David (1983), Associate Professor of Theatre; B.S.E., Duquesne University; M.F.A., Rutgers, The State University

Barkley, Margaret V. (1963), Professor Emeritus of Family Re sources and Human Development; B.S., Millikin University, M S., Ed D., University of Illinois

Barkson, Joseph A. (1958), Professor Emeritus of Engineering; B.S.E E., University of Michigan, M S , Ph.D., University of Illinois

Barlow, Richard B. (1964 , Professor Emeritus of History; B.A., M.A., Ph.D., University of Pennsylvania

Barnard, John P. (1991 , Assistant Learning Resources Specialist, University Media Systems; B.S., State University of New York; M.Ed , Arizona State University

Barnhill, Robert (1986), Professor of Computer Science and Engi neering; Vice President for Research and Strategic Initiatives, B A., University of Kansas; M.A., Ph.D., University of Wisconsin, Madi son

Barona, Andrés 1986 , Associate Professor of Education, Interim Associate Dean, Graduate Programs and Research; B S , M Ed , Texas A&M University; Ph.D., University of Texas, Austin

Barone, Thomas 1990), Associate Professor of Curriculum and In struction; B.A , Loyola University, New Orleans; M.A., University of New Orleans; Ed.D , Stanford University

Barrera, Manuel (1977), Professor of Psychology; B.S., University of Wisconsin, Eau Claire; M.A , Ph D., University of Oregon

Barrett, Thomas W. (1950), Professor Emeritus of Agribusiness and Environmental Resources; B S., Brigham Young University; M.S., Ph.D., Cornell University

Barroll-Aschaffenburg, Rayna (1980), Associate Professor of Mu sic; B.M , University of Texas; D.M.A., University of Maryland, College Park

Bartels, Robert D. (1981), Professor of Law; B A., University of Michigan; J D , Stanford University

Barton, C. Michael (1987 , Associate Museum Professional, An thropology, Collections Administrator B A., University of Kansas; M.A., Ph.D., University of Arizona

Bartz, Donna R. (1968), Professor of Theatre; B.F.A , M.A., Uni- versity of Colorado

Bashford, Howard H. (1991), Associate Professor of Construction; B.S., M.S , University of Wyoming, Ph D , Brigham Young Univer sity

Bassford, Gerald (1969), Associate Professor of Management; B.S., M.S., University of Wyoming, D.B.A Indiana University

Bataille, Gretchen M. (1988), Professor of English; Associate Dean, Administration and Personnel, College of Liberal Arts and Sciences; B.S., M.A., California Polytechnic State University, D A , Drake University

Batalden, Stephen K. (1976), Associate Professor of History, B.A , Augsburg College; M.A., Ph.D., University of Minnesota

Bates, Dawn (1989), Assistant Professor of English; B.A , Ph D , University of Washington

Baty, Wayne M. (1962), Professor Emeritus of General Business, B.S., Southwest Missouri State College; M.A., Northwestern Univer sity; Ph D., University of Southern Californ a

Bauer, Ernst 1990 , Distinguished Research Professor of Physics and Astronomy; Diplom , Dr rer nat., University of Munich (West Germany)

Baxter, Harry R. (1982), Professor Emeritus of Engineering; B A., New York University; M.B.A., Fairleigh Dickinson University; M.Tech , Arizona State University

Beakley, George C. Jr. (1956), Professor Emeritus of Engineering; Associate Dean Emeritus, College of Engineering and Applied Sci ences; B.S.M.E., Texas Tech University; M.S.M.E , University of Texas Austin, Ph.D , Oklahoma State University, P E.

Beardmore, Gary D. (1979), Associate Research Technologist, Ge ology; B A , Arizona State University

Beck, Lasca (1984 , Faculty Associate of Nursing, B S N , Texas Woman's University; M.Ed., East Texas State University

Becker, R. James (1965), Professor Emeritus of Public Affairs, B.S., M.A., Bradley University; Ph.D., University of Illinois

Becker, John R. 1993), Faculty Associate of Law; B A., University of Nebraska, Lincoln; J D , Arizona State University, LL.M , New York University

Beckman, James R. 1980), Associate Professor of Engineering; B.S., M S., University of Wisconsin, Ph D , University of Arizona

Bedard, Roger L. (1990 , Professor of Theatre, B A., University of Northern Iowa; M.F A., University of Oregon, Ph D., University of Kansas

Bedient, Jack D. (1963 , Professor Emeritus of Mathematics; A.B , Albion College; M.B.S , Ed D , University of Colorado

Bedworth, David D. (1963 , Professor Emeritus of Engineering; B S I E , Lamar College of Technology, M S I E , Ph.D., Purdue University

Belgarde, Mary Jiron (1993), Assistant Professor of Curriculum and Instruction, B.S., M.A., New Mexico State University, Ph D , Stanford University

Bell, George H. (1976–82, 1989), Associate Librarian, Science Ref erence Service; B.A., William Paterson College; M.L S., Pratt Insti tute

Bell, James W. (1966 , Professor Emeritus of Secondary Education; A.B., Washburn University of Topeka, M Ed., Ed.D., University of Kansas

Bell, John E. (1965), Professor Emeritus of Secondary Education, B S , University of Nebraska, Lincoln; M A., Ed D., University of Wyoming

Bell, Mary E. (1970 , Professor Emeritus of Education; B.S., Indi ana State Teachers College, M S , Butler University, Ed.D., Indiana University, Bloomington

Bell, Shirley (1988), Assistant Professor of Nursing, B.S N., Univer sity of Cincinnati, M S N , Wayne State University, Ed.D., West Virginia University

Bellamy, Lynn (1976), Associate Professor of Engineering, B S , Texas A&M University, M.S , Ph D , Tulane University

Belok, Michael V. (1959), Professor Emeritus of Education; B.S., Indiana University, Bloomington; M.A., Arizona State University; Ph.D., University of Southern California

Beltramini, Richard F. (1979), Associate Professor of Marketing; B S , M.S., University of Illinois; Ph.D., University of Texas, Austin

Benavides, Alfredo H. (1988), Associate Professor of Multicultural Education; Academic Program Coordinator, Multicultural Educa tion, B A , Texas A&I University; M A., Ph.D., Michigan State Uni versity

Bender, Bert A. (1971), Professor of English; B A., University of Washington, Ph.D., University of California, Irvine

Bender, Gordon L. (1953), Professor Emeritus of Zoology, B.S., Iowa State College; M.S., University of Wisconsin, Ph D , Univer sity of Illino s

Bender, Paul 1984 , Professor of Law; A B , LL B , Harvard Uni versity

Benedict, Joel A. (1946), Professor Emeritus of Education, B.A , M.A , Arizona State University; Ed D., Stanford University

Benin, David B. (1970), Associate Professor of Physics and As tronomy; A B. Cornell University, M A , Ph D., University of Roch ester

Benin, Mary B. (1979 , Associate Professor of Sociology, B A , Vanderbilt University; M.A , Ph D., University of Nebraska, Lincoln

Bennett, ElDean (1970 , Professor Emeritus of Journalism and Telecommunication; B.A., Brigham Young University; M.A , Ph D , Michigan State University

Bennett, Gordon R. 1993), Assistant Professor of Aerospace Stud ies, B A., University of Portland; M.B.A., University of South Da kota

Bennett, Peter A. (1984), Associate Professor of Physics and As tronomy; B.A., University of Minnesota, Twin Cities; Ph.D , Univer sity of Wisconsin, Madison

Benzinger, Robert P. (1970), Professor Emeritus of Design; B.S.M E , University of Wisconsin, Madison, M A.E , Chrysler In stitute of Engineering

Berch, Michael A. (1969 , Professor of Law; B.A , J.D., Columbia University

Berch, Rebecca White (1984), Instructional Professional, Director, Legal Writing and Tutorial Programs, B S M.A , J D , Arizona State University

Berkowitz, Harold L. (1990 , Faculty Associate, Center for Envi ronmental Studies; B.Ch E , Polytechnic Institute of Brooklyn; M.Ch E., Buchnell University

Berliner, David C. 1987), Professor of Elementary Education and Psychology in Education; B.A , University of California, Los Ange les, M A , California State University, Los Angeles; Ph.D., Stanford University

Berman, David R. (1966), Professor of Political Science, B A , Rockford College, M A , Ph D , American University

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Winkelman, Richard D. (1965), Assoc ate Professor of Economics, B A , Southern I inois University, M A , Ph D , University of Illi nois

Wintergalen, Barbara A. 1992 , Faculty Associate of Nursing; B.S.N., Loretto Heights College, M.S , Arizona State University

Wirtz, Dorothy (1959), Professor Emeritus of French, B A , Univer sity of Iowa; M A Ph D , University of Wisconsin

Wiseman, Douglas E. (1976 , Associate Professor of Special Edu cation, B S M A Eastern Michigan University, Ph D , University of Illinois

Wiseman, Greta 1984), Faculty Associate of Nursing, B.S.N., Han lin e University; M.S., Arizona State University

Wiseman, Robert M. (1991), Assistant Professor of Management; B B A., University of W sconsin, La Crosse; M.B.A., University of Wisconsin, Milwaukee, Ph D University of Minnesota

Withey, Michael B. 1993 , Faculty Associate of Law, B A , West ern Michigan University, J D , University of Arizona

Witt, Tom 1975 Associate Professor of Design; B A., M A , M F A., University of California Los Angeles

Wittmershaus, Bruce P. 1986 , Assistant Research Scientist, Phys ics and Astronomy, B S , Franklin and Marshall College, M.A., Ph D., Univers ty of Rochester

Wixted, J. Timothy (1978), Professor of Asian Languages, B.A., University of Tor nto (Canada , A M., Stanford Un versity, D Phil , University of Oxford England)

Wochner, Raymond E. (1952), Professor Emeritus of Education B S , York College, M A University of Nebraska, Lincoln, Ph D University of Wyoming

Wolchik, Sharlene 1980 , Professor of Psychology; B A , Vassar College, M.S., Ph.D , Rutgers, The State University

Wolf, Donald J. 1969 Professor Emeritus of Political Science; B A., M A , Gonzaga University, S T M., University of Santa Clara; Ph D., Ge orgetown Univers ty

Wolf, George H. 1986), Associate Professor of Chemistry and Bio chemistry; B A., University of California, San Diego, M S , Ph D., University of Ca ifornia, Berkeley

Wolf, Robert Lee 1985 , Professor of Design; Director, School of Design, B S , Southern I linois University, Carbondale, M A , Uni versity of Missouri; Cert. Konstindustriskolan Goteborg Sweden

Wolf, W. Shapard Jr. (1983 Associate Research Adm nistrator, Sociology, Director, Survey Research Laboratory, Sociology; B.F.A., Flo ida State Un versity, M Ed., University of Georgia

Wolfe, Philip M. 1988), Professor of Engineering; Chair, Depart ment of Industrial and Management Systems Engineering; B.S., Uni versity of Missouri M S E., Ph D , Arizona State University

Wollam, Owen A. (1964 , Professor Emeritus of French; B.A , M A., Montana State Un versity, Ph D., University of Washington

Wolthering, Dianne, Capt (1992), Assistant Professor of Aerospace Studies

Wood, Billy G. 19 , A oc ate Professor of Technology, A B , University of Cal fornia, B S , Ea tern Illinois University, M.S , Uni versity of Ar zona

Wood, Byard D. (1970 , Professor of Engineering, Director, Center for Energy Systems Research, B S M E., M.S.M E , Utah State Uni versity; Ph D , University of Minnesota, Twin Cit es

Wood, Harry 1954), Professor Emeritus of Art; B A , M.A., Uni versity of Wisconsin, Madison B A , Ph.D , Oh o State University

Wood, Steven D. 1975 , Professor of Decision and Information Systems, B.S , M A., California State University, San Diego; Ph.D , Unive sity of Wisconsin, Madison

Woodbury, Neal W. 1987 , Assistant Professor of Chemistry and Biochemistry; B.S., University of Cal fornia, Davis, Ph D., Univer sity of Washington

Woodfill, Marvin C. 1966 , Professor of Computer Science and Engineering, B.S , M.S., Ph D Iowa State University

Wooding, Robert R. (1971 , Professor Emeritus of Construction, B S , United States Naval Academy; B.C.E., M C E , Rensselaer Polytechnic Institute

Woodman, Natalie J. (1969 , Professor Emeritus of Social Work, B A , New York University, M.S.S., Smith Co ege

Woods, Roosevelt Jr. 1965 , Professor En eritus of Art; B.S., M.A., Arizona State University

Woodward, Mark R. (1985), Associate Professor of Re igious Studies; B A M A , Ph.D., University of I linois

Wooldridge, Charles B. 1959 , Professor Emeritus of Engineering, A.B , B.S., University of Kentucky; M S , Ph D , Purdue University

Wooldridge, Mary C. (1959 , Professor Emeritus of Family Re sources and Human Development; B.S., M S , University of Ken tucky, Ph D., Purdue University

Woolf, Charles M. 1961–63, 1964 , Professor Emeritus of Zool o y, Dean Emeritus, College of Liberal Arts and Sciences and Graduate College, B S , M S., University of Utah; Ph.D., University of California Berkeley

Woolsey, D. Kristine (1988), Assistant Professor of Architecture, M Arch , Arizona State University

Wootton, Richard T. 1964 , Professor Emeritus of Education, B S , M.S., Ed D , University of Utah

Wootten, William W. (1959), Professor Emeritus of History, B A , University of Chicago, M A., University of Iowa; Ph.D., University of Minnesota, Twin Cities

Wrenn, C. Gilbert (1965), Professor Emeritus of Counselor Educa t'on; A B , Willamette University; M A., Ph D., Stanford University; LL.D , Willamette University

Wright, Danaya C. (1993), Visiting Professor of Law, B A , J D., Cornell University

Wright, Robert L. (1991), Faculty Associate of Manufacturing and Industrial Technology, B S J D , Arizona State University

Wright, M. Lin (1973 , Professor of Theatre; Chair, Department of Theatre, B A., M A., Ph D , University of Minnesota, Twin Cities

Wu, Ai-hwa 1964 , L brarian, Original Cataloging, B A , National Taiwan University (Taiwan), M L S , Un versity of Washington

Wulk, Ned W. 1957 , Professor Emeritus of Physical Education, B S , Wisconsin State University, M Ed., Xavier University

Wurzburger, Marilyn J. 1960), Librarian; Head, Special Collec tions, B A., MacMurray College

Wurzell, Carol A. 1965), Professor Emeritus of Nursing, B.S., California State College, Chico, M S., University of Maryland, Col lege Park

Wyckoff, Susan (1979), Professor of Physics and Astronomy; Chair, Department of Physics and Astronomy; B.A., Mount Holyoke College; Ph.D., Case Western Reserve University

Wyndelts, Robert W. (1974), Professor of Accountancy; B.B.A., M.P.A., Georgia State University; Ph.D., University of Georgia; C.P.A., Arizona, Georgia

Wytko, Joseph R. (1975), Professor of Music; B.M.E., West Virginia University; M.M., D.M., Northwestern University

Yabes, Ruth Ammerman (1990), Assistant Professor of Planning and Landscape Architecture; B.S. (Planning), B.S. (Economics), University of California, Davis; M.C.P., University of Pennsylvania, Ph.D., Cornell University

Yaghi, Omar M. (1992), Assistant Professor of Chemistry and Biochemistry; B.S., State University of New York, Albany; Ph.D., University of Illinois

Yale, Francis G. (1952), Professor Emeritus of Physics and Astronomy/Science Education; A.B., M.A., University of Northern Colorado; Ed.D., Columbia University

Yamaguchi, Gary T. (1989), Assistant Professor of Engineering; A.B., Occidental College; B.S., California Institute of Technology; S.M.M.E., Massachusetts Institute of Technology; Ph.D., Stanford University

Yamamori, Tetsumao (1989), Adjunct Professor of Sociology; B.A., Northwest Christian College; B.D., Texas Christian University; Ph.D., Duke University

Yaniv, Daphna (1992), Senior Research Specialist, Chemistry and Biochemistry; B.S., Ph.D., Israel Institute of Technology (Israel)

Yao, Lun-Shin (1981), Professor of Engineering; B.S.E., Cheng Kung University; M.S., University of Texas; Ph.D., University of California, Berkeley

Yao, Winberta M. (1975), Associate Librarian, Reference Service; B.A., University of California; M.S., Columbia University

Yates, Ann M. (1978), Associate Research Specialist, Chemistry and Biochemistry; B.S., St. Lawrence University; Ph.D., Arizona State University

Yeater, James W. 1958), Professor Emeritus of Theatre; B.A., Baker University, M.A., University of Washington, Ph.D., University of Illinois

Yoshioka, Carlton (1988), Associate Professor of Recreation Management and Tourism; B.A., University of California, Santa Barbara, M.A., California State University, Chico, Ph.D., University of Oregon

Youm, Kyu Ho (1991), Associate Professor of Journalism and Telecommunication, B.A., Konkuk University (South Korea); M.A., Ph.D., Southern Illinois University, Carbondale

Young, Bernard (1988), Associate Professor of Art, B.F.A., Temple University; M.F.A., Ph.D., Cornell University

Young, Denise I. (1990), Faculty Associate of Law; B.A., Stevens College, J.D., University of Arizona

Young, Dennis L. (1975), Professor of Mathematics; B.S., St. Louis University; M.S., Ph.D., Purdue University

Young, Hewitt H. (1967), Professor Emeritus of Engineering; B.S.M.E., M.S.I.E., Case Institute of Technology; Ph.D., Arizona State University

Young, Joseph E. (1979), Associate Professor of Art, B.A., California State University at Los Angeles; M.A., University of California, Los Angeles

Young, Otis E. Jr. 1963), Professor Emeritus of History; A.B., A.M., Ph.D., Indiana University

Young, Michael Cochise (1990), Associate Dean, University Honors College; B.A., St. Joseph's University; M.A., Ph.D, University of Pennsylvania

Youngblood, Robert L. (1973), Professor of Political Science, B.A., Willamette University; M.A., University of Hawaii, Manoa, Ph.D., University of Michigan

Yuen, George U. (1957), Professor Emeritus of Chemistry and Biochemistry; B.S., Arizona State University; Ph.D., University of Utah

Zacher, Robert V. (1947), Professor Emeritus of Advertising, B.S., M.S.B.A., University of Alabama

Zaniewski, John (1986), Associate Professor of Engineering, B.S.C.E., M.S.C.E., Ph.D., University of Texas, Austin

Zaslow, Bertram (1956), Professor Emeritus of Chemistry and Biochemistry; B.A., Cornell University; M.S., University of Minnesota, Twin Cities, Ph.D., Iowa State University

Zatz, Marjorie S. (1982), Associate Professor of Justice Studies; B.A., University of Massachusetts, Amherst; M.A., Ph.D., Indiana University, Bloomington

Zautra, Alex (1976), Professor of Psychology; Director, Clinical Program in Psychology; B.A., Antioch College; M.S., Ph.D., University of Utah

Zeitlin, Marilyn A. (1992), Director, University Art Museum; A.B., M.A., Harvard University

Zeng, Gualiang (1991), Assistant Professor of Electronics and Computer Technology; B.S., Chengdu Telecommunication Institute (China), M.S., University of California, San Diego; M.N.S., Ph.D., Arizona State University

Zerkle, Terry (1989), Faculty Associate of Public Affairs; A.B., M.P.A., Eastern Kentucky University

Zettler, Hugo F. (1977), Faculty Associate of Law; B.S., Arizona State University; J.D., University of Arizona

Zimiles, Herbert (1988), Professor of Early Childhood Education; B.A., New York University; Ph.D., University of Rochester

Zimmer, Carl R. (1959), Professor Emeritus of Engineering; B.S.E.E., Cornell University; M.S.E.E., Ph.D., Syracuse University

Zimmerman, Allan D. (1988), Adjunct Assistant Professor of Botany; B.S., University of Arizona, Ph.D., University of Texas, Austin

Ziurys, Lucy M. (1988), Associate Professor of Chemistry and Biochemistry; B.A., William Marsh Rice University; Ph.D., University of California, Berkeley

Zorita, Paz Mendez-Bonito (1993), Assistant Professor of Social Work; A.S., School of Social Work of Gijón (Spain); M.S.S.A., Ph.D., Case Western Reserve University

Zucker, Stanley H. (1975), Professor of Special Education; Academic Program Coordinator, Special Education; B.A., State University of New York, Stony Brook, M.S., Hofstra University; Ph.D., University of Missouri, Columbia

Zuckerman, Howard S. (1991), Professor of Health Administration and Policy; B.A., Hunter College; M.B.A., Xavier University; Ph.D., University of Michigan

Zwiebel, Imre (1979), Professor of Engineering; B.S., University of Michigan, M.S., Ph.D., Yale University

Zygas, K. Paul (1984), Associate Professor of Architecture, A.B., M.Arch., Harvard University; Ph.D., Cornell University

Zylla, Julie (1988), Lecturer of Family Resources and Human Development; B.S., South Dakota State University; M.S., Arizona State University

Regents' Professors

The title "regents' professor" is conferred on selected members of the ASU tenured faculty who have achieved and are sustaining the highest level of distinction by their exceptional contributions to the mission of the university in research or other creative activity and in teaching or professional service.

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Regents' Professor of Zoology

DAVID L. ALTHEIDE
Regents' Professor of Justice Studies

CONSTANTINE BALANIS
Regents' Professor of Electrical Engineering

PETER R. BUSECK
Regents' Professor of Chemistry and Geology

ROBERT B. CIALDINI
Regents' Professor of Psychology

JEFFREY COOK
Regents' Professor of Architecture

JOHN M. COWLEY
Regents' and Galvin Professor of Physics

NORMAN DUBIE
Regents' Professor of English

NANCY EISENBERG
Regents' Professor of Psychology

LEROY EYRING
Regents' Professor Emeritus of Chemistry

MARTIN T. FARRIS
Regents' Professor Emeritus of Purchasing and Logistics Management

DAVID K. FERRY
Regents' Professor of Electrical Engineering

DAVID WILLIAM FOSTER
Regents' Professor of Spanish

DAVID R. HICKMAN
Regents Professor of Music

DAVID H. KAYE
Regents' Professor of Law

GARY D. KELLER
Regents' Professor of Spanish

RAYMOND W. KULHAVY
Regents' Professor of Psychology in Education

DANIEL M. LANDERS
Regents' Professor of Exercise Science and Physical Education

SHENG H. LIN
Regents' Professor of Chemistry and Biochemistry

LEE MEYERSON
Regents' Professor Emeritus of Psychology

WARREN MILLER
Regents' Professor of Political Science

CARLETON B. MOORE
Regents' Professor of Chemistry and Biochemistry and Geology

DENNIS J. PALUMBO
Regents' Professor of Justice Studies

GEORGE R. PETTIT
Regents' Professor of Chemistry and Biochemistry

MARYBETH STEARNS
Regents Professor of Physics and Astronomy

WILLIAM T. TROTTER
Regents' Professor of Mathematics

CHRISTY G. TURNER
Regents' Professor of Anthropology

CHINARY UNG
Regents' Professor of Music

J. BRUCE WAGNER JR.
Regents Professor, Center for Solid State Science and Chemistry

Administrative and Academic Personnel

Arizona Board of Regents

Ex Officio

Fife Symington, B.A , *Governor of Arizona*

C. Diane Bishop, B.S., M Ed , M S , *Superintendent of Public Instruction*

Appointed

To January 1996

Andrew D Hurwitz, J.D.

Douglas J. Wall, J.D.

To January 1998

Eddie Basha, B.A.

Arthur Chapa, B A , M A , J D

To January 2000

Rudy E. Campbell, CLU

John F. Munger, B A., J.D

To January 2002

George H. Amos III, B.S.

Judith Gignac

Student Regent

To June 1994

Spencer Insolia

Joel Sideman, J.D , *Counsel to the Board*

University Organization

President's Office

President ..... Lattie F. Coor
Senior Executive Assistant
to the President ..... Ben R. Forsyth
Special Assistant to the President
for Administration ..... Lawrence D. Mankin
Manager of Operations ..... C. Vinette Cowart
Business Operations Manager ..... Julia R Berry
Director, Athletics ..... Charles S. Harris
Director, Equal Opportunity/
Affirmative Action ..... Barbara A. Mawhiney
General Counsel ..... Paul J. Ward
ICA Faculty Representative ..... Jerry L Kingston

ASU West

See page 440 for a list of ASU West administrators.

Academic Affairs

Senior Vice President and Provost ..... Milton D. Glick
Vice Provost ..... Kathleen K Church
Vice Provost ..... Walter Harris
Vice Provost for Information
Technology ..... William E. Lewis
Assistant Vice President for
Academic Affairs ..... Louis Olivas
Assistant to the Senior Vice President
and Provost ..... Linda Van Scoy
Fiscal Operations Administrator ..... Lynn Carpenter
Executive Director, Undergraduate
Academic Services ..... John Ramage
Director, Academic and Administrative
Documents ..... Tabb Forster
Director, Academic Facilities ..... Jack Shafer
Director, Institutional Analysis ..... John Porter
Director, International Programs .....
Director, Strategic Planning ..... Mary P McKeown
Director, Summer Sessions ..... Leon Kemper
Director, University Evaluation ..... William S. Johnson
Director, University Program for
Faculty Development ..... George Watson
Associate Director, Development ..... Patrick Burkhart
Manager, Campus Facilities ..... Susan Lowry
Coordinator, Articulation ..... Zoila Gamero de Tovar

College of Architecture and Environmental Design

Dean, College of Architecture and
Environmental Design ..... John Meunier
Associate Dean, College of Architecture
and Environmental Design ..... James Rapp
Director, School of Architecture ..... Michael Underhill
Director, School of Design ..... Robert Lee Wolf
Director, School of Planning
and Landscape Architecture ..... Frederick Steiner
Director, Herberger Center for
Design Excellence ..... Beverly Brandt
Director, Joint Urban Design Program ..... Michael Fifield

College of Business

Dean, College of Business ... Larry E. Penley
Director, School of Accountancy ... Philip M.J. Reckers
Chair, Department of Business Administration ... *Larry R. Smeltzer*
Chair, Department of Decision and Information Systems ... Vicki L Smith Daniels
Chair, Department of Economics ... Paul L Burgess
Chair, Department of Finance ... Herbert M. Kaufman
Director, School of Health Administration and Policy ... Frank G. Williams
Chair, Department of Management ... Luis R. Gomez Mejia
Chair, Department of Marketing ... Michael P Mokwa
Director, Center for Advanced Purchasing Studies ... Harold E Fearon
Director, Arizona Real Estate Center ... Jay Q. Butler
Director, Center for Business Research ... Timothy D Hogan
Executive Director, Center for Financial System Research ... Herbert M. Kaufman
Director, First Interstate Center for Services Marketing ... Stephen W. Brown
Director, Division of Information, Management, and Systems Technology ... Robert T. Keim
Director, Economic Outlook Center ... Lee R. McPheters
Director, Joan and David Lincoln Center for Ethics ... Mark Pastin
Director, L. William Seidman Research Institute ... Eugene S. Schneller

College of Education

Dean, College of Education ... Leonard A. Valverde
Interim Associate Dean, Graduate Programs and Research ... Andrés Barona
Interim Associate Dean, Personnel and Student Services ... Nicholas R. Appleton
Interim Director, Division of Curriculum and Instruction ... *Sheryl L Santos*
Assistant Director, Division of Curriculum and Instruction ... Larry A. Faas
Academic Program Coordinator, Early Childhood Education ... Elaine Surbeck
Academic Program Coordinator, Educational Media and Computers ... Gary Bitter
Academic Program Coordinator, Elementary Education ... Herbert Cohen
Academic Program Coordinator, Multicultural Education ... Alfredo Benavides
Academic Program Coordinator, Reading and Library Science ... Lyndon W. Searfoss
Academic Program Coordinator, Secondary Education ... Robert Gryder
Academic Program Coordinator, Special Education ... Stanley Zucker
Interim Director, Division of Psychology in Education ... Gail Hackett
Academic Program Coordinator, Counseling Psychology ... Charles D. Claiborn
Academic Program Coordinator, Counselor Education ... Douglas Gross
Academic Program Coordinator, Learning and Instructional Technology ... Wilhelmina Savenye
Academic Program Coordinator, Lifespan Developmental Psychology ... Elsie G. Moore
Academic Program Coordinator, Measurement, Statistics, and Methodological Studies ... David J. Krus
Academic Program Coordinator, School Psychology ... Maryann Santos de Barona
Interim Director, Division of Educational Leadership and Policy Studies ... K. Forbis Jordan
Academic Program Coordinator, Educational Administration and Supervision ... Thomas H. Metos
Academic Program Coordinator, Educational Policy Studies ... Gene Glass
Academic Program Coordinator, Higher Education ... Robert Fenske
Director, Center for Bilingual and Bicultural Education ... M. Beatriz Arias
Director, Bureau of Educational Research and Services ... Margaret Mangini
Director, Educational Services ... Marigold Linton
Director, Center for Indian Education ... Karen Swisher
Director, Mountain States Multifunctional Resource Center ... Rodolfo Chavez
Director, Professional Field Experiences ... Billie Enz
Interim Director, Student Affairs ... Stephanie Jacobson

College of Engineering and Applied Sciences

Dean, College of Engineering and Applied Sciences ... David C Chang
Associate Dean, Academic Affairs ... Daniel F Jankowski
Associate Interim Dean, Business and Student Affairs ... Mary R. Anderson
Associate Dean, Industrial and Professional Development ... Charles E. Backus
Associate Dean, Research and Strategic Initiatives ... David K. Ferry
Director, School of Agribusiness and Environmental Resources ... Eric P. Thor
Director, Del E Webb School of Construction ... William W. Badger
Director, School of Technology ... Albert L. McHenry
Chair, Department of Aeronautical Technology ... Robert O Meitz
Chair, Department of Electronics and Computer Technology ... Albert L. McHenry
Chair, Department of Manufacturing and Industrial Technology ... Donald W. Collins
Director, School of Engineering ... David C. Chang
Interim Chair, Department of Chemical, Bio and Materials Engineering ... James W. Mayer
Chair, Department of Civil Engineering ... Larry W. Mays
Acting Chair, Department of Computer Science and Engineering ... Ben M. Huey
Chair, Department of Electrical *Engineering* ... Peter E. Crouch

Chair, Department of Industrial and Management Systems Engineering ... Philip M. Wolfe
Chair, Department of Mechanical and Aerospace Engineering ... Don L. Boyer
Director, Engineering Core and Special and Interdisciplinary Studies ... Daniel F. Jankowski
Acting Director, Center for Advanced Transportation Systems Research ... Judson S. Matthias
Director, Aerospace Research Center ... Helen Reed
Director, Center for Agribusiness Policy Studies ... Eric P. Thor
Director, Computer Integrated Manufacturing Systems Research Center ... Dan L. Shunk
Director, Center for Energy Systems Research ... Byard D. Wood
Director, Center for Research in Engineering and Applied Sciences ... David K. Ferry
Director, Center for Professional Development ... Charles S. Elliott
Director, Center for Solid State Electronics Research ... Lex A. Akers
Director, Systems Science and Engineering Research Center ... Peter E. Crouch
Director, Telecommunications Research Center ... Constantine A. Balanis

College of Extended Education

Dean, College of Extended Education ... Bette F. DeGraw
Business Operations Manager, Administrative Services ... Dolores Shoecraft
Director, American Language and Culture Program ... Gailynn Valdés
Director, Arizona Prevention Resource Center ... Gail S. Chadwick
Director, Center for Lifelong Learning ... Jeanne G. Crawford
Director, Distance Learning Technology ... Elizabeth H. Craft
Director, Division of Instructional Programs ... Patricia A. Feldman
Director, Downtown Center ... Geneva Duarte
Director, Independent Study by Correspondence ... Patricia A. Feldman
Director, Office of Marketing and Communication ... Mary Jane Finley
Director, Office of Planning and Development ... Alan R Brown

College of Fine Arts

Dean, College of Fine Arts ... _____
Associate Dean ... Toni-Marie Montgomery
Sr. Business Operations Manager ... Suzanne Bias
Director, School of Art ... Julie F Codell
Chair, Department of Dance ... Elizabeth C. Lessard
Director, School of Music ... George E. Umberson
Chair, Department of Theatre ... M. Lin Wright
Director, Institute for Studies in the Arts ... Richard L. Loveless
Director, University Art Museum ... Marilyn Zeitlin

College of Law

Dean, College of Law ... Richard J. Morgan
Director, Center for the Study of Law, Science and Technology ... Daniel S. Strouse
Director, Indian Legal Programs ... Siera T. Russell
Acting Director, Legal Research and Writing ... Catherine O'Grady

College of Liberal Arts and Sciences

Dean, College of Liberal Arts and Sciences ... Gary S. Krahenbuhl
Chair, Department of Aerospace Studies ... Col. Merrill R. Karp
Chair, Department of Anthropology ... Charles L. Redman
Chair, Department of Botany ... J. Kenneth Hoober
Chair, Department of Chemistry and Biochemistry ... Morton E. Munk
Chair, Department of English ... Wendy K. Wilkins
Interim Chair, Department of Exercise Science and Physical Education ... Philip E Martin
Chair, Department of Family Resources and Human Development ... Gary Peterson
Chair, Department of Geography ... Anthony J. Brazel
Chair, Department of Geology ... Edmund Stump
Chair, Department of History ... Retha M. Warnicke
Chair, Department of Languages and Literatures ... Pier Raimondo Baldini
Chair, Department of Mathematics ... Christian Ringhofer
Chair, Department of Microbiology ... Edward A. Birge
Chair, Department of Military Science ... Lt. Col. Stephen J. Heynen
Chair, Department of Philosophy ... Jane Maienschein
Interim Chair, Department of Physics and Astronomy ... Susan Wyckoff
Chair, Department of Political Science ... Stephen G. Walker
Acting Chair, Department of Psychology ... J. Jay Braun
Chair, Department of Religious Studies ... Linell E Cady
Chair, Department of Sociology ... A. Wade Smith
Interim Chair, Department of Speech and Hearing Science ... M. Jeanne Wilcox
Chair, Department of Zoology ... James P. Collins
Director, Center for Asian Studies ... Stephen MacKinnon
Director, Cancer Research Institute ... G. Robert Pettit
Acting Director, Child Laboratory Program ... Mary Lamparski
Director, Climatology Laboratory ... Robert C. Balling
Director, Hispanic Research Center ... Felipe G. Castro
Director, Interdisciplinary Humanities Program ... Bettie Anne Doebler
Interim Director, Center for Latin American Studies ... L. Teresa Valdivieso
Director, Arizona Center for Medieval and Renaissance Studies ... Jean R. Brink
Director, Center for Meteorite Studies ... Carleton B. Moore
Director, Center for Solid State Science ... James W. Mayer
Director, Women's Studies Program ... Mary Logan Rothschild

College of Nursing

Dean, College of Nursing ..... Barbara A. Durand
Interim Associate Dean for Graduate Programs and Research ..... Nancy Melvin
Interim Associate Dean for Undergraduate Programs and Extended Education ..... Mary Killeen

College of Public Programs

Dean, College of Public Programs ..... Anne L. Schneider
Associate Dean, College of Public Programs ..... Thomas V. Schade
Chair, Department of Communication ..... Charles Bantz
Director, Walter Cronkite School of Journalism and Telecommunication ..... Douglas A. Anderson
Director, School of Justice Studies ..... Rita Mae Kelly
Chair, Department of Recreation Management and Tourism ..... Maria T. Allison
Director, School of Public Affairs .....
Director, Advanced Public Executive Program ..... Montgomery Van Wart
Director, Morrison Institute for Public Policy ..... Robert Melnick

Graduate College

Dean, Graduate College ..... Brian L. Foster
Associate Dean ..... Noel J. Stowe
Associate Dean ..... Jerry R. Thomas
Assistant Dean ..... Sandra L. Luehrsen

School of Social Work

Dean, School of Social Work ..... Emilia E. Martinez Brawley

University Honors College

Dean, University Honors College ..... Ted Humphrey
Associate Dean ..... Michael Cochise Young

University Libraries

Dean, University Libraries ..... Sherrie Schmidt
Associate Dean for Library Services ..... Jane Conrow
Associate Dean, Collection Development ..... Dora Biblarz
Associate Dean, University Media Systems ..... Warren Fry
Assistant Dean for Personnel ..... Kurt Murphy
Head, Acquisitions and Bibliographic Records ..... Marcia Anderson
Head, Noble Science and Engineering Library ..... Mirek Borovansky
Head, Instructional Services ..... Susan Broyles
Head, Government Documents ..... Rebecca Burke
Head and Conservator, Preservation ..... Shar Grant
Acting Head, Library Technology and Systems ..... Scott Herrington
Acting Head, Program Development and Evaluation, UMS ..... Phil Konomos
Head, Music Library ..... Arlys McDonald
Head, Map Collection ..... Rosanna Miller
Head, Architecture and Environmental Design Library ..... Berna Neal
Head, Department of Archives and Manuscripts ..... Ed Oetting
Assistant Head, Noble Science and Engineering Library ..... Mara Pinckard
Head, Media Development, UMS ..... Jeremy Rowe
Head, Reference Services ..... Ed SantaVicca
Head, Original Cataloging ..... Lois Schneberger
Head, Access Services ..... Virginia Sylvester
Head, Interlibrary Loan ..... Sheila Walters
Head, Special Collections ..... Marilyn Wurzburger

Administrative Services

Associate Vice President and Chief Administrative Services Officer, ASU Main ..... Jennus Burton
Vice Provost and Chief Administrative Services Officer, ASU West ..... Gebeyehu Ejigu
Assistant Vice President, Administrative Services ..... LeEtta Overmyer
Assistant Vice President, Administrative Services ..... Susan M. Malaga
Comptroller and Treasurer ..... Gerald E. Snyder
Associate Comptroller ..... Kevin Walker
Assistant Comptroller, Business Services ..... Henry Spomer
Assistant Comptroller, Accounting Services ..... Pat Zurga
Director, Facilities Management ..... Val Peterson
Associate Director ..... Dave Brixen
Director, Facilities Planning and Construction ..... Henry Mortarotti
Assistant Director, Administration ..... John Ordini
Assistant Director, Design Project Management ..... Vance Linden
Acting Director, Human Resources ..... Connie Wood
Assistant Director, Employment/ Classification Services ..... Christine Cervantes
Acting Assistant Director, Records and Payroll ..... Sue Madden
Interim Assistant Director, Benefits/ Employment ..... William Mermis
Interim Assistant Director, Staff Relations/Development ..... Susan Courtney
Director, Public Safety ..... William Bess
Interim Associate Director ..... Lanny Standridge
Acting Assistant for Administration ..... Sheila Woods Stokes
Chief of Police ..... Craig Emanuel
Assistant Director, Parking and Transit ..... Linda Riegel
Assistant Director, Risk Management/ Safety Services ..... Robert Gomez
Director, Purchasing ..... Ray Jensen
Associate Director ..... John Riley
Assistant Director ..... Don Green
Director, ASU Bookstore ..... Val Ross
Manager, ASU Internal Audit ..... Tracy Myers

Research and Strategic Initiatives

Vice President for Research and Strategic Initiatives ..... Robert Barnhill
Associate Vice President ..... Ronald Barr
Director, Office of Research and Creative Activities ..... Gary Chaffins
Director, Cost Studies and Property Control ..... Mike Anthony
Assistant Director, Office of Research and Creative Activities ..... Janice Bennett
Director, Animal Care Program ..... George Bjotvedt
Assistant Director ..... Gloria Aerni
Director, Radiation Protection ..... Mark Coombs
Director, Technology Transfer Industry Liaison Office ..... Gary Argue
Director, Center for Environmental Studies ..... Duncan T. Patten

Student Affairs

Vice President for Student Affairs ..... Christine Wilkinson
Associate Vice President for Student Affairs ..... Leon Shell
Assistant Vice President for Student Affairs ..... Robert Soza
Assistant to the Vice President ..... Lowell Crary
Assistant to the Vice President ..... Kathy McBride
Coordinator of Student Information Systems ..... John O'Connell
Dean, Student Development and Residential Life ..... James Rund
Dean, Student Life ..... Art Carter
Director, Career Services .....
Director, Counseling and Consultation ..... Teresa Branch
Director, Educational Development .....
Director, Memorial Union ..... Floyd Land
Director, Recreational Sports and Student Activities ..... Gerald Maas
Director, Student Financial Assistance ..... Kate Dosil
Interim Director, Student Health ..... Dale Bowen
Director, Student Publications ..... Bruce Itule
Director, Undergraduate Admissions ..... Susan Clouse Dolbert
Registrar ..... Lou Ann Denny

University Relations

Vice President for University Relations ..... Brent W. Brown
Associate Vice President for University Relations ..... Allan Price
Assistant Vice President for Special Programs ..... Frank B. Hidalgo
Executive Director, Alumni Association ..... Don Dotts
Executive Director, Public Events ..... Colleen Jennings Roggensack
Executive Director, Constituent Outreach ..... Ann E. Bergin
Executive Director for Univeriity Relations ..... Judy C. Knudson
Director, Federal Government Relations ..... Neil Giuliano
Director, Fiscal and Administrative Operations ..... Steve Miller
Director, Development ..... Lonnie L. Ostrom
Director, Economic Development ..... Gail Howard
Director, Information Services ..... George L. Cathcart
Director, Stadium Operations ..... Tom Sadler
General Manager, Television Station KAET ..... Charles R. Allen

Arizona State University Foundation

Chair of the Board ..... Robert Duckworth
Vice Chair ..... Robert L. Bluemle
Vice Chair ..... William Shover
Vice Chair ..... Donald Ulrich
President ..... Lonnie L. Ostrom
Secretary ..... Florence Nelson
Treasurer ..... David Lincoln
Legal Counsel ..... John R. Christian
Past Chair ..... G.M. "Solly" Sollenberger
Vice President ..... Mrs. Grady (Kathryn) Gammage
Vice President ..... Patrick Burkhardt
Vice President ..... Tere Mont'Ros-Mendoza

Board of Directors

Barbara McConnell Barrett
Richard Bloechl
Robert L. Bluemle
Junius Bowman
Patrick J Burkhart
Ed Carson
Tom Chauncey (Emeritus)
John Christian
Mal Craig
Mrs. Herbert (Diane) Cummings
Dino DeConcini (Emeritus)
Ms Pam Del Duca
Frank Diaz
Don Dotts
Robert Duckworth
Ralph Elsner
Ron Erhardt
George Evans
Robert Fletcher
Kate Forbes
Gesford Francis
Mrs Grady (Kathryn) Gammage
Mrs. G Robert (Kax) Herberger (Emeritus)
Robert Hobbs
Leonard Huck (Emeritus)
Mrs. John (Thelma) Kieckhefer
Frank Labriola
John R. Lassen
Wayne E Legg (Emeritus)
Orme Lewis Jr.
David Lincoln
Mrs. Hugh W. (Barbara) Long (Emeritus)
Mrs. John (Pit) Lucking
Russ Lyon Jr.
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Rod J. McMullin (Emeritus)
Tere Mont'Ros Mendoza
Mrs. Jerry (Florence) Nelson
Paul Oreffice
Lonnie L Ostrom
Robin E. Parke
Richard Parker
Budd Peabody
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William Shover
James P. Simmons (Emeritus)
Franklin K. Skinner
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Susan Bitter Smith
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G.M. "Solly" Sollenberger
Rex E. Staley (Emeritus)
Robert Swanson (Emeritus)
Mae Sue Talley
John D. Thomas
Gary L. Tooker
Lyle E. Trimble (Emeritus)
Keith Turley (Emeritus)
Donald Ulrich
Morrison Warren (Emeritus)
Craig Weatherup
A. Milton Whiting
Mrs Russell (Libby) Williams

Sun Angel Foundation Board of Directors

Chair ..... Fred Homes
Vice Chair ..... Bob Hobbs
Treasurer ..... Bob Duckworth
Secretary ..... C.E. "Pep" Cooney
At Large: John Bebbling
Don Carson
Donald Chambers
Dennis Conry
Bill Georgantos
Steve Johnson
Nap Lawrence
Mike Maloney
Bob Matthews
Bill Schaefer
Max Schrimsher
Don Tapla
Stephen Wood

ASU Alumni Association Board, 1994–95

Chairman ..... Susan Bitter Smith, '77, '82 MBA
Chairman-Elect ..... Diane B. McCarthy, '60
Vice Chairman ..... Kim Ruggiero, '78
Treasurer ..... _____
Past Chairman ..... John D. Thomas, '77

COLLEGE DIRECTORS

Architecture and Environmental Design ..... John Williams, '81
Business ..... Bette Dickey, '79
Education ..... Paul Chavarria, '61, '74 M.A.E.
Engineering and Applied Sciences ..... Bill Hochgraef, '65, '68 M.S.E.
Fine Arts ..... Toni Ryon, '78
Liberal Arts and Sciences ..... John Fees, '89
Nursing ..... Lisa Weisenburger, '86

AT-LARGE DIRECTORS

Linda Brock-Nelson, '75 M.C.
Fred Dworkis, '63
Florence Eckstein, '76 M.S.W.
Chris Herstam, '71, '72 M.A.E.
Don Isaacson, '73 J.D.
Tanya Kirkpatrick, '61
Mike Leeds, '81
Ron Leeds, '57
Monica Limon-Wynn, '84
Vada Manager, '83
Wayne Manning, '70
Diane McCarthy, '60
John Mistler, '82
Cliff Ochser, '84
Ed Pastor, '66, '74 J.D.
Tony Posada, '72
Kim Ruggiero, '78
Glenn Stapley, '48
Don Stout, '61, '62 M.S.
Gary Tooker, '62
P.L. Warner, '81 M.B.A.
Rhetta Williams, '83
Sister Lynn Winsor, '65
Doug Zimmerman, '64

STUDENT DIRECTORS

ASASU President ..... Rossie Turman
Devil's Advocates President ..... _____
Student Alumni President ..... _____
Student Foundation President ..... _____
Graduate Student Association Director ..... _____

FACULTY DIRECTOR

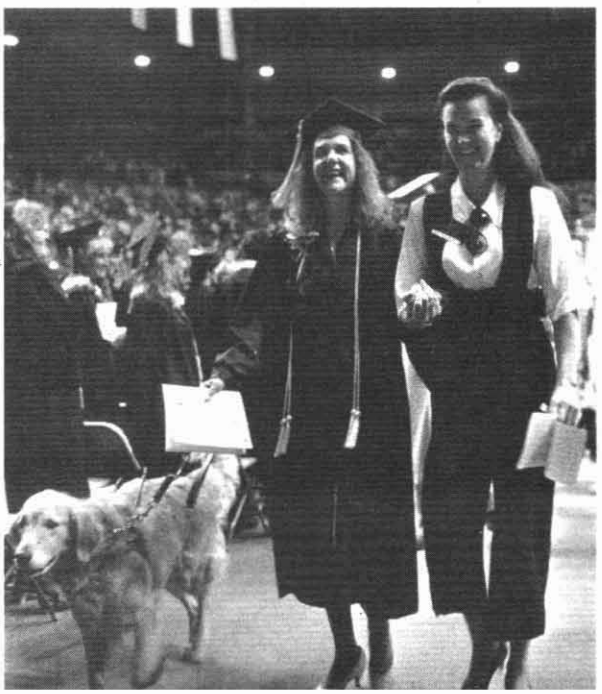
Alan Matheson

CHAPTER DIRECTORS

Evergreen ..... Roger Thorn, '84
Greater New York ..... Karen Davis, '60, '61 M.A.E.
Hawaii ..... Bill Flanders, '71
Northern California ..... Ed Lane, '58
Orange County ..... Brian Werner, '82
Sedona/Verde Valley ..... Linda Lawrence, '85 M.E.D., '86 Ed.D.
Twin Devils ..... Judy Simmons, '66
Valley Coordinating Committee Representatives ..... Frank Pezzorello, '69, '81 M.S.
Howard Sukenic, '84

KAET Community Advisory Board, 1994

Mark Sklar, Chair
Lucia Madrid, Vice-Chair
Robert H. Ellis, At-Large Member
Charles R. Allen, Ex Officio
Erik Anderson, Ex Officio
Brent W. Brown, Ex Officio
Addie Kinsinger, Ex Officio
Kathryn Gammage, Emeritus Ex Officio
Patricia Korrick, Emeritus Ex Officio
Kathy Zatz, Emeritus Ex Officio
Malena Albo
Lee Ansel
Stuart R. Brackney
Dominique K. Brown
Rita Carrillo
Ben R. Forsyth
John Fung
Bruce Hernandez
David Hume
Lupe Iniguez
Scott A. Jacobson
Peggy Kirch
Paul Koehler
Michael Koether
William Lavidge
Lizabeth McNamee
Roxanne Song Ong
Nick Rago
Richard Rector
Bonnie Richardson
Richard J. Rizzo
Stephen Roman
Daniel T. Santy
Karen Scates
Wayne Stutzer
Sandy Werthman
Anthony T. Yeung



ASU West

Ben R. Forsyth, M.D.
Vice President amd Provost

ASU West was established in 1984 to meet the higher education needs of residents of western Maricopa County. It is a nonresidential campus of ASU that offers upper division and graduate courses. ASU West offers students the opportunity to earn a baccalaureate de gree in any of 21 academic majors in the arts and sciences and in selected professional fields. The campus also offers four certificate programs and master's degree programs in Business Administration, Educational Adminis tration and Supervision, Elementary Education, and Secondary Education.

The faculty of ASU West are com mitted to preparing students to be suc cessful in the global society of the 21st century. Course offerings engender a responsiveness to change and an appre ciation of intellectual, cultural, gender, and generational diversity. The campus is committed to encouraging the educa tional, economic, cultural, and social development of the Phoenix metropoli tan area

Academic programs and support ser vices are designed to meet the needs of working adults and transfer students pursuing degrees, seeking career growth, or furthering their knowledge. The graduate programs are designed primarily for persons employed full time in businesses and schools. Most graduate courses, as well as under graduate courses, are offered in the evening.

With an enrollment of about 5,000 students, ASU West has a small-college atmosphere. Yet students have access to the resources of a major research university. As the newest campus in the state, the ASU West campus, con sisting of seven buildings totaling about 600,000 square feet, provides state-of-the art facilities in a beautifully land-scaped environment. The 300 acre campus is easily accessible via major interstate routes.

Accreditation

ASU West is accredited by the North Central Association of Colleges and Schools. Professional programs in the various academic units are also accred ited by national bodies

Academic Organization and Administration

The chief administrative and operat ing officer of ASU West is the vice president and provost for ASU West. There are four academic units at ASU West administered by academic direc tors. In addition, ASU West offers an interunit Women's Studies program ad ministered by a coordinator.

Academic Administration

Ben R. Forsyth, V ce President and Provost
Dav'd E. Schwa m, Vice Provost, Academ c Programs
Patr'c a A. Spakes, Vice Provost, Academ c Personnel
Richard C. Knopf, Associate Vice Provost, Research
Ali R. Ma ekzadeh, Associate Vice Provost, Graduate Studies
Ida M. Ma ian, Assoc ate Vice Provost, Faculty Deve opment
Christine C. Ha l, Assistant V ce Provost; D rector, Educationa Development

Arts and Sciences

Joseph J. Comprone, Academ c D rector
M chae E. Cerveris, Program Coordinator, Interd sc p nary Arts and Performance
Em y F. Cutrer, Program Coordinator, Amer can Studies
Thomas V McGovern, Program Coord nator Integrative Stud es
Carol M. Mueller, Program Coord nator, Socia and Behavioral Sciences
Harvey Pough, Program Coord nator, L fe Sciences

Business

Jonathan S lberman Academ'c D rector
Bruce A. Baldwin, Director, Accountancy Program
Roger W. Hutt, Director, Undergraduate Programs
Afsaneh Nahavand , Director, Master of Business Administration Program
Don V ckrey, Director, Faculty Development

Education

William S. Svoboda nterim Academic D rector
Ray R. Buss, Coordinator, Postbaccalaureate Cert fication and Graduate Programs
Ann Nevin, Coordinator, Undergraduate Professional Teacher Preparation Program

Human Services

Janet H. Shirreffs, Academic D rector
Les ey D Mare, Program Coord nator Commun cation Stud es, and Interim Program Coordinator, Justice Studies
Jerry F nn, Program Coordinator, Soc al Work
R chard C. Knopf Program Coordinator, Le sure Studies

Women's Studies

Ida M. Malian, Interim Program Coordinator

Admission and Advisement

Nondegree Students. Nondegree students may take courses at ASU West according to the special provisions on page 34 of this catalog

Degree-seeking Students. Degree seeking students must meet the university admissions standards set by the Arizona Board of Regents (ABOR). Any student admitted to ASU may take courses at ASU West. To be admitted to an ASU West degree program, the student must meet ABOR admissions requirements and the specific admission requirements of the ASU West program. A student who is admitted to an ASU West degree program is defined as an ASU West student.

For more information on applying to ASU West degree programs, see the *ASU West 1994–95 Catalog* or the current *ASU West Schedule of Classes*. For applications and admission information, call 602/543 8123 or visit or write to

ADMISSIONS AND RECORDS
UNIVERSITY CENTER BUILDING 120
ARIZONA STATE UNIVERSITY WEST
PO BOX 37100
PHOENIX AZ 85069–7100

Transfer from ASU Main to ASU West

Currently enrolled ASU Main degree seeking students who want to relocate to an ASU West degree program should contact the Admissions and Records Office at ASU West for the appropriate procedures. Acceptance to an ASU West degree program requires the student to meet the prerequisites for entry to the student's choice of major as stated in the *ASU West 1994–95 Catalog* or previous *General Catalogs*.

Transfer Credit

Upon application, transfer credit is evaluated by the ASU West Office of Admissions and Records in consultation with the faculty or academic advisor of the student's choice of major. Selected ASU West courses are applicable to ASU Main degree programs. Certain ASU Main courses are also applicable toward degree programs at ASU West. In all cases, students should seek advice from academic advisors at the campus of their major before registering for classes on the other campus.

Academic Advisement

Students are strongly encouraged to seek academic advisement at the earliest possible time before admission and then regularly throughout their studies at ASU West. For academic advisement information, call 602/543 8122 or visit or write to

GENERAL ADVISING CENTER
UNIVERSITY CENTER BUILDING 220
ARIZONA STATE UNIVERSITY WEST
4701 W. THUNDERBIRD RD.
PO BOX 37100
PHOENIX AZ 85069 7100

Degree Programs

ASU West offers the following degree or certificate programs.

Arts and Sciences
- B.A. ..... American Studies
- B.A. ..... English
- B.A. ..... History
- B.A. ..... Integrative Studies
- B.A. ..... Interdisciplinary Arts and Performance
- B.A. ..... Political Science
- B.S.. ..... Political Science
- B.A. ..... Psychology
- B.S. ..... Psychology
- B.A. ..... Social and Behavioral Sciences
- B.S. ..... Social and Behavioral Sciences
- B.A. ..... Sociology
- B.S. ..... Sociology
- B.A .. . Spanish

Business
- B.S .. .. Accountancy
- B.S. ..... Management
- B.S. ..... Marketing
- M.B.A. .... Business Administration
- Postbaccalaureate Certificate in Accountancy

Education
- B A.E. ..... Elementary Education with options in early childhood education, bilingual education, English as a second language, and middle school
- B A.E .. .. Secondary Education with academic specializations and options in English, history, mathematics, middle school, and social studies
- B.A.E .. . Special Education
- M.Ed. ..... Educational Administration and Supervision
- M. Ed ..... Elementary Education
- M Ed. Secondary Education
- Postbaccalaureate Initial Teacher Certification
  - Elementary Education
  - Secondary Education

Human Services
- B.A. ..... Communication Studies
- B.S. ..... Communication Studies
- B.S. ..... Justice Studies
- B.S. ..... Recreation
- B S.W ..... Social Work

Women's Studies (Interunit Programs)
- B.A. ..... Women's Studies
- B.S. ..... Women's Studies

Certificate in Women's Studies

For more information on ASU West degree requirements, see the *ASU West 1994–95 Catalog*.

ASU West offers selected courses in the following degree programs:

Education
- B.A.E. ..... Secondary Education with academic specializations in biological sciences; business, office, and distributive education; chemistry; family resources and human development; physical education; physics; political science; Spanish

These specializations require course work in the subject area not currently available at ASU West. Required course work is offered at ASU Main.

ASU Main Programs Hosted at ASU West

Selected courses in Engineering and Applied Sciences are available at ASU West.

For information on degree requirements, refer to the "College of Engineering and Applied Sciences" section in this catalog.

- B.S.N. ..... Nursing

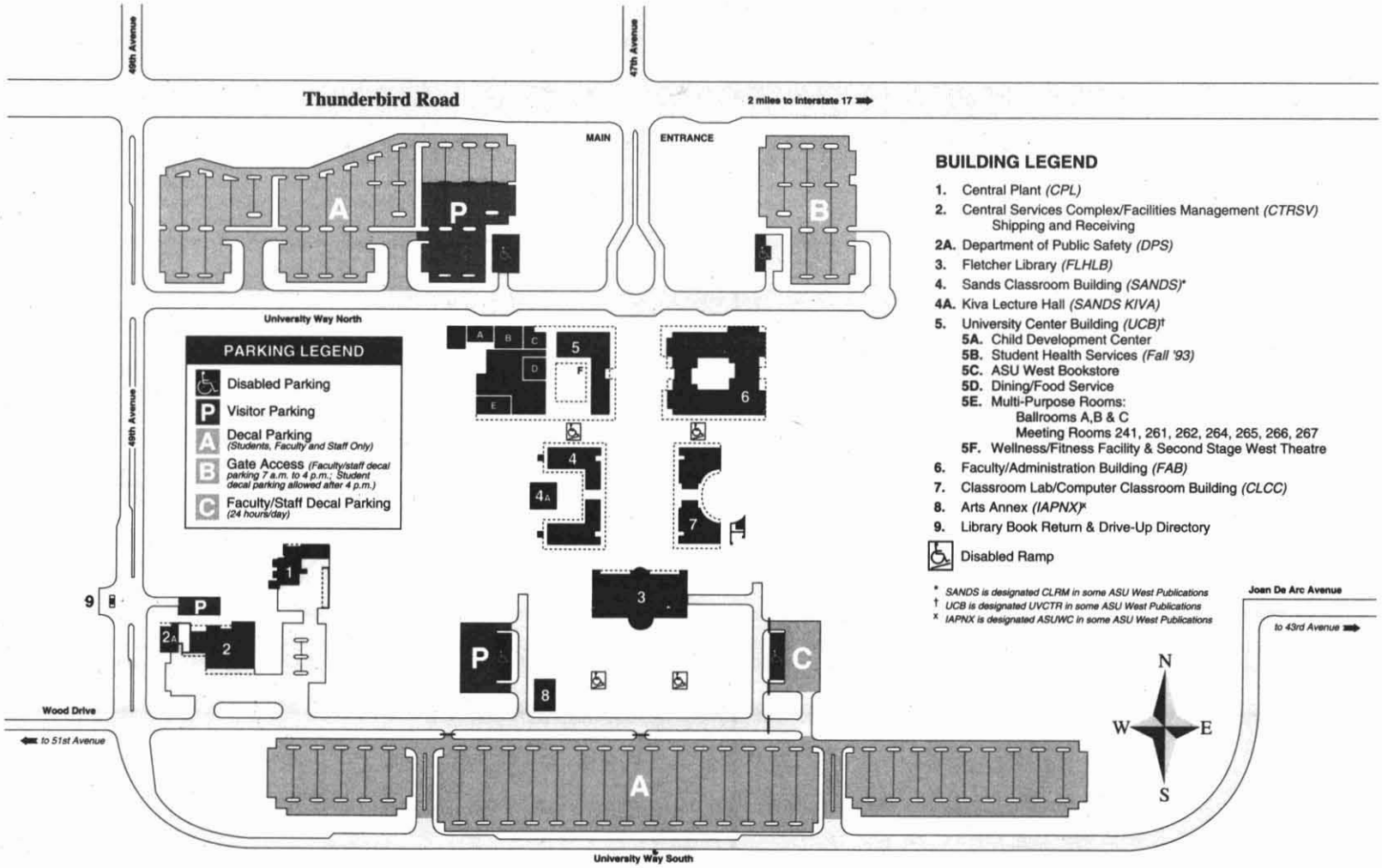
For specific information on requirements, refer to the "College of Nursing" section in this catalog.

Certificate in Gerontology

For specific information on requirements, refer to Adult Development and Aging Program, page 367

Course Information

For information on ASU West course offerings, see the current *ASU West Schedule of Classes* For ASU West course descriptions and general studies courses offered at ASU West, see the *ASU West 1994–95 Catalog*.


49th Avenue
47th Avenue
Thunderbird Road
2 miles to Interstate 17
MAIN
ENTRANCE
A
P
B
University Way North
49th Avenue
PARKING LEGEND
Disabled Parking
Visitor Parking
Decal Parking
(Students, Faculty and Staff Only)
Gate Access (Faculty/staff decal parking 7 a.m. to 4 p.m.; Student decal parking allowed after 4 p.m.)
Faculty/Staff Decal Parking
(24 hours/day)
5
6
4
4A
7
1
9
2A
2
3
8
C
Wood Drive
to 51st Avenue
University Way South
Joan De Arc Avenue
to 43rd Avenue
N
W
E
S
BUILDING LEGEND
1. Central Plant (CPL)
2. Central Services Complex/Facilities Management (CTRSV)
Shipping and Receiving
2A. Department of Public Safety (DPS)
3. Fletcher Library (FLHLB)
4. Sands Classroom Building (SANDS)*
4A. Kiva Lecture Hall (SANDS KIVA)
5. University Center Building (UCB)†
5A. Child Development Center
5B. Student Health Services (Fall '93)
5C. ASU West Bookstore
5D. Dining/Food Service
5E. Multi-Purpose Rooms:
Ballrooms A,B & C
Meeting Rooms 241, 261, 262, 264, 265, 266, 267
5F. Wellness/Fitness Facility & Second Stage West Theatre
6. Faculty/Administration Building (FAB)
7. Classroom Lab/Computer Classroom Building (CLCC)
8. Arts Annex (IAPNX)x
9. Library Book Return & Drive-Up Directory
Disabled Ramp
* SANDS is designated CLRM in some ASU West Publications
† UCB is designated UVCTR in some ASU West Publications
x IAPNX is designated ASUWC in some ASU West Publications

Directory

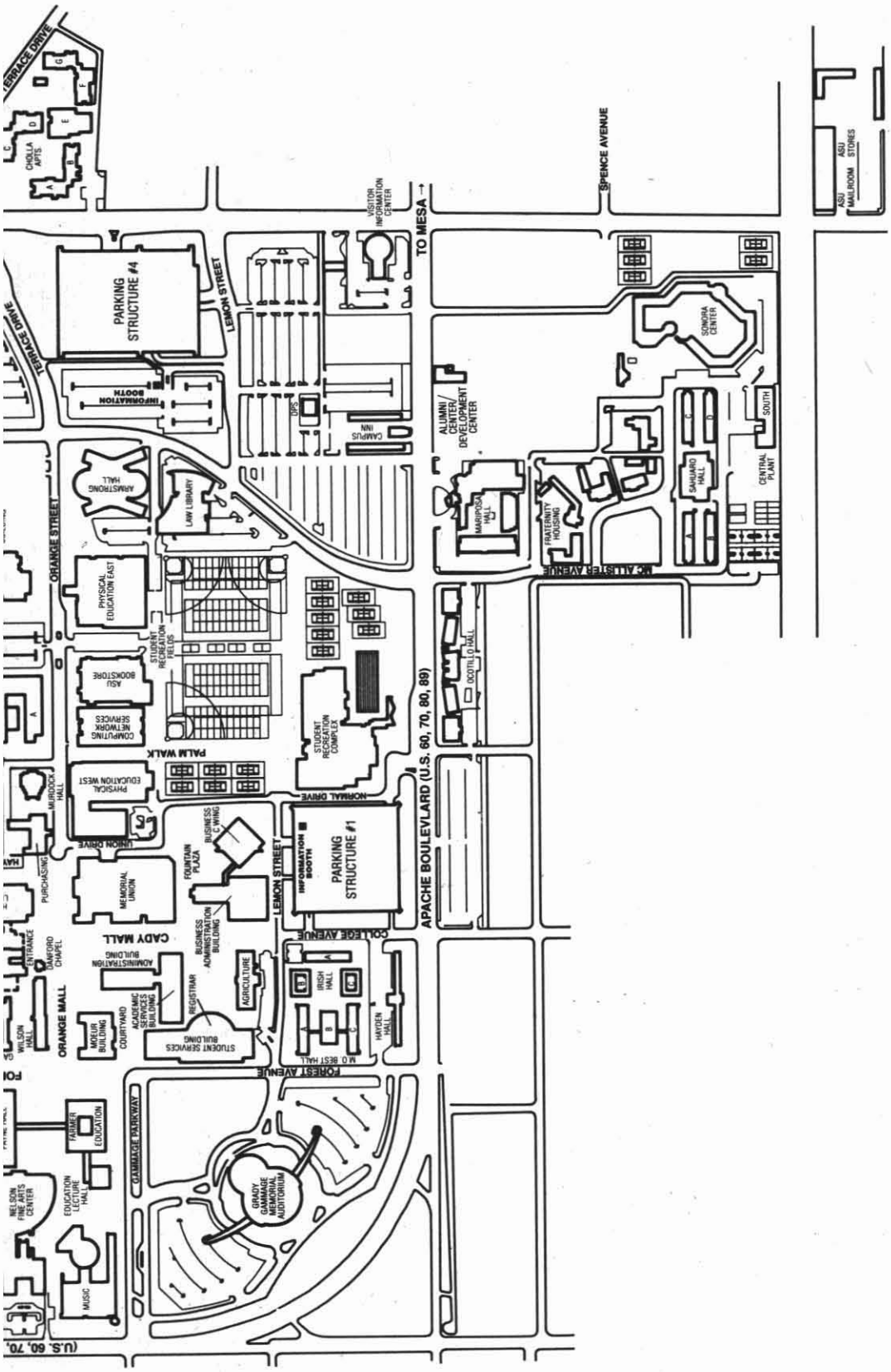
Academic Units (Administrative and Faculty Offices)

Arts and Sciences	FAB N200L3	543–6000
American Studies	FAB N2101	543–6090
Integrative Studies	FAB N279	543–6003
Interdisciplinary Arts and Performance	FAB N320F	543–6057
Life Sciences	CLCC 308A	543–6059
Social and Behavioral Sciences	FAB N2512	543–6058
ASU Main Programs Hosted at ASU West		
Adult Development and Aging	FAB S301C	543–4507
Engineering	FAB S141	543–6411
Nursing	FAB S1102	543–6605
Business	FAB N101	543–6200
Accountancy	FAB S184	543–6210
M.B.A.	FAB N150	543–6201
Undergraduate Programs	FAB N106C	543–6205
Education	FAB S200L1	543–6300
Postbaccalaureate Certification and Graduate Programs	FAB S239	543–6343
Undergraduate Professional Teacher Preparation Programs	FAB S210C	543–6329
Human Services	FAB N290A	543–6600
Communication Studies	FAB N290B	543–6606
Justice Studies	FAB N290B	543–6603
Leisure Studies	FAB S275	543–6616
Social Work	FAB S270F	543–6614
Women's Studies	FAB S115A	543–3300

Other

Admissions (Admissions and Records)	UCB 120	543–8123
Advisement (General Advising Center)	UCB 220	543–8122
Career Services and Personal Counseling Center	UCB 320	543–8124
Disability Resource Center	UCB 130	543–8145
Financial Aid Services	UCB 120	543–8178
Graduate College (at ASU West)	FAB S301A	543–4567
Information Desk	FAB Lobby	543–5500
Multicultural Student Services	UCB 201	543–8148
Registration Services (Admissions and Records)	UCB 120	543–8123
Residency Classification	UCB 120	543–8123
Student Life	UCB 221	543–8187
Student Records (Admissions and Records)	UCB 120	543–8123
Veterans Services	UCB 120	543–8167
Women's Resource Center	UCB 323	543–3421

TO SCOTTSDALE →
SCOTTSDALE ROAD
RURAL ROAD
KARSTEN GOLF COURSE
SOFTBALL FIELD
J.V. BASEBALL FIELD
FOOTBALL PRACTICE FIELDS
BAND PRACTICE FIELDS
COLLEGE OF EXTENDED EDUCATION CORNERSTONE MALL
PACKARD BASEBALL STADIUM
JOE SELLEH TRACK
SUN ANGEL STADIUM
WHITEMAN TENNIS CENTER
SOLAR FACILITY
PACKARD DRIVE
RIO SALADO PARKWAY
6TH STREET
ALPHA DRIVE
MAINTENANCE SHOPS
RECEIVING AND MOTOR POOL GARAGE
CERAMICS
TYLER STREET
PARKING STRUCTURE #2
FACILITIES MANAGEMENT
TECH. ANNEX
TECHNOLOGY CENTER
GOLDWATER CENTER
BATEMAN PHYSICAL SCIENCES CENTER
FORESTRY SERVICE LAB
UNIVERSITY ACTIVITY CENTER
MANZANITA HALL
STADIUM DRIVE
UNIVERSITY DR.
SUN DEVIL STADIUM
TICKET OFFICE
SKYBOXES
INFORMATION BOOTH
PARKING STRUCTURE #5
PALO VERDE EAST
PALO VERDE MAIN
PALO VERDE WEST
STUDENT HEALTH CENTER
TYLER MALL
UNIVERSITY CLUB
OLD MAIN
UNIVERSITY ARCHIVES
LIFE SCIENCE CENTER
ARMORY
MONA PLUMMER AQUATIC CENTER
KENNY DR.
COLLEGE AVENUE
LANGUAGE & LITERATURE
NURSING
COWDEN FAMILY RESOURCES
FAMILY STUDIES
ANTHROPOLOGY
LYCEUM
MATTHEWS HALL
NEELY HALL
ART
PARKING STRUCTURE #3
NORTH
SOUTH
ARCHITECTURE
TOWER CENTER
ART WAREHOUSE
TEMPE CENTER
MILL AVENUE
TOWERS BLDG.
INFORMATION BOOTH
FOREST AVENUE
MYRTLE AVENUE
FIFTH STREET
TO PHOENIX →
COMMUNITY SERVICES BUILDING (across river on Curry Road)
TEMPE BUTTE
N


TERRACE DRIVE
CHOLLA APTS
PARKING STRUCTURE #4
LEMON STREET
VISITOR INFORMATION CENTER
TO MESA →
SPENCE AVENUE
ASU MAILROOM
ASU STORES
INFORMATION BOOTH
CAMPUS INN
DPS
ALUMNI / CENTER/ DEVELOPMENT CENTER
SONORA CENTER
ORANGE STREET
ARMSTRONG HALL
LAW LIBRARY
MARIPOSA HALL
FRATERNITY HOUSING
McALLISTER AVENUE
SAN MARCO HALL
SOUTH
CENTRAL PLANT
PHYSICAL EDUCATION EAST
STUDENT RECREATION FIELDS
ASU BOOKSTORE
COMPUTING NETWORK SERVICES
PALM WALK
STUDENT RECREATION COMPLEX
BOOTH HALL
NORMAL DRIVE
PHYSICAL EDUCATION WEST
MIRROR HALL
UNION DRIVE
PURCHASING
BUSINESS LAWING
FOUNTAIN PLAZA
MEMORIAL UNION
INFORMATION BOOTH
PARKING STRUCTURE #1
APACHE BOULEVLARD (U.S. 60, 70, 80, 89)
LEMON STREET
COLLEGE AVENUE
CADY MALL
ADMINISTRATION BUILDING
BUSINESS ADMINISTRATION BUILDING
STANFORD CHAPEL
ENTRANCE
ORANGE MALL
WILSON HALL
MOEUR BUILDING
COURTYARD
ACADEMIC SERVICES BUILDING
REGISTRAR
AGRICULTURE
STUDENT SERVICES BUILDING
IRISH HALL
HAYDEN HALL
M.O. BEST HALL
FOREST AVENUE
FO
NELSON FINE ARTS CENTER
EDUCATION LECTURE HALL
FARMER EDUCATION
MUSIC
GRANADA PARKWAY
GRADY GAMMAGE MEMORIAL AUDITORIUM
(U.S. 60, 70,

Building Abbreviations

ADM ..... Administration Building
AED ..... College of Architecture and Environmental Design/North
AG ..... Agriculture Building
ANTH (Wings A–C) ..... Anthropology Building
AQUAT (Wings A and B) ..... Mona Plummer Aquatics Center
ARCH ..... College of Architecture and Environmental Design/South
ARCV ..... University Archives
ART ..... Art Building
ARWH ..... Art Warehouse
ASB ..... Academic Services Building
ASUDC ..... Downtown Center
BA ..... Bus0iness Administration Building
BAC ..... Business Administration C Wing
BKSTR ..... ASU Bookstore
BLPZA ..... Bell Plaza Professional Building South
CERA (Wings A and B) ..... Ceramics Annex
CFS ..... Center for Family Studies
CHAPL ..... Danforth Chapel
CLCC ..... Classroom Laboratory/Computer Building*
CMPIN ..... Campus Inn
CMSC1 ..... Community Services Center Building
COB (Wings A and B) ..... Classroom Office Building
CP ..... Central Plant
CPCOM ..... Computing Commons Building
CRNSN ..... Cornerstone Mall
CTRSV ..... Central Services Complex*
EC (Wings A–G) ..... Engineering Center
ECANX ..... Engineering Center Annex
ED ..... Hiram B. Farmer Education Building
EDB ..... Ira D. Payne Education Hall
EDC ..... Education Lecture Hall
ENGRC ..... Engineering Research Center
FAB ..... Faculty and Administration Building*
FAC ..... Nelson Fine Arts Center
FIELD ..... University Field Lab
FLHLB ..... Fletcher Library*
FSL ..... Forestry Services Lab
GGMA ..... Grady Gammage Memorial Auditorium
GHALL ..... Dixie Gammage Hall
GWC ..... Barry M. Goldwater Center for Science and Engineering Research
HEC (Wings A and B) ..... Cowden Family Resources Building
IAPNX ..... Interdisciplinary Arts and Performance Annex*
ICA ..... Intercollegiate Athletics
IRISH ..... Frederick M. Irish Hall
LAW ..... John S. Armstrong Hall
LAWLB ..... John J. Ross William C. Blakley Law Library
LIB ..... Charles T. Hayden Library
LL (Wings A–C) ..... Language and Literature Building
LS (Wings A–C) ..... Life Sciences Center
LSE ..... Life Sciences E-Wing
LYC ..... Lyceum Theatre
MAIN ..... Old Main
MCENT ..... A.J. Matthews Center
MCL ..... James H. McClintock Hall
MHALL ..... Carrie Matthews Hall
MOEUR ..... B.B. Moeur Administration
MTCHL ..... Mitchell School (Tempe)
MU ..... Memorial Union
MUR ..... John Murdock Lecture Hall
MUSIC ..... Music Building
NEEB ..... L.S. Neeb Hall
NOBLE ..... Daniel E. Noble Science and Engineering Library
NUR ..... Nursing Building
PBS ..... Packard Baseball Stadium
PEBE ..... Physical Education Building East
PEBW ..... Physical Education Building West
PPS ..... Physical Plant and Shops
PS (Wings A H) ..... George M. Bateman Physical Sciences Center
PSY ..... Psychology Building
PURCH ..... Purchasing and General Stores
RITT (Wings A and B) ..... Ritter Building
SANDS ..... Sands Classroom Building*
SDF ..... Solar Demonstration Facility
SHS (Wings A and B) ..... Student Health Service
SRC ..... Student Recreation Complex
SS ..... Social Sciences Building
SSV ..... Student Services Building
STAD ..... Sun Devil Stadium
STAUF (Wings A and B) ..... Charles Stauffer Communication Arts Building
TC ..... Technology Center
TCB ..... Aeronautics Building
TCC ..... Technology Center Annex
TCM ..... Technology Modulars
THWH ..... Theatre Warehouse
TOWER (Wings A and B) ..... University Tower Center
TRACK ..... Joe Selleh Track
UAC ..... University Activity Center
UCB ..... University Center Building*
UCLUB ..... University Club
VISIT ..... ASU Visitor's Information Center
WH ..... Warehouse
WHALL ..... West Hall
WILSN ..... George W. Wilson Hall
WTC ..... Whiteman Tennis Center

+Located at ASU West.

Directory

Admissions, Graduate ..... **WILSN 101** **965–6113**

Admissions, Law ..... **LAW 101** **965–7896**

Admissions, Undergraduate ..... **SSV C111** **965–7788**

Advising (see University Academic Advising Center)

ASU West (see page 440)

Architecture and Environmental Design, College of ..... **ARCH 134** **965–3216**
Architecture, School of ..... AED 162 965–3536
Design, School of ..... AED 154 965–4135
Planning and Landscape Architecture, School of ..... AED 158 965–7167

Bookstore ..... **BKSTR** **965–7928**

Business, College of ..... **BA 123** **965–4227**
Accountancy, School of ..... BA 267 965–3631
Business Administration, Department of ..... BA 318 965–3231
Decision and Information Systems, Department of ..... BAC 554 965–6350
Economics, Department of ..... BAC 659 965–3531
Finance, Department of ..... BAC 519 965–3131
Health Administration and Policy, School of ..... BA 397 965–7778
Management, Department of ..... BA 323 965–3431
Marketing, Department of ..... BAC 462 965–3621

Campus Dining Services ..... **MU138** **965–3464**

Career Services ..... **SSV C359** **965–2350**

Child Care Resources ..... **MU 14C** **965–9515**

Computer Accounts Office ..... **CPCOM 105** **965–1211**

Computer Assistance Center ..... **CPCOM 202** **965–5939**

Computing Consulting, Student Office ..... **CPCOM 103** **965–6388**

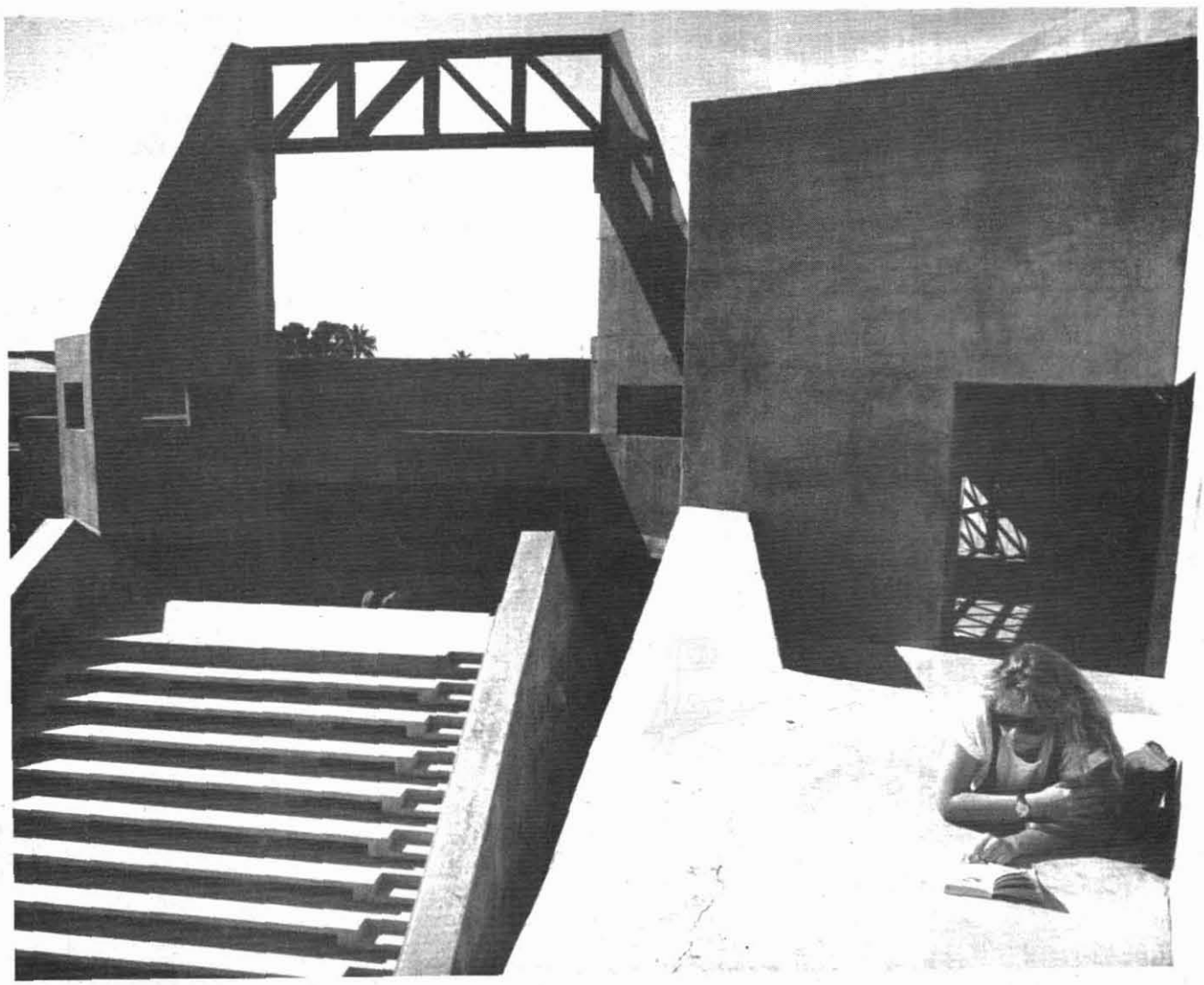
Disabled Student Resources ..... **MCENT 143**
voice/TDD **965–1234**

Drop/add and withdrawal information ..... **SSV B114** **965–3124**

Education, College of ..... **EDB 104** **965–3306**
Curriculum and Instruction, Division of ..... ED 409 965–1644
Educational Leadership and Policy Studies, Division of ..... ED 108 965–6357
Psychology in Education, Division of ..... EDB 301 965–3384

Engineering and Applied Sciences, College of ..... **ECG 100** **965–3421**
Aeronautical Technology, Department of ..... TC 100 965–7775
Agribusiness and Environmental Resources, School of ..... AG 281 965–3585
Chemical, Bio and Materials Engineering, Department of ..... ECG 202 965–3313
Civil Engineering, Department of ..... ECG 252 965–3589
Computer Science and Engineering, Department of ..... GWC 206 965–3190

Recreational Sports and Student Activities	SRC 220	965–8900
Registrar	SSV B114	
voice		965–3124
TDD		965–3236
Residency Classification	SSV B115	965–7712
Residential Life	SSV A131	965–3515
Social Work, School of	WHALL 137	965–3304
State Press Information	MCENT 15	965–7572
Student Financial Assistance	SSV C219	965–3355
Student Health	SHS	965–3346
Student ID	EDB 42	965–3124
Student Organization Center	MU N340	965–2249
Summer Sessions, Office of	ASB 109	965–6611
Transcripts (outgoing)	SSV B113	965–7853
University 100	UAS 200	965–2502
University Academic Advising Center	MCENT	965–4464
University Honors College	MCL 112	965–2359
University Libraries	LIB	
information		965–6164
hours		965–3415
renewal		965–2595
circulation		965–3605
University Testing Services	EDB 302	965–7146
Veterans Services Section	SSV B117	965–7723
Writing across the Curriculum	UAS 200	965–3097
Writing Centers		965–3097



Checklist for New Students

- [ ] **How do I apply to ASU Main?**
  Complete an application and have transcripts and test scores, if needed, sent directly to Undergraduate Admissions. See page 31.

- [ ] **How do I apply to ASU West?**
  For students seeking admission to ASU West degree or certificate programs, admission, advising, and registration services are available through Student Intake and Information Services at ASU West. See page 441. For more information, call 602/965 8125.

- [ ] **What if I am a transfer student?**
  Upon admission, note the number of semester hours on your Certificate of Admission. When registering, consult your department advisor to determine how transfer credits fit into the curriculum (see "Academic Advisement," page 41). Have you met the First Year Composition requirement (see page 71)? If you have completed 87 or more semester hours, file a program of study (see page 72). See page 34.

- [ ] **What if I have a disability or am a veteran?**
  Disabled students with questions should refer to Disabled Student Resources, page 75. Veteran students using GI benefits should see page 77.

- [ ] **How do I get financial aid?**
  Apply before the March 1 priority deadline. See pages 26, 29 31, 74, and 75.

- [ ] **How do I secure housing and purchase a meal plan?**
  Apply early (four to six months in advance of the semester). See pages 74–75. Meal plans may be purchased in advance, or upon arrival on campus. For more information, call Campus Dining Services at 602/965 3464.

- [ ] **What about orientation?**
  Attend orientation, where questions regarding advisement, class registration, student IDs, on-campus housing, and other pertinent topics are answered. See page 32

- [ ] **How do I get an ID, and what about parking?**
  See page 42 about obtaining an ASU student ID card. If you are planning to park on campus, purchase a parking decal. See page 26.

- [ ] **What about placement examinations?**
  See page 40

- [ ] **Before I register for classes, how do I get an advisor?**
  Call the college of your major to schedule an appointment with an academic advisor. See page 41.

- [ ] **How do I register?**
  Pick up a copy of the *Schedule of Classes* or the *Summer Sessions Bulletin* for information. See page 42

- [ ] **Once I am registered and ready to go, how can I ensure my success at ASU?**
  Consider enrolling in UNI 100 Academic Success at the University. See page 45.

- [ ] **Now that the business is over, what's left to do?**
  You are encouraged to become involved in the university by getting to know professors, joining student organizations, and taking advantage of the myriad of cultural and social opportunities. For more information on campus life, call Student Life at 602/965–6547. New students are urged to investigate the challenges and advantages of the University Honors College. See pages 79 81.

Academic Definitions

Academic Renewal. An undergraduate who has been read mitted to the university after an absence of at least five years and who has satisfactorily completed a minimum of 12 ap proved, additional semester hours in residence at ASU within three semesters after re entry, may, upon petition to the dean of the college, have the former record treated in the same manner as transfer credits. See page 41.

ACT. All new freshman applicants *must* take either the American College Test (ACT) or Scholastic Aptitude Test (SAT) on a national test date in their junior or senior years of high school. See page 33.

Advanced Placement. Students who have taken an advanced placement course of the College Entrance Examina tion Board (CEEB) in their secondary school *and* who have taken an Advanced Placement Examination of CEEB may re ceive university credit. See page 36.

ALCP. The American Language and Culture Program (ALCP) features an intensive, noncredit course of study designed for adult international students who desire to become proficient in English as a second language. See pages 36 and 362.

ASASU. The Associated Students of Arizona State Univer sity (ASASU) is the student government for the university, the official representative of the student body in matters of university governance, and, with 18 departments, the largest student programming organization on campus. See page 77.

ASU Main. ASU Main is the principal campus of ASU, lo cated in Tempe. See page 15.

ASU West. ASU West is the Phoenix-based satellite campus of ASU, established in 1984 by the Arizona Legislature to serve the educational needs of residents in western Maricopa County. See pages 440–442.

Audit Enrollment. A student who audits a course attends regularly scheduled class sessions but earns no credit. See page 45.

Buckley Amendment. See *Family Educational Rights and Privacy Act* in this section.

CLEP. As part of the College Level Examination Program (CLEP), students who have taken a College-Level Examina tion of the College Entrance Examination Board may receive university credit. See pages 36, 38 39.

Comprehensive Exam. A comprehensive examination is in tended to permit a student to establish academic credit in a field in which the student has gained experience or compe tence equivalent to an established university course. See pages 36, 39–40.

Concentration. A concentration is a selection of courses within a major or among one or more majors.

Cooperative Education. Cooperative Education is any educational program that requires alternating classroom and work experience in government or industry. The work expe rience exists for its educational value. See page 43.

Corequisite. A requirement to be met, such as taking a cer tain course, *while* taking a course is a corequisite. See *pre-requisite* in this section.

Course Loads. A minimum full-time course load for an un dergraduate student is 12 semester hours. The maximum course load for which a student may register is 18 semester hours (with the exception of a 19-hour maximum for students enrolled in the College of Engineering and Applied Sciences or the College of Architecture and Environmental Design). See page 42.

Course Prefix. The course prefix is the three-letter designa tion assigned by each instruction unit. The "Course Prefix Index," on pages 478–480, provides a comprehensive list Also see *cross listing* below.

Credit Enrollment. One semester hour represents one 50 minute class exercise per week per semester. A minimum of 126 semester hours is required for graduation with a bacca laureate degree. To obtain credit, a student must be properly registered and pay fees for the course. See page 45.

Cross-listing. One course may have more than one course prefix and may be offered by more than one department. Some instruction units require students to enroll in a course under a certain prefix in order to receive credit properly. Course descriptions in the *General Catalog* indicate courses that are cross listed.

Cum Laude. An undergraduate student with a cumulative GPA of 3.40–3.59 graduates *cum laude*. See page 73. Also see *magna cum laude* and *summa cum laude*.

Drop/Add. A student who has registered for courses for a semester or summer session may drop or add courses through the first week of classes in a semester or the first two days of a summer session. See page 46.

Emphasis. An area of emphasis is a selection of courses within a major or among one or more majors.

Family Educational Rights and Privacy Act. The Family Educational Rights and Privacy Act of 1974, or Buckley Amendment, sets forth the requirements governing the protection of the privacy of the educational records of students who are or have been in attendance at Arizona State University. See pages 49 50.

Freshman. A student who has earned 24 or fewer hours is a freshman.

General Studies Requirements. The general studies pro gram consists of five core areas and three awareness areas. The core areas are literacy and critical inquiry, numeracy, humanities and fine arts, social and behavioral sciences, and natural sciences. The awareness areas are cultural diversity in the United States, global awareness, and historical awareness. All undergraduate students must successfully complete a minimum of 35 semester hours of approved general studies courses. See pages 53 71.

GPA. The grade point average (GPA) is obtained by dividing the total number of grade points earned by the number of semester hours graded. Grade point averages are rounded to the nearest hundredth of a grade point. See page 46.

Grade Points. For the purpose of computing the GPA, grade points are assigned to each of the grades for each semester hour as follows: "A," four points; "B," three points; "C," two points; "D," one point; and "E," zero points.

Graduate Catalog. The *Graduate Catalog* describes the procedures and requirements for enrollment in the Graduate College. See pages 366–374 of the *General Catalog* for information on the Graduate College. See pages 375–377 specifically for a complete list of graduate degrees, majors, and concentrations.

Graduate-Level Courses. Courses numbered 500–799 are designed for graduate students. However, an upper-division undergraduate student may enroll in graduate courses with the approval of his or her advisor, the course instructor, the department chair, and the dean of the college or school in which the course is offered. See pages 43–44.

Incomplete. A mark of "I" (incomplete) is given by the instructor only when a student who is otherwise doing acceptable work is unable to complete a course because of illness or other conditions beyond the student's control. See page 45.

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 under-

graduate 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. See page 44.

International Baccalaureate. Students who have taken a higher level examination through the International Baccalau reate program may receive university credit. See pages 36 and 40.

Junior. A student who has earned 56–86 hours is a junior.

Lower-Division Courses. Courses numbered 100–299 are designed primarily for freshmen and sophomores. See page 43.

Magna Cum Laude. A student with a cumulative GPA of 3.60–3 79 graduates *magna cum laude*. See page 73. Also see *cum laude* and *summa cum laude* in this section.

Major. A major is a specialized group of courses contained within the program of study. Refer to college and school sections for specific descriptions and requirements.

Minor. A minor is a specialized group of courses contained within the program of study available from some instruction units. Refer to page 73 and to college and school sections for specific descriptions and requirements.

Omnibus Course. An omnibus course is offered on a one time or tutorial basis when the course content is new or peri odically changes. See page 44.

Option. An option is a selection of courses within a major or among one or more majors

Pass/Fail Enrollment. A mark of "P" (pass) or "E" (fail) may be assigned for this grading option. This grading method may be used at the option of individual colleges and schools within the university. See page 45.

Prerequisite. A requirement to be met, such as completing a certain course, *before* registering for a course is a prerequi site. See *corequisite* in this section.

Probation. A student's college assumes responsibility for enforcing academic standards and may place any student on probation who has failed to maintain good standing. A stu dent on academic probation is required to observe any rules or limitations the college may impose as a condition for re tention. See page 49.

Proficiency Examination. A proficiency examination is given to: (a) waive a course requirement; (b) validate certain transfer credits in professional programs; or (c) determine a student's ability in a field where competence is an important consideration. See page 40.

Program of Study. A student must file an Undergraduate Program of Study for graduation within the semester he or she earns his or her 87th hour. See page 72. The complete array of courses included in the study leading to a degree make up a student's program of study.

Registration Fee. All students who register for classes at ASU are assessed this charge. See *tuition* in this section.

Restricted Complete Withdrawal. From the fifth week to the transaction deadline for a semester and from the seventh day to the transaction deadline for a summer session, stu dents may withdraw from all courses but will receive a mark of "W" only from courses in which the instructor certifies that they are passing at the time of the withdrawal. See page 46.

Restricted Course Withdrawal. From the fifth week to the end of the 10th week of a semester and from the seventh day to the end of the third week of a summer session, students may withdraw with a mark of "W" only from courses in which the instructor certifies that they are passing at the time of withdrawal. See page 46.

SAT. All new freshman applicants *must* take either the American College Test (ACT) or Scholastic Aptitude Test (SAT) on a national test date in their junior or senior years of high school. See page 31.

Senior. A student who has earned 87 or more hours of credit is a senior.

Sophomore. A student who has earned 25 55 hours of credit is a sophomore.

Special Topics. Courses numbered 294, 394, and 494 cover topics of immediate or special interest to a faculty member and students See page 41.

Summa Cum Laude. A student with a cumulative GPA of 3.80–4.00 graduates *summa cum laude*. See page 73. Also see *cum laude* and *magna cum laude* in this section.

TOEFL. The Test of English as a Foreign Language (TOEFL) is taken by students whose native language is not English. See pages 35 and 343. See also *ALCP* in this sec tion.

Transcript. The transcript has information about classes taken and grades earned. The Office of the Registrar releases official transcripts only upon written request of the student for a fee of $1.00 per copy for enrolled students or $5.00 per copy for nonenrolled students. Additional copies ordered at the same time are $1.00 each. Unofficial transcripts may be obtained free of charge in person at the Office of the Regis trar, any registrar site, or by mail if a signed release is en closed. See page 47. Also see *Family Educational Rights and Privacy Act* in this section.

Tuition. This term refers to the additional charges assessed only to nonresidents, as established in Arizona Board of Re gents' Policy 4–102 See *registration fee* in this section.

Unrestricted Withdrawal. During the first four weeks of a semester or the first six days of a summer session, a student may withdraw from any course with a mark of "W." See page 46.

Upper-Division Courses. Courses numbered 300–499 are designed primarily for juniors, seniors, and other advanced students. See page 43.

WICHE. Through the Western Interstate Commission for Higher Education (WICHE), qualified Arizona residents may attend professional schools of dentistry, veterinary medicine, occupational therapy, optometry, and osteopathy in other western states at essentially the same expense to the students as to residents of the state in which the school is located. See page 73

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Course Prefix Index


ARIZONA STATE UNIVERSITY
GREAT SEAL OF THE STATE OF ARIZONA
DITAT DEUS
1912
1885

Arizona State University