
ASU East

www.east.asu.edu

Charles E. Backus, Ph.D., Provost, ASU East; Vice President, ASU

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Arizona State University East, located 23 miles southeast of ASU Main, was established in 1996 at the former Williams Air Force Base. There, ASU East and its educational partners have created the Williams Campus—an academic community focused on meeting the needs of students, business, industry, and the larger community. The 600-acre campus offers a small residential college environment, with access to the amenities of a major metropolitan area and the resources of a major research university.

ASU East offers degree programs that help students develop knowledge and skills they need for success in their professional, civic, and personal lives in the 21st century. Sixteen baccalaureate degree programs, five master's degree

programs, and two certificate programs can be completed at ASU East, with additional programs in the planning stages. (See the “Morrison School of Agribusiness and Resource Management,” page 597, the “East College Baccalaureate Degrees and Majors” table, page 601, and the “College of Technology and Applied Sciences” table, page 623.)

The College of Technology and Applied Sciences offers a master's degree and a range of bachelor's programs in high demand areas of technology, the only programs of their kind in Arizona. The unique bachelor's and master's degrees in Agribusiness offered by the faculty in the Morrison School of Agribusiness and Resource Management lead to careers in one of the fastest growing sectors of global business.

East College offers a range of supporting courses for all ASU East programs and bachelor's degrees with majors in Applied Biological Sciences, Applied Psychology, Business Administration, Elementary Education, Exercise and Wellness, Human Health Studies, Interdisciplinary Studies, Multimedia Writing and Technical Communication, and Nutrition. Students who are uncertain of their major may start college at ASU East as East College/No Preference majors.

Although it is a young campus, ASU East has already developed significant student-centered innovations in higher education that have earned national recognition.

ASU East assumed leadership in Arizona in developing and offering the Bachelor of Applied Science (B.A.S.) degree, a program designed specifically as a career progression degree for students holding the Associate of Applied Science (A.A.S.) degree. The B.A.S. emphasizes management, leadership, and communication skills, along with additional technical course work.

ASU East has also developed an innovative academic partnership with Chandler-Gilbert Community College (CGCC). This partnership combines the strengths of the two institutions to provide ASU students with high quality education in a cost-effective way. CGCC provides lower-division general education and major prerequisite courses that are directly equivalent to ASU courses and transfer automatically. ASU East provides both lower- and upper-division courses in the major and upper-division general studies and general interest courses. Through the partnership, students at the Williams Campus can take all of the courses needed to graduate with an ASU baccalaureate degree, generally at some savings in tuition.

New facilities, new programs, and new opportunities are constantly emerging at ASU East. The campus is easily accessible via major interstate routes. See the “ASU East

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See “General Studies,” page 85.

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Map,” page 649. For the latest information, call 480/727-EAST (3278) or access the Web site at www.east.asu.edu.

ACADEMIC ORGANIZATION AND ACCREDITATION

The chief academic officer of ASU East is the provost. There are two colleges and one school at ASU East administered by deans. These academic units develop and implement the teaching, research, and service programs of the institution. Additional support for the academic mission of the campus is provided by Library Services and Information Technology, each administered by a director. See “ASU East Faculty and Academic Professionals,” page 651, and “Academic Organization,” page 9.

Accreditation

The North Central Association of Colleges and Schools accreditation of ASU Main includes ASU East. In addition, ASU East 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, Inc. (TAC of ABET). For more information, call 410/347-7700 or write

TECHNOLOGY ACCREDITATION COMMISSION
OF THE ACCREDITATION BOARD FOR
ENGINEERING AND TECHNOLOGY INC
111 MARKET PLACE SUITE 1050
BALTIMORE MD 21202-7102

Both the professional flight and the air transportation management concentrations, in the Department of Aeronautical Management Technology, are fully accredited by the Council on Aviation Accreditation. For more information, call 334/844-2431, e-mail caa@auburn.edu, or write

COUNCIL ON AVIATION ACCREDITATION
3410 SKYWAY DRIVE
AUBURN AL 36830

The Bachelor of Science in Industrial Technology degree (including the environmental technology management, graphic information technology, and industrial technology management concentrations) is fully accredited by the National Association of Industrial Technology (NAIT). For more information, call 734/677-0720, e-mail nait@nait.org, or write

NATIONAL ASSOCIATION OF INDUSTRIAL
TECHNOLOGY
3300 WASHTENAW AVENUE SUITE 220
ANN ARBOR MI 48104-4200

ADMISSION

Nondegree Students. Nondegree students may take courses at ASU East according to the special provisions under “Undergraduate Enrollment,” page 59.

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 East. To be admitted to an ASU East degree program, the student must meet undergraduate admissions requirements and the specific admission requirements of the ASU East program. A student who is admitted to an ASU East degree program is defined as an ASU East student.

For more admissions information and applications to ASU East degree programs, call 480/727-EAST (3278) or write

UNDERGRADUATE ADMISSIONS
ARIZONA STATE UNIVERSITY
PO BOX 870112
TEMPE AZ 85287-0112

Transfer Among ASU Campuses

Degree-seeking students currently enrolled at either ASU Main or ASU West who want to relocate to an ASU East degree program should contact the OASIS at ASU East, the Office of the Registrar at ASU Main, or the Admissions and Records Office at ASU West for appropriate procedures. All credit earned at any ASU campus automatically transfers to ASU East. Students should consult with their ASU East major advisor to determine how this credit applies to their major and graduation requirements. Students should be aware that certain requirements (e.g., the minimum number of upper-division semester hours to graduate) may differ among campuses.

TRANSFER CREDIT

Courses taken from Chandler-Gilbert Community College through the Partnership in Baccalaureate Education are automatically transferred to ASU East each semester. These courses and courses taken at other Arizona public community colleges transfer according to equivalencies established in the current Arizona Higher Education Course Equivalence Guide. (Transfer guides are available at www.asu.edu/provost/articulation.) The acceptability and applicability of courses transferred from other universities and community colleges is determined by ASU Main Undergraduate Admissions in consultation with the faculty or academic advisor of the student’s choice of major.

JOINT ADMISSION CONTINUOUS ENROLLMENT (JAC)

JAC 001 Joint Admission Continuous Enrollment. (0–12)

fall, spring, summer

For use by ASU East to track undergraduate students admitted to East Campus degree programs who are concurrently enrolled or solely enrolled in courses offered by Chandler-Gilbert Community College. May be repeated for credit.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see “Omnibus Courses,” page 56.

ADVISING

Students are encouraged to take advantage of the skill and knowledge of the advising professionals available to them in the academic units and to seek academic advising early.

For more information or to schedule an advising session, contact an academic advisor (see the “[Academic Advising at ASU East](#)” table, page 589).

Academic Advising at ASU East

Unit	Location	Telephone	Days	Hours ¹
Agribusiness and Resource Management, Morrison School of	CNTR 20	480/727-1585	Mon.–Fri.	8 A.M.–5 P.M.
Barrett Honors College ²	IRISH A 121	480/965-2359	Mon.–Fri.	8 A.M.–5 P.M.
East College	CNTR 92	480/727-1333	Mon.–Fri.	8 A.M.–5 P.M.
Applied Biological Sciences	CNTR 92	480/727-1333	Mon.–Fri.	8 A.M.–5 P.M.
Applied Psychology, Faculty of	CNTR 92	480/727-1333	Mon.–Fri.	8 A.M.–5 P.M.
Business Administration, Faculty of	CNTR 92	480/727-1333	Mon.–Fri.	8 A.M.–5 P.M.
Education, Faculty of	COMM2 105	480/727-1454	Mon.–Fri.	8 A.M.–5 P.M.
Exercise and Wellness, Department of	CLRB 102	480/727-1945	Mon.–Fri.	8 A.M.–5 P.M.
Human Health Studies, Faculty of	CNTR 92	480/727-1333	Mon.–Fri.	8 A.M.–5 P.M.
Multimedia Writing and Technical Communication, Faculty of	CNTR 92	480/727-1333	Mon.–Fri.	8 A.M.–5 P.M.
Nutrition, Department of	HSC 1345	480/727-1728	Mon.–Fri.	8 A.M.–5 P.M.
Technology and Applied Sciences, College of	CNTR 10	480/727-1874	Mon.–Fri.	8 A.M.–5 P.M.

¹ Walk-ins are welcome; appointments are recommended.

² The Barrett Honors College is located at ASU Main.

ASU EXTENDED CAMPUS

The College of Extended Education was created in 1990 to extend the resources of ASU throughout Maricopa County, the state, and beyond. The College of Extended Education is a university-wide college that oversees the ASU Extended Campus and forms partnerships with other ASU colleges, including those at ASU East, to meet the instructional and informational needs of a diverse community.

The ASU Extended Campus goes beyond the boundaries of the university's three physical campuses to provide access to quality academic credit and degree programs for working adults through flexible schedules; a vast network of off-campus sites; classes scheduled days, evenings, and weekends; and innovative delivery technologies including television, the Internet, and Independent Learning. The Extended Campus also offers a variety of professional continuing education and community outreach programs.

For more information, see "ASU Extended Campus," page 671, or access the Web site at www.asu.edu/xed.

CAMPUS AND STUDENT SERVICES

ASU East is a student-centered campus that offers many of the features of a small residential college in a suburban area while providing access to the resources of a major research university and the amenities of a large metropolitan area. The campus includes excellent educational facilities: mediated classrooms and modern laboratories, a 21st-century electronic library, and state-of-the-art computer equipment. Other amenities include a learning center, child care services, campus union, bookstore and copy center. A shuttle service provides transportation between ASU East, Mesa Community College, and ASU Main. An additional shuttle is available for transportation from ASU Main to ASU West.

Enrollment Services—OASIS

The OASIS provides one-stop services for admission, financial aid, business services, and registration. Conveniently located in the Academic Center Building, students

find personnel ready to assist them with registration processes, tuition payment, financial assistance information, student employment, ASU Sun Cards (photo IDs), and parking information.

Learning Center

In the Learning Center, undergraduate and graduate students can study, utilize computers for research and writing, and access tutoring services. Qualified undergraduate and graduate students provide tutoring to individual students or study groups by appointment or on a drop-in basis. Writing assistance is offered both face-to-face and online through the Learning Center Web site to students seeking help with any written assignment. Other services include workshops on writing, presentation and study skills, and computer-assisted instruction. Learning Center tutors also staff the Freshman Year Experience hall study room during weekday and evening hours.

The Learning Center is located in the Academic Center Building. For more information or to schedule a tutoring appointment, call 480/727-1452, or visit the Web site at www.east.asu.edu/learningcenter.

Library Services

Strong resources and personal service define the ASU East Library. As a primarily electronic research library, it is designed to take maximum advantage of new technology. Electronic indexes, catalogs, and journals support study and research in many fields, with an emphasis on the majors offered at ASU East. While the library acquires materials in all formats, by intention it prefers electronic text. Thousands of periodicals are available digitally in all subjects, while those that remain in print form can be obtained by the library quickly. Documents in electronic form can be delivered directly to students' computers. Librarians and staff

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See "General Studies," page 85.

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pursue service customized to individual students' needs, cultivating a small college atmosphere. The library's Web address is eastlib.east.asu.edu.

Computing Services

With more than 300 workstations in five classrooms, three computing sites, and a Computing Commons, Information Technology (IT) at ASU East provides general computing services that include e-mail and general purpose computing. The IT East department provides specialized software and systems to meet the particular needs of the ASU East programs. In addition, IT East provides more than 28 mediated classrooms and audiovisual materials to support e-learning initiatives. IT East has a staff of support personnel to aid the campus community's diverse computing needs, including Web development, academic computing, and administrative computing.

Food Services

ASU East has a variety of food service options on campus to serve student, faculty, staff, and visitor needs. Services include a coffee bar/convenience shop in the Williams Campus Union, a full-service dining facility in the Campus Dining Hall, and catering services. Food can be purchased on a cash basis; a meal plan can be selected to suit individual preferences. For more information about food service at the Williams Campus, call 480/988-5212.

Student Health Services

Health services for ASU East students are provided by the Veteran's Administration Medical Center located at the Williams Campus. Services include primary assessment and treatment of health problems and injuries, physical examinations and immunizations, women's health care, diagnostic tests, laboratory tests/X-rays, and a pharmacy. Student registration fees cover the cost of office visits for full-time ASU East students. Part-time students pay a nominal fee. Some office procedures and laboratory tests require additional charges. Health insurance is not required to use the health services; however, it is strongly advised for all students and is required for international students. For more information, call 602/222-6568.

Student Counseling

Confidential professional counseling services are available to help ASU East students achieve their academic goals by addressing a variety of problems and issues often faced in college. Professional help is offered in the following areas: psychological issues, personal concerns, relationship issues, career/life decision-making and crisis intervention. Individual, couples, and group sessions are available at no cost. Students may schedule an appointment by calling 480/727-1255. Appointments may also be made in person at Student Counseling Services (Garden Level of the Academic Center Building).

Career Preparation Center

Professional career counselors are available to meet with ASU East students. They provide individual career advising, group workshops, assistance in researching job and internship possibilities, resume and cover letter critiques, preparation for employment interviews, and career resources in

print and online. For more information, call 480/727-1411 or access the Web site at www.east.asu.edu/sta/career.html.

Williams Campus Union

The Williams Campus Union is in the center of campus and serves as a common gathering place for students, faculty, staff, and guests. The union has meeting space, study rooms, private computer rooms, a TV lounge, a coffee bar/convenience shop, a game room, and a ballroom. Programs and services that complement the academic experience and enhance campus life include a film series, dances, live performances, resources for student organizations, cultural awareness activities, leadership workshops, community service information, and holiday celebrations. The union is staffed primarily by students, providing them the opportunity to develop valuable leadership skills and work experience. For more information, call 480/727-1098.

Recreational Facilities and Services

ASU East and Chandler-Gilbert Community College are partners in providing recreation, intramural, and group fitness opportunities on the Williams Campus. A \$30 per semester fitness membership provides access to the Physical Activity Center (PAC) and the Chandler-Gilbert Physical Education Center. Facilities include:

1. a fitness center with state-of-the-art strength training and cardiovascular equipment;
2. two aerobic studios and equipment for step aerobics, fitness cycling, and kickboxing;
3. a martial arts studio featuring a fully padded floor;
4. racquetball courts;
5. a gymnasium for intramural and open recreation;
6. an all-weather quarter mile track with an infield for soccer, ultimate, and flag-football;
7. four newly resurfaced tennis courts with lights for evening play; and
8. a seasonal swimming pool (May–October) with lights.

At the fitness center, trained exercise and wellness professionals are available to perform assessments, develop programs, and provide expert advice and personal training assistance.

In addition to the facilities, the PAC runs group fitness programs that are free of charge with the paid fitness membership. Classes are offered Monday through Thursday and include fitness cycling, yoga, aerobic fitstep, aerobic kickboxing, water aerobics, strength and conditioning, and cultural dance classes. A full schedule of intramural programs and special events are also offered at the PAC. Times for open recreation such as pick-up games are scheduled at the facilities.

ASU East students have developed clubs that work closely with the recreation programs to offer unique recreation experiences including hiking, West African dance, flamenco dancing, and sunrise yoga.

For more information, access the PAC Web site at www.east.asu.edu/pac or call 480/727-1972. The Chandler-Gilbert Fitness Center can be reached at 480/988-8400.

Child Care

Child care programs on campus are offered through the East Mesa/Apache Junction YMCA, Head Start and Early Head Start, and the East Valley Boys & Girls Club. The YMCA offers toddler and preschool programs with full- and part-time options available. Head Start and Early Head Start also offer child care programs on campus for individuals who meet certain income criteria. The Boys & Girls Club offers after school programs for children ages 6 to 18. For more information, call the YMCA at 480/727-1400, the Boys & Girls Club at 480/279-1406, or Head Start at 480/988-9389.

Williams Campus Housing and Residential Life

Living on-campus at ASU East provides students with the best opportunity to make the most of their college experience. No matter which housing option students choose, the residential life program offers social, academic, and recreational activities that are designed to support and enrich the student's campus life experience. Residential students benefit from easy access to campus resources such as the library, learning center, fitness center, and campus union.

ASU East's unique residential environment offers housing options for Williams Campus students throughout their undergraduate and graduate education. This includes residence halls, houses, and special residential communities. Residential students can also take advantage of such amenities as outdoor swimming, sand volleyball, tennis, and picnic areas.

For more information, call the Williams Campus Housing Office at 480/727-1700, or access the Web site at www.east.asu.edu/sta/u-life/housing.

Residence Halls. Undergraduate and graduate students are eligible for residence halls with a large private room, featuring a private bath and a shared kitchenette. Students may, if they prefer, elect to share a room with another student. Each room includes basic furnishings; the kitchenette includes a refrigerator and microwave.

Houses. A large number of two- to four-bedroom houses are available for students with families or for groups of single undergraduate or graduate students. Each house includes basic appliances.

Freshman Year Experience. Freshmen begin their residential experience on campus in a dedicated freshman residence hall that includes the Freshman Year Experience (FYE) program. The FYE program helps freshmen achieve scholastic and personal success by providing academic support ser-

vices and enhanced opportunities for learning, campus involvement, and out of class interaction with faculty. Research has consistently shown that freshmen participating in living-learning communities, such as FYE, achieve greater academic success. For more information about the FYE program, send e-mail to eastfye@asu.edu.

The FYE hall offers two bedroom suites with a shared bath, to house four students. Each room is equipped with local phone service, basic cable, and two computer ports. The FYE hall features a computer lab, quiet study, group study/tutoring room, and community lounge. Residents can select a meal plan from several options offered by Campus Dining Services.

Faculty Fellows. The Faculty Fellows program provides opportunities for faculty to interact with students outside of the classroom and to build academic community on campus. Fellows join students for meals in the dining hall, participate in special events such as the Leadership Conference, and help plan a variety of activities, including field trips, the Faculty Film Series, and community service projects. Through these informal meetings faculty enhance students' opportunities for learning outside of the classroom, and develop mentoring relationships, which help students make the most of their college experience. For more information about this program, call 480/727-1452.

The Residence Life Leadership Award. The Residence Life Leadership Award (RLLA) is designed to encourage the "best and brightest" ASU East undergraduates to live on campus and participate in a leadership development program. Applicants are selected for the RLLA based on:

1. the strength of their academic performance in high school;
2. their record of active involvement in leadership and/or service activities in their community;
3. their willingness to be actively involved in the leadership development program and in campus life at ASU East during their award year; and
4. the quality, completeness, and overall presentation of their application materials.

RLLA recipients receive a \$1,000 waiver that is applied toward their housing costs at ASU East. Five first-time freshmen and five continuing or new transfer students are selected for the awards each academic year. For more information, call 480/727-1452.

Morrison School of Agribusiness and Resource Management

www.east.asu.edu/msabr

Raymond A. Marquardt, Ph.D, Dean

PURPOSE

The Morrison School of Agribusiness and Resource Management provides a variety of academic programs in Agribusiness. Agribusiness is the business of food and fiber production and the technology necessary to change a raw material (a commodity) or an idea into a new product or business for the world's consumers. Producing, financing, marketing, and providing food and fiber for the world amounts to more than one-half of the earth's global economy.

Agribusiness courses in the Morrison School are designed to prepare students for a wide range of job opportunities in agribusiness and business. More than 20 percent of all jobs in the United States are agribusiness-related, and the industry is even more important internationally, with more than half of all jobs in developing countries related to food and fiber products. Population increases worldwide have led forecasters to predict that more than nine billion food and fiber consumers will be part of the global agribusiness system by the year 2050. Forecasts also estimate that, at that time, more than 20,000 agribusiness jobs will go unfilled due to a lack of skilled professionals.

The academic programs in Agribusiness are especially designed to meet the needs of the urban student who has little or no previous agriculture experience. An interest in plants, animals, or food can be the starting point for career development in agricultural industries or resource management. The undergraduate programs also provide the necessary training for students preparing to enter graduate degree programs.

The Morrison School is strategically positioned to offer some unique programs. The concentration in professional golf management provides a student with the opportunity to qualify for the Professional Golfers' Association certification program in addition to majoring in Agribusiness. Similarly, for individuals more interested in the development and management of golf and other turf facilities, the golf and facilities management concentration is well suited.

Food, its marketing and safety, is of paramount importance today and in the future. The Morrison School offers specific concentrations in both of these areas. Food and agribusiness marketing is one of the signature academic concentrations in the school. Food science and safety are emphases stressed in the food and agribusiness marketing concentration.

NATIONAL FOOD AND AGRICULTURAL POLICY PROJECT

The National Food and Agricultural Policy Project (NFAPP) constructs a 10-year baseline forecast for the fruit and vegetable produce industry and specific commodities, responds to congressional inquiries concerning policies affecting the fruit and vegetable industry, and publishes a monthly newsletter highlighting research efforts. Areas of study include domestic and international promotion of fruits and vegetables, trade and the impact of trade agreements, and crop insurance and risk management. For more information, call the director at 480/727-1124.

DEGREE PROGRAMS

The Morrison School offers a B.S. degree in Agribusiness with the following concentrations: agribusiness finance, food and agribusiness marketing, food science, general agribusiness, golf and facilities management, international agribusiness, management of agribusiness, professional golf management, resource management, e-commerce, and pre-veterinary medicine.

For students holding an A.A.S. degree, the school offers the Bachelor of Applied Science degree with concentrations in consumer products technology, food retailing, and resource team specialist. See the "[Morrison School of Agribusiness and Resource Management Baccalaureate Degrees and Majors](#)" table, page 595.

The school also offers the M.S. degree in Agribusiness with concentrations in agribusiness management and marketing, and food quality assurance. Students may select either a research-oriented program, which leads to the completion of a supervised thesis, or a program consisting of course work only (nonthesis option). All M.S. candidates in Agribusiness must complete a minimum of 36 semester hours.

ADMISSION

The Morrison School admits students to the B.S. degree programs who meet the undergraduate admission requirements of Arizona State University; see "Undergraduate Admission," page 59. Admission to the B.A.S. degree program is restricted to students holding an A.A.S. degree from a regionally accredited U.S. postsecondary educational institution. A GPA of 2.00 or higher is required for all resident applicants and 2.50 for nonresident applicants.

GRADUATION REQUIREMENTS

Agribusiness—B.S.

The completion of a minimum of 120 semester hours—including First-Year Composition, General Studies (see “General Studies,” page 85), and the school and concentration requirements—leads to the B.S. degree. Note that all three General Studies awareness areas are required. An overall GPA of 2.00 is required for graduation and students must have completed a minimum of 45 semester hours of upper-division credit. Also see special graduation requirements under “**Preveterinary Medicine**,” page 595.

Prerequisite Courses. Students who select the concentrations in agribusiness finance, food and agribusiness marketing, food science, general agribusiness, golf and facilities management, international agribusiness, management of agribusiness, or professional golf management, must complete the following courses, some of which can also be used to meet university General Studies requirements:

ACC 230 Uses of Accounting Information I.....	3
ACC 240 Uses of Accounting Information II	3
BIO 100 The Living World <i>SQ</i>	4
CHM 101 Introductory Chemistry <i>SQ</i> ¹	4
ECN 111 Macroeconomic Principles <i>SB</i> ²	3
ECN 112 Microeconomic Principles <i>SB</i>	3
ENG 301 Writing for the Professions <i>L</i>	3
MAT 210 Brief Calculus <i>MA</i>	3
Total	26

- ¹ This course is not required for the professional golf management concentration.
- ² This course is not required for the golf and facilities management or professional golf management concentration.

Core Requirements. Agribusiness employers require their employees to possess a wide range of skills and competencies. Rapid changes in information technology and the increasingly competitive food production and distribution sector mean that agribusiness needs graduates equipped to deal with these changes. The agribusiness core, required of all the concentrations, is designed to give students these skills. The core consists of courses in business principles—management, marketing, and finance—as well as in the fundamentals of agribusiness operations management.

AGB 100 Introduction to Agribusiness	3
AGB 161 Computer Applications for Agribusiness Industries <i>CS</i>	3
AGB 310 Agribusiness Management I	3
AGB 320 Agribusiness Marketing I	3
AGB 321 Agribusiness Marketing II*	3
AGB 332 Agribusiness Finance I	3
AGB 333 Agribusiness Finance II	3
AGB 360 Agribusiness Statistics <i>CS</i>	3
AGB 364 Agribusiness Technologies I	3
AGB 365 Agribusiness Technologies II*	3
AGB 410 Agribusiness Management II	3

AGB 414 Agribusiness Analysis <i>L</i>	3
Core total	36

* This course is not required for the professional golf management, golf and facilities management, or resource management concentrations.

Concentrations

After completing the required agribusiness core, students select a concentration in their area of interest. A concentration allows a student to select a series of courses that complement the agribusiness core, supplement the student’s desire to master another area of interest, and broaden career opportunities.

E-commerce Concentration. The extraordinary growth of e-commerce in the business and agribusiness venues provides significant opportunities for students prepared to work in this medium. A student following this concentration builds on the prerequisite core and the agribusiness core to prepare for this field. The opportunities for personal development, advancement, and success are present domestically and internationally.

E-commerce	
AGB 436 Entrepreneurship and Financial Management of E-commerce	3
AGB 463 Electronic Commerce Applications	3
AGB electives	8
Agribusiness core	36
Agribusiness prerequisite courses	26
Web site design course	3
Total	79

Agribusiness Finance Concentration. Agribusiness finance concentration graduates are expected to possess a broad knowledge of financial theory and practice as it pertains to the agribusiness sector. This will involve applying quantitative and computer-based analytical techniques to real-world agribusiness problems. Specific course content includes topics in financial management, financial markets, risk management, and the evaluation of financial assets and business alternatives.

Agribusiness Finance	
AGB 334 Agricultural Commodities	3
AGB 431 Intermediate Agribusiness Financial Management	3
AGB 434 Agricultural Risk Management and Insurance	3
AGB electives	8
Agribusiness core	36
Agribusiness prerequisite courses	26
Total	79

Management of Agribusiness Concentration. Agribusiness managers encounter many problems and opportunities on a daily basis that are unique to the agribusiness sector. Students choosing this concentration develop skills in managing people, internal resources, and external relationships in an increasingly dynamic environment.

L literacy and critical inquiry / **MA** mathematics / **CS** computer/statistics/quantitative applications / **HU** humanities and fine arts / **SB** social and behavioral sciences / **SG** natural science—general core courses / **SQ** natural science—quantitative / **C** cultural diversity in the United States / **G** global / **H** historical / See “General Studies,” page 85.

MORRISON SCHOOL OF AGRIBUSINESS AND RESOURCE MANAGEMENT

Management of Agribusiness

AGB 351 Management Science CS.....	3
AGB 380 Applied Microeconomics.....	3
AGB 411 Agricultural Cooperatives.....	3
or AGB 480 Agribusiness Policy and Government Regulations (3)	
AGB electives	8
Agribusiness core.....	36
Agribusiness prerequisite courses.....	26
Total	79

Food and Agribusiness Marketing Concentration. Students in the food and agribusiness marketing concentration develop critical skills relevant to dealing with firms involved in food, fiber, consumer products, and pharmaceutical manufacturing; distribution; and retailing. Students also learn about the relationship between input suppliers, commodity associations, and primary producers. To this end, food and agribusiness marketing students are required to complete a series of courses that analyze the behavior and performance of both commodity and consumer food markets.

Food and Agribusiness Marketing

AGB 334 Agricultural Commodities	3
or AGB 420 Food Marketing (3)	
AGB 422 Consumer Behavior	3
AGB 429 Marketing Research	3
AGB electives	8
Agribusiness core.....	36
Agribusiness prerequisite courses.....	26
Total	79

Food Science Concentration. The food science concentration focuses on both scientific and technical competency skills with an emphasis on food microbiology, food chemistry, biotechnology, mathematics, and statistics. This unique program prepares graduates for employment opportunities in the food, beverage, and dairy industries; regulatory agencies such as the FDA and USDA; international organizations such as FAO and WHO; and consumer organizations. In addition, graduates may choose to pursue advanced degrees.

Food Science

AGB 340 Food Processing	3
AGB 440 Food Safety	3
AGB 442 Food and Industrial Microbiology	4
AGB upper-division electives	7
Agribusiness core.....	36
Agribusiness prerequisite courses.....	26
Total	79

General Agribusiness Concentration. The general agribusiness concentration offers students a chance to build a broad perspective in the field of agribusiness. In an age of specialization, there remains a growing need for generalists. These individuals have mastered finance, marketing, management, and other technologies such as computers and statistics and are capable of demonstrating this mastery.

General Agribusiness

AGB 334 Agricultural Commodities	3
AGB electives	14
Agribusiness core.....	36

Agribusiness prerequisite courses.....	26
Total	79

International Agribusiness Concentration. A student studying international agribusiness is typically preparing for a career with government agencies oriented toward international issues; programs of agribusiness for or in developing countries; U.S. agribusiness firms affected significantly by trade; or U.S.-based international agribusiness firms. This concentration requires a mastery of subjects in international trade, agricultural development, international policy, and global marketing practices and institutions.

International Agribusiness

AGB 450 International Agricultural Development G	3
AGB 452 International Agricultural Policy.....	3
AGB 454 International Trade	3
AGB electives	8
Agribusiness core.....	36
Agribusiness prerequisite courses.....	26
Total	79

Professional Golf Management Concentration. The Professional Golf Management (PGM) concentration, accredited by the Professional Golfer's Association (PGA) of America, is specifically designed for students who aspire to become Class A PGA Professionals and work in management careers in the golf industry. International students admitted to this program should be aware that membership in the PGA of America is restricted to U.S. citizens and resident aliens. PGM students complete the agribusiness core, which helps them develop the critical skills needed to manage complex organizations. In addition, the PGM concentration requires a minimum of 23 semester hours of golf-related curriculum, of which nine hours consist of hands-on internship experience at golf facilities. The remaining 14 semester hours include courses selected from the following areas: golf course operations, turf grass management, club fitting and repair, pro shop merchandising, movement analysis, sports psychology and equipment, mechanics and shop maintenance and repair. Students must also complete the majority of requirements in the PGA Golf Professional Training Program, including the PGA Playing Ability Test. All golf-related courses and internships are selected with the assistance of the PGM program director.

PGM Admission. To be admitted to the PGM program, students must meet a playing ability test. Call the PGM director at 480/727-1017 for more information.

Professional Golf Management

Agribusiness core.....	27
Agribusiness prerequisite courses.....	22
Professional golf management courses	14
Professional golf management internship.....	9
Total	72

Golf and Facilities Management Concentration. The Golf and Facilities Management (GFM) concentration is designed to prepare students for careers as golf course superintendents. Through the agribusiness core, students develop the critical skills needed to manage complex organizations. In addition, the GFM concentration requires a

Morrison School of Agribusiness and Resource Management Baccalaureate Degrees and Majors

Major	Degree	Concentration	Administered By
Agribusiness	B.S.	Agribusiness finance, e-commerce, food and agribusiness marketing, food science, general agribusiness, golf and facilities management, international agribusiness, management of agribusiness, preveterinary medicine, professional golf management, resource management	Morrison School of Agribusiness and Resource Management
Applied Science	B.A.S.	Consumer products technology, food retailing, resource team specialist	Morrison School of Agribusiness and Resource Management

minimum of 25 semester hours of golf and facilities management-related curriculum, of which six hours consist of hands-on internship experience at golf courses. The remaining 19 semester hours include courses selected from the following areas: golf course operations, plants and landscaping, soils, irrigation and water management, fertilizers, pest control, turf grass management, mechanics and shop maintenance and repair. The GFM concentration also requires the student to complete six semester hours of internship experience at golf facilities, providing valuable hands-on experience. Call the GFM program coordinator at 480/727-1256 for additional information.

Golf and Facilities Management

Agribusiness core.....	27
Agribusiness prerequisite courses.....	23
Golf and facilities management courses.....	19
Internship.....	6
Total.....	75

Prerequisite Courses for Preveterinary Medicine. Students who select the preveterinary medicine concentration must take the following courses, some of which can also be used to meet the General Studies requirement.

ACC 230 Uses of Accounting Information I.....	3
BCH 361 Principles of Biochemistry.....	3
BIO 187 General Biology I <i>SG</i>	4
BIO 188 General Biology II <i>SQ</i>	4
BIO 340 General Genetics.....	4
CHM 113 General Chemistry <i>SQ</i>	4
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i>	5
or CHM 116 General Chemistry <i>SQ</i> (4)	
Choose between the course combinations below.....	4-8
CHM 231 Elementary Organic Chemistry <i>SQ</i> (3) ¹	
CHM 235 Elementary Organic Chemistry Laboratory <i>SQ</i> (1) ¹	
or	
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)	
ECN 112 Microeconomic Principles <i>SB</i>	3
ENG 301 Writing for the Professions <i>L</i>	3
MAT 210 Brief Calculus <i>MA</i>	3
MIC 205 Microbiology <i>SG</i> ²	3
MIC 206 Microbiology Laboratory <i>SG</i> ²	1
PHY 111 General Physics <i>SQ</i> ³	3
PHY 113 General Physics Laboratory <i>SQ</i> ³	1

Upper-division AGB, BIO, or ERS.....	6
Total.....	54-58

- 1 Both CHM 231 and 235 must be taken to secure *SQ* credit.
- 2 Both MIC 205 and 206 must be taken to secure *SG* credit.
- 3 Both PHY 111 and 113 must be taken to secure *SQ* credit.

Preveterinary Medicine. A student studying agribusiness could also be preparing for admission to a professional veterinary school. While completing the courses needed for acceptance into veterinary school, the student is broadening his or her career potential with agribusiness courses. The Agribusiness major provides knowledge of how to run a business or practice. In addition, should a preveterinary student decide not to apply to a veterinary school, this major provides alternative career paths into human or veterinary pharmaceutical industries or the food industry. This concentration permits students to complete the preveterinary requirements for entrance to professional veterinary school.

Preveterinary Medicine

Agribusiness core.....	21
AGB 310 Agribusiness Management I (3)	
AGB 320 Agribusiness Marketing I (3)	
AGB 332 Agribusiness Finance I (3)	
AGB 360 Agribusiness Statistics <i>CS</i> (3)	
AGB 364 Agribusiness Technologies I (3)	
AGB 365 Agribusiness Technologies II (3)	
AGB 414 Agribusiness Analysis <i>L</i> (3)	
Preveterinary medicine prerequisites.....	54-58
Total.....	75-79

Veterinary College Acceptance. A student who has been accepted to a school of veterinary medicine before he or she has earned a B.S. degree in the Morrison School may do so by completing a minimum of 30 semester hours at ASU and the General Studies requirement. Students must receive a written statement from the dean of the Morrison School giving senior-in-absentia privileges. A student is eligible to receive the B.S. degree after the ASU Office of the Registrar receives a recommendation from the dean of the veterinary professional school and a transcript indicating the student

L literacy and critical inquiry / **MA** mathematics / **CS** computer/statistics/quantitative applications / **HU** humanities and fine arts / **SB** social and behavioral sciences / **SG** natural science—general core courses / **SQ** natural science—quantitative / **C** cultural diversity in the United States / **G** global / **H** historical / See “General Studies,” page 85.

MORRISON SCHOOL OF AGRIBUSINESS AND RESOURCE MANAGEMENT

has completed the necessary semester hours commensurate with ASU graduation requirements.

Veterinary Medical Schools. There are approximately 27 schools of veterinary medicine in the United States. Each school establishes the specific prerequisites that are required for admission. Advisors in the Morrison School assist students in designing their class schedules to meet the requirements of the veterinary schools to which they plan to apply. Each school generally looks for courses in biology, chemistry, genetics, microbiology, and organic chemistry. In addition to a science foundation, all students must meet the University General Studies requirement, complete 45 semester hours of upper-division courses, and satisfy the school admission requirements.

Resource Management Concentration. The resource management concentration combines the agribusiness concentration core with solid technical preparation in biology, chemistry, and/or economics. There is a growing demand by industry and government for persons who understand both the technical and managerial basis for sustainable development, remediation and/or utilization of natural resources for agribusiness, conservation, and habitat restoration. Courses and field projects prepare the student to analyze, develop, and manage programs that make use of land and water in an economic as well as environmentally sustainable fashion.

Resource Management Concentration Prerequisite Courses. Students who select the resource management concentration must complete these courses, some of which can also be used to meet General Studies requirements:

ACC 230 Uses of Accounting Information I.....	3
BIO 187 General Biology I <i>SG</i>	4
BIO 188 General Biology II <i>SQ</i>	4
CHM 101 Introductory Chemistry <i>SQ</i>	4
CHM 231 Elementary Organic Chemistry <i>SQ</i> *.....	3
CHM 235 Elementary Organic Chemistry Laboratory <i>SQ</i> *.....	1
ECN 112 Microeconomic Principles <i>SB</i>	3
ENG 301 Writing for the Professions <i>L</i>	3
MAT 210 Brief Calculus <i>MA</i>	3
Total	28

* Both CHM 231 and 235 must be taken to secure *SQ* credit.

Resource Management

AGB 455 Resource Management <i>SB</i>	3
AGB 480 Agribusiness Policy and Government Regulations.....	3
AGB electives or approved courses	12
Agribusiness core	27
Resource Management prerequisites	28
Total	73

APPLIED SCIENCE—B.A.S.

The Bachelor of Applied Science degree is a capstone degree for the Associate of Applied Science degree. The B.A.S. degree exposes students to advanced concepts and diverse critical thinking skills to prepare them for future career opportunities and professional advancement.

Admission

Admission to the B.A.S. degree program is restricted to students holding an A.A.S. degree from a regionally accredited

U.S. postsecondary educational institution. A GPA of 2.00 or higher is required for all resident applicants and 2.50 for nonresident applicants.

B.A.S. Degree Graduation Requirements

The B.A.S. degree program consists of 60 semester hours of upper-division courses, with 30 semester hours in residence. An overall GPA of 2.00 or higher is required.

A.A.S. degree	60
Assignable credit.....	6
B.A.S. core.....	16
Concentration	19
General Studies	19
Total	120

General Studies Curriculum. The B.A.S. curriculum builds on the general education content of the A.A.S. degree. Additional General Studies courses are taken in the core or concentration. General Studies courses focus on contextual learning.

L.....	3
MA.....	3
HU.....	3
HU or SB	3
SB.....	3
SG.....	4
Total	19

Assignable Credit. Assignable credit allows space in the curriculum for prerequisite courses. The courses are determined by the student and advisor.

B.A.S. Core

AGB 310 Agribusiness Management I.....	3
AGB 320 Agribusiness Marketing I.....	3
AGB 360 Agribusiness Statistics <i>CS</i>	3
AGB 414 Agribusiness Analysis <i>L</i>	3
AGB 460 Agribusiness Management Systems	4
Total	16

Consumer Products Technology Concentration. Students in this concentration prepare for a career in the food and consumer products industries. Students learn to develop food, drug, cosmetic, and other consumer products and to ensure product safety and marketability by obtaining a thorough mastery of courses in product and package design, manufacturing, processing, and safety.

Consumer Products Technology

AGB 340 Food Processing	3
AGB 364 Agribusiness Technologies I.....	3
AGB 440 Food Safety	3
MET 341 Manufacturing Analysis.....	3
MET 494 ST: Consumer Manufacturing.....	3
MET 494 ST: Packaging Design.....	3
AGB elective	1
Total	19

Food Retailing Concentration. A student studying food retailing prepares for a career in the food marketing and distribution industries. Potential employers are food manufacturing and processing companies, distribution centers, wholesalers, and all types of food retailers, e.g., supermar-

kets, mass merchandisers, fast food outlets, restaurants, and direct marketers of food.

Food Retailing

AGB 332 Agribusiness Finance I.....	3
AGB 340 Food Processing	3
AGB 420 Food Marketing.....	3
AGB 440 Food Safety	3
AGB 445 Food Retailing.....	3
AGB 484 Internship	1
AGB elective	3
Total	19

Resource Team Specialist Concentration. The resource team specialist concentration combines the technical preparation acquired in an A.A.S. program with a special orientation in environmental and resource management. This concentration prepares individuals to participate as an integral part of an environmental emergency response team as well as postemergency biological and environmental rehabilitation efforts.

Resource Team Specialist

AGB 332 Agribusiness Finance I.....	3
AGB 457 Resource Policy and Sustainability.....	3
AGB 484 Internship	1
ETM 301 Environmental Management	3
ETM 303 Environmental Regulations	3
AGB electives	6
Total	19

**Morrison School of Agribusiness
and Resource Management**

www.east.asu.edu/msabr

480/727-1585

CNTR 20

Raymond A. Marquardt, Dean

Professors: Daneke, Edwards, Kagan, Marquardt, Seperich, Shultz, Thor

Associate Professors: Patterson, Raccach, Richards

Assistant Professors: HUGHNER, Manfredo, Schmitz

Senior Lecturer: Lindley

AGRIBUSINESS (AGB)

AGB 100 Introduction to Agribusiness. (3)

fall

Overview of agribusiness industries and career opportunities.

AGB 161 Computer Applications for Agribusiness Industries. (3)

spring

Uses and integrates word processing, spreadsheets, and databases as tools for managing an agribusiness firm. Lecture, lab.

General Studies: CS

AGB 171 Animal Science. (3)

spring

Comparative growth, development, propagation of domestic animals.

AGB 191 First-Year Seminar. (1-3)

selected semesters

AGB 194 Special Topics. (1-4)

selected semesters

AGB 258 International Agribusiness. (3)

fall

Identifies and analyzes methods, problems, and future of international agribusiness operations. Emphasizes special problems associated with international agribusiness systems.

General Studies: G

AGB 271 Veterinary Medicine Today. (3)

spring

Introduces the role of the veterinarian as related to the fields of food supply and veterinary medicine.

AGB 294 Special Topics. (1-4)

selected semesters

AGB 310 Agribusiness Management I. (3)

fall

Principles of management, including planning, organizing, integrating, measuring, and developing people in agribusiness organizations.

AGB 311 Establishing an Agribusiness. (3)

fall

Opportunities and problems associated with new firm development in agribusiness. Business plan is written and presented orally.

AGB 320 Agribusiness Marketing I. (3)

fall and spring

Examines marketing strategy, focusing on the marketing mix (product, price, promotion, and place) in a dynamic socioeconomic environment. Prerequisites: ACC 230, 240; AGB 360; ECN 112.

AGB 321 Agribusiness Marketing II. (3)

fall and spring

Examines the food marketing system with emphasis on the marketing institutions, arrangements, and methods for basic commodities. Prerequisites: ACC 230, 240; AGB 360; ECN 112.

AGB 332 Agribusiness Finance I. (3)

fall and spring

Introduces concepts in agribusiness financial management: time value of money, risk and return, capital budgeting, and cost of capital. Prerequisites: ECN 111 and 112 (or their equivalents); introductory accounting.

AGB 333 Agribusiness Finance II. (3)

spring

Introduces financial markets and institutions. Interest rate determination, money and banking, equity markets, farm credit system, vendor financing. Prerequisites: ECN 111 and 112 (or their equivalents); introductory accounting.

AGB 334 Agricultural Commodities. (3)

fall

Trading on futures markets. Emphasis on the hedging practices with grains and meats. Prerequisite: AGB 320.

AGB 340 Food Processing. (3)

fall

Introduces processed food quality assurance, statistical sampling, and inspection procedures. Prerequisite: AGB 364.

AGB 341 Food Analysis. (3)

selected semesters

Processing control and scientific instrumentation used in food quality assurance laboratories. Prerequisites: AGB 364; CHM 101.

AGB 351 Management Science. (3)

fall

Focus on the construction, solution, and interpretation of quantitative models used for management decision making in agribusiness firms. Prerequisites: AGB 320, 360; ECN 112; MAT 117.

General Studies: CS

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See "General Studies," page 85.

MORRISON SCHOOL OF AGRIBUSINESS AND RESOURCE MANAGEMENT

AGB 355 Sustainable Agriculture Systems. (3)

fall and spring

Innovative developments in precision farming, irrigation, soils, tillage methods, machinery, and biotechnology in crop production.

AGB 360 Agribusiness Statistics. (3)

fall and spring

Statistical methods with applications in agribusiness and resource management. Lecture, computer lab. Prerequisite: college algebra.

General Studies: CS

AGB 364 Agribusiness Technologies I. (3)

fall

Examines methods of managing diverse crop and livestock enterprises with emphasis on growth, development, marketing, and loss prevention. Prerequisite: BIO 100.

AGB 365 Agribusiness Technologies II. (3)

fall

Biotechnology and other methods used in the production, processing, and distribution of food. Prerequisite: BIO 100.

AGB 370 Wildlife and Domestic Animal Nutrition. (3)

spring

Survey of nutritional needs of domestic and wild animals. Prerequisite: a General Studies SQ course.

AGB 371 Animal Genetics. (3)

fall

Principles of animal genetics, including heritable traits, chromosomal aberrations, population genetics, molecular genetics, and gene regulation. Prerequisites: BIO 187, 188.

AGB 380 Applied Microeconomics. (3)

fall and spring

Emphasizes application of the theory of the firm, theory of exchange, and consumer theory.

AGB 394 Special Topics. (1–4)

selected semesters

AGB 410 Agribusiness Management II. (3)

spring

Principles of human resource management in agribusiness firms. Prerequisite: AGB 310.

AGB 411 Agricultural Cooperatives. (3)

spring

Organization, operation, and management of agricultural cooperatives.

AGB 414 Agribusiness Analysis. (3)

fall and spring

Analysis of agribusiness firm decisions in the ecological, economic, social, and political environments. Special emphasis on ethical issues surrounding food production and consumption.

General Studies: L

AGB 420 Food Marketing. (3)

spring

Food processing, packaging, distribution, market research, new food research and development, and social implications. Prerequisite: AGB 320.

AGB 422 Consumer Behavior. (3)

fall

Applies behavioral concepts in analyzing consumer food purchases and their implications for marketing strategies. Prerequisite: completion of Agribusiness core (or its equivalent).

AGB 424 Sales and Merchandising in Agribusiness. (3)

summer

Principles and techniques of selling and merchandising in the agricultural and food industries.

AGB 425 Agricultural Marketing Channels. (3)

fall

Operational stages of agricultural commodities in normal distribution systems and implementation of marketing strategies. Prerequisite: AGB 320.

AGB 429 Marketing Research. (3)

fall

Examines the marketing research process and its role in facilitating agribusiness decisions. Emphasizes problem identification, survey design, and data analysis. Prerequisite: completion of Agribusiness core (or its equivalent).

AGB 431 Intermediate Agribusiness Financial Management. (3)

spring

Comprehensive treatment of topics in financial management of agribusiness: capital structure, dividend policy, asset valuation, mergers and acquisitions, risk management. Prerequisites: AGB 332, 333.

AGB 433 Intermediate Agribusiness Financial Markets. (3)

spring

Role and function of agribusiness in U.S. financial system. Topics include rural banking, farm credit system, monetary policy, and federal reserve. Prerequisite: completion of Agribusiness core (or its equivalent).

AGB 434 Agricultural Risk Management and Insurance. (3)

fall

Strategies to manage agricultural price and business risk: derivatives, insurance, self-insurance, and public policy. Prerequisite: completion of Agribusiness core (or its equivalent).

AGB 436 Entrepreneurship and Financial Management of E-commerce. (3)

fall

Uses lectures, case studies, and business plans to highlight challenges of starting and running a small business. Lecture, seminar, case studies, computer labs.

AGB 440 Food Safety. (3)

spring

Control, prevention, and prediction of microbial and chemical food-borne diseases. Prerequisite: AGB 442 or instructor approval.

AGB 441 Food Chemistry. (3)

spring

Biochemical and chemical interactions that occur in raw and processed foods. Prerequisites: CHM 115, 231.

AGB 442 Food and Industrial Microbiology. (4)

selected semesters

Food- and industrial-related microorganisms; deterioration and preservation of industrial commodities. Lecture, lab. Prerequisite: a course in microbiology with lecture and lab.

AGB 443 Food and Industrial Fermentations. (3)

spring

Management, manipulation, and metabolic activities of industrial microbial cultures and their processes. Prerequisite: AGB 442 or instructor approval.

AGB 445 Food Retailing. (3)

fall

Food retail management. Discusses trends, problems, and functions of food retail managers within various retail institutions. Lecture, case studies.

AGB 450 International Agricultural Development. (3)

fall

Transition of developing countries from subsistence to modern agriculture. Emphasis placed on implications for U.S. agribusiness working abroad.

General Studies: G

AGB 452 International Agricultural Policy. (3)

fall

Use of international trade theory to analyze the effects of government policies, trade agreements, and exchange rates on agribusiness. Prerequisite: ECN 112.

AGB 454 International Trade. (3)

spring

International practices in trading of agribusiness, technology, and resource products and services.

AGB 455 Resource Management. (3)

spring

Explores differences between societal and individual valuations of natural resources and considers public policy versus market-based solutions to environmental concerns. Prerequisite: ECN 112.

General Studies: SB

AGB 457 Resource Policy and Sustainability. (3)

fall

Considers the evolution of policy design, focusing on how resource and environmental concerns have affected agricultural development and trade policies. Prerequisite: ECN 112.

AGB 460 Agribusiness Management Systems. (4)

spring

Development and use of decision support systems for agribusiness management and marketing. Lecture, lab.

AGB 463 Electronic Commerce Applications. (3)

fall

Overview of electronic commerce technology with introduction to basics of design, control, operation, organization, and emerging issues. Pre- or corequisite: AGB 460 (or its equivalent).

AGB 470 Comparative Nutrition. (3)

selected semesters

Effects of nutrition on animal systems and metabolic functions. Prerequisite: CHM 231.

AGB 471 Diseases of Domestic Animals. (3)

spring

Discusses animal welfare, mechanisms of disease development, causes and classification of diseases, disease resistance, and common zoonoses. Prerequisite: BIO 188.

AGB 473 Animal Physiology I. (3)

selected semesters

Control and function of the nervous, muscular, cardiovascular, respiratory, and renal systems of domestic animals. Prerequisites: BIO 188; CHM 113.

AGB 479 Veterinary Practices. (3)

fall and spring

Observation of and participation in veterinary medicine and surgery supervised by local veterinarians. Prerequisite: advanced preveterinary student.

AGB 480 Agribusiness Policy and Government Regulations. (3)

spring

Development and implementation of government food, drug, pesticide, and farm policies and regulations that affect the management of agribusiness.

AGB 484 Internship. (1–12)

fall and spring

AGB 492 Honors Directed Study. (1–6)

selected semesters

Topics may include the following:

- Recent Advances in Food Science. (1)

AGB 493 Honors Thesis. (1–6)

selected semesters

AGB 494 Special Topics. (1–4)

selected semesters

AGB 498 Pro-Seminar. (1–7)

selected semesters

AGB 499 Individualized Instruction. (1–3)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see “Omnibus Courses,” page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see “Graduate-Level Courses,” page 56.

PROFESSIONAL GOLF MANAGEMENT (PGM)

PGM 100 Introduction to GPTP. (2)

fall and spring

Introduces the golf professional training program. Career enhancement, rules of golf, tournament operations, and playing professional development programs. Prerequisite: admission to PGM program.

PGM 110 Player Development I. (1)

fall and spring

Introductory instruction on golf game improvement to assist PGM students in preparation for Players Ability Test. Evaluation. Prerequisite: admission to PGM program.

PGM 111 Player Development II. (1)

fall and spring

Instruction to assist PGM students in preparation for Players Ability Test with emphasis on full swing mechanics and practice plan development. Evaluation. Prerequisite: admission to PGM program.

PGM 112 Player Development III. (1)

fall and spring

Emphasizes classroom and “hands-on” applications of full swing analysis and short game strategies. Special focus on golf course management. Evaluation. Prerequisite: admission to PGM program.

PGM 113 Player Development IV. (1)

fall and spring

Emphasizes classroom and “hands-on” applications of full swing analysis and short game strategies. Special focus on golf course management. Evaluation. Prerequisite: admission to PGM program.

PGM 114 Player Development V. (1)

summer

Introductory instruction on golf game improvement to assist PGM students in preparation for Player Ability Test. Evaluation. Prerequisite: admission to PGM program.

PGM 150 Teaching Golf I. (2)

fall and spring

Introduces golf instruction. Focus on fundamentals of golf swing and teaching techniques. Prerequisite: admission to PGM program.

PGM 200 GPTP II. (2)

fall

Focuses on golf professional training program and the completion of the PGA Level One experience kit. Prerequisite: admission to PGM program.

PGM 250 Teaching Golf II. (1)

fall and spring

Communicating with student golfers, swing evaluation, key factors club fitting, developing a successful teaching practice. Prerequisite: admission to PGM program.

PGM 266 Golf Course Irrigation. (3)

fall and spring

Design, management, and maintenance of golf course irrigation systems.

PGM 300 GPTP III. (1)

fall

Business planning and operations, business communications related to business of golf. Completion of the PGA Level Two experience kit. Prerequisite: admission to PGM program.

PGM 350 Teaching Golf III. (1)

fall and spring

Teaching swing concepts. Developing a teaching philosophy, analyzing flawed swing mechanics through video and swing analysis software. Prerequisite: admission to PGM program.

PGM 366 Golf Turf Management. (2)

fall and spring

Selection, establishment, and maintenance of turf grasses bred specifically for golf greens, fairways, and roughs.

PGM 367 Golf Course Landscape Plants and Design. (3)

fall and spring

Identification, culture, and use of plants in a golf course setting. Cross-listed as PLB 363. Credit is allowed for only PGM 367 or PLB 363. Fee.

PGM 400 GPTP IV. (1)

fall

Food and beverage control, supervision and delegation of golf facilities. Completion of the PGA Level Three experience kit. Prerequisite: admission to PGM program.

PGM 466 Integrated Pest Control. (2)

fall and spring

Management of pests affecting golf turf and landscape plants. Structural Pest Control Board sprayer certification preparation offered during the semester.

PGM 484 Internship. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see “Omnibus Courses,” page 56.

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See “General Studies,” page 85.

East College

www.east.asu.edu/ecollege

David E. Schwalm, Ph.D., Dean

PURPOSE

East College offers a variety of liberal and professional programs. Baccalaureate programs are offered in applied biological sciences, applied psychology, business administration, elementary education, exercise and wellness, human health studies, interdisciplinary studies, multimedia writing and technical communication, and nutrition. Minors, certificates, and graduate programs are also available in some areas.

Each semester, East College offers a selection of popular upper-division ASU General Studies and general interest courses. While designed primarily to support ASU East students, these courses are open to all ASU students who might find the times and location convenient. East College typically offers courses in anthropology, art, communication, economics, English, history, mathematics, music, philosophy, political science, psychology, religious studies, sociology, and women's studies. Students should refer to the current *Schedule of Classes* for specific courses offered at ASU East each semester. All credit earned at ASU East automatically transfers to ASU Main or ASU West.

Students who begin their college careers at ASU East benefit from the small, residential campus environment. If they are uncertain about a major they can declare East College/No Preference status. Students are able to complete General Studies requirements and search for an ASU major that serves their personal and career objectives while enrolled as No Preference majors. East College provides advising to No Preference majors.

East College also offers statistics courses (APM) to meet requirements for a range of majors and support courses for the Bachelor of Applied Science (B.A.S.) degree. The applied science core (ASC) courses are upper division and specifically designed to build upon the mathematics and science base acquired in the Associate of Applied Science (A.A.S.) degree.

APPLIED MATHEMATICS (APM)

APM 301 Introductory Statistics. (3)

selected semesters

Probability, distributions, statistical hypothesis testing, t-tests, basic correlation, and regression. Prerequisite: MAT 117 or instructor approval.

General Studies: CS

APM 401 Intermediate Statistics. (3)

selected semesters

Analysis of variance, multiple comparisons, multiple regression. Prerequisite: APM 301 (or its equivalent) or instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

APPLIED SCIENCE CORE (ASC)

ASC 301 Contextual Uses of Algebra in Technology. (1)

fall and spring

Uses algebra to solve real-world technological problems using currently available computer software. Prerequisite: B.A.S. major.

ASC 302 Contextual Uses of Geometry in Technology. (1)

fall and spring

Uses geometrical concepts to solve real-world technological problems using currently available computer software. Prerequisite: B.A.S. major.

ASC 303 Contextual Uses of Trigonometry in Technology. (1)

fall and spring

Uses trigonometry to solve real-world technological problems using currently available computer software. Prerequisite: B.A.S. major.

ASC 315 Numeracy in Technology. (3)

fall and spring

Contextual uses of mathematics in applied sciences. Emphasizes using mathematical methodologies to solve technology-related problems. Prerequisite: B.A.S. major.

ASC 325 Physical Sciences in Technology. (4)

fall and spring

Physical systems and their interrelationships on technology systems. Real-world applications of physical systems. Lecture, lab. Prerequisite: B.A.S. major.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Partnership in Baccalaureate Education. The Partnership in Baccalaureate Education, an agreement between Chandler-Gilbert Community College and ASU East, is coordinated through East College. Through this partnership, ASU East students take first-year composition courses and courses that meet lower-division ASU General Studies requirements. They are listed in "General Studies," page 85. These courses, combined with introductory courses within the major, are available in an innovative and integrated first-year curriculum designed to foster academic success. Students can also take major prerequisite courses, introductory language courses, and other lower-division courses of general interest through the partnership. These courses automatically transfer to ASU each semester.

DEGREE PROGRAMS

See the "East College Baccalaureate Degrees and Majors" table, page 601. For graduate degrees, see the "East College Graduate Degrees and Majors" table, page 602.

East College also offers a certificate program in Multimedia Writing and Technical Communication; minors in Wellness Foundations, Food and Nutrition Management, and Human Nutrition; and concentrations for the B.A.S. See the *Graduate Catalog* for more information about graduate programs.

East College Baccalaureate Degrees and Majors

Major	Degree	Concentration	Administered By
Applied Biological Sciences	B.S.	Applied biological sciences, applied biological sciences/secondary education, ecological restoration, urban horticulture, wildlife habitat management	East College
Applied Psychology	B.S.	—	East College
Applied Science	B.A.S.	Food service management, multimedia writing and technical communication	East College
Business Administration	B.S.	—	East College
Elementary Education	B.A.E.	—	East College
Exercise and Wellness	B.S.	Exercise and wellness, health promotion	Department of Exercise and Wellness
Human Health Studies	B.A., B.S.	—	East College
Interdisciplinary Studies	B.I.S.	See the “B.I.S. Concentrations” table, page 118.	Bachelor of Interdisciplinary Studies Advisory Committee
Multimedia Writing and Technical Communication	B.S.	—	East College
Nutrition	B.S.	Dietetics, food and nutrition management, human nutrition	Department of Nutrition

INTERDISCIPLINARY STUDIES—B.I.S.

The Bachelor of Interdisciplinary Studies (B.I.S.) program is intended for the student who has academic interests that might not be satisfied with existing majors. Building on academic concentrations and an interdisciplinary core, students in the B.I.S. program take an active role in creating their educational plans and defining their career goals. The B.I.S. program emphasizes written communication, versatility, and critical thinking, skills desired in the 21st-century workplace. Self-assessment and appraisal of opportunities to support academic and career goals are key elements in the core courses. The concentrations are generally based on approved academic minors, certificate programs, or special coherent clusters of course work. The student should be able to integrate these into a meaningful program.

The combination of areas of concentration gives students flexibility in creating unique programs to accomplish individual academic goals. Students who declare the B.I.S. as their major in East College at ASU East take their core courses and at least one concentration through ASU East. The second concentration may be taken at ASU Main or ASU East. The B.I.S. core courses are offered by East College. Concentrations at ASU East are offered by East College, the College of Technology and Applied Sciences, and the Morrison School of Agribusiness and Resource Management. Students interested in the B.I.S. program should arrange an appointment with an East College advisor at 480/727-1333 before declaring the B.I.S. major.

Basic Requirements

The B.I.S. major requires 120 semester hours. The major is composed of a 12 hour core and a minimum of 36 hours in two or three concentration areas (18 hours or more each). Throughout the core sequence, the student assembles a portfolio including self-assessment of progress toward career goals and an evaluation of key educational and personal activities that may apply. The core courses must be taken in

sequence. These courses may not be transferred from other institutions. BIS 401 may be taken as a corequisite or prerequisite for BIS 402. All core courses must be completed with a grade of “C” or higher.

Core Courses

BIS 301	Foundations of Interdisciplinary Studies <i>L</i>	3
BIS 302	Interdisciplinary Principles	3
BIS 401	Applied Interdisciplinary Studies	3
BIS 402	Senior Seminar <i>L</i>	3
Total	12

For course descriptions, see “Bachelor of Interdisciplinary Studies,” page 117.

Other Requirements

In addition to the basic requirements, students must complete all university requirements, including First-Year Composition and General Studies. Early advising is recommended to ensure that students meet requirements efficiently and optimize their choices.

Declaring the B.I.S. Major

Students must receive approval from an East College advisor before declaring the B.I.S. major. In addition, the student must

1. complete at least 45 semester hours of university credit;
2. earn a cumulative G.P.A. of at least 2.00;
3. complete two courses in each concentration with a minimum grade of “C” before enrolling in BIS 301; and

L literacy and critical inquiry / *MA* mathematics / *CS* computer/statistics/quantitative applications / *HU* humanities and fine arts / *SB* social and behavioral sciences / *SG* natural science—general core courses / *SQ* natural science—quantitative / *C* cultural diversity in the United States / *G* global / *H* historical / See “General Studies,” page 85.

East College Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Applied Psychology	M.S.	—	East College
Curriculum and Instruction*	Ph.D.	Exercise and wellness education	Interdisciplinary Committee on Curriculum and Instruction
Environmental Design and Planning*	Ph.D.	Design; history, theory and criticism; planning	Committee on Environmental Design and Planning
Environmental Resources	M.S.	GIS/remote sensing, natural resource management, range ecology	Department of Applied Biological Sciences
Exercise and Wellness	M.S.	—	Department of Exercise and Wellness
Nutrition	M.S.	—	Department of Nutrition

* Doctoral courses for this interdisciplinary program administered by ASU Main are offered at ASU East.

- complete the university mathematics and First-Year Composition requirements.

All incoming students and continuing students with a minimum GPA of 2.00 who do not meet the above requirements are placed in a pre-B.I.S. major until the requirements have been met.

Approved Concentrations

Each concentration requires 18 or more semester hours, with each course completed with a grade of “C” or higher. Twelve or more of the semester hours must be in upper-division courses. Students should check for new information about concentrations on the Web at www.east.asu.edu/ecollege or contact an East College advisor at 480/727-1333.

- wildlife habitat management.

The goal of the program is to ensure that all students know basic biological principles and the supporting sciences appropriate to each concentration. Concentrations are designed to be flexible to allow students to pursue specialized interests.

Applied Biological Sciences graduates can pursue entry-level careers in biological research, education, and applied sciences such as ecological restoration, urban horticulture, and wildlife biology. The Applied Biological Sciences major also prepares students for graduate school and professional schools in disciplines such as medicine, dentistry, physical therapy, ecology, horticulture, and wildlife biology.

Graduation Requirements

A total of 120 semester hours, with a minimum of 45 semester hours of upper-division credit, is required for graduation. As part of the undergraduate degree program, students complete the ASU General Studies requirement. For courses that meet ASU General Studies requirement, see “General Studies,” page 85. It is strongly recommended that students work with an academic advisor when selecting courses to meet the General Studies requirement since otherwise required courses can often be used to meet the General Studies requirement.

Applied Biological Sciences Core. All Applied Biological Sciences students are required to complete the following courses:

Applied Biology Core

ABS 350 Applied Statistics <i>CS</i>	3
BIO 187 General Biology I <i>SG</i>	4
BIO 188 General Biology II <i>SQ</i>	4
MAT 210 Brief Calculus <i>MA</i>	3
Total	14

Students majoring in Applied Biological Sciences must select one of the concentrations listed below.

Applied Biological Sciences Concentration

The applied biological sciences concentration provides a general background in the biological sciences and associated sciences. This concentration is appropriate for students seeking an education rich in the liberal arts. It is designed to

Applied Biological Sciences

480/727-1515
CNTR 92

Ward W. Brady, Faculty Head

Professors: Brady, Brock, Ohmart

Associate Professors: Green, Martin, Miller, Steele, Stutz, Whyson

APPLIED BIOLOGICAL SCIENCES—B.S.

The B.S. degree in Applied Biological Sciences is designed to prepare professionals and scholars for careers in the biological sciences. Because of the large diversity of career options available in this field, five concentrations are offered:

- applied biological sciences;
- applied biological sciences/secondary education;
- ecological restoration;
- urban horticulture; and

EAST COLLEGE

BCH 361 Principles of Biochemistry.....	3
PHY 111 General Physics <i>SQ*</i>	3
PHY 112 General Physics <i>SQ*</i>	3
PHY 113 General Physics Laboratory <i>SQ*</i>	1
PHY 114 General Physics Laboratory <i>SQ*</i>	1

* Both PHY 111 and 113 and PHY 112 and 114 must be taken to secure *SQ* credit.

Note: If General Studies courses are carefully chosen with assistance from an advisor, then up to an additional 14 semester hours of electives are available.

Applied Biological Sciences/Secondary Education Concentration

The applied biological sciences/secondary education concentration qualifies students for the State of Arizona Certification in Secondary Biology Education. Students interested in pursuing this concentration need to complete the science content courses related to biology and the courses specific to the secondary education curriculum. The program concludes with full-time student teaching in a secondary science classroom. Students interested in pursuing the concentration need to be admitted into the Teacher Education unit before taking the secondary methods courses (approximately during the junior year). See “[Applied Biological Sciences Concentration](#),” page 611, for application requirements.

Applied Biological Sciences/Secondary Education Concentration Requirements

ABS 150 Environmental Conservation.....	3
ABS 207 Applied Plant Taxonomy.....	3
ABS 355 Vertebrate Zoology.....	4
ABS 370 Ecology: Individuals, Populations, and Communities...3	
BIO 201 Human Anatomy and Physiology I <i>SG</i>	4
BIO 340 General Genetics.....	4
Choose between the course combinations below.....	4–5
BIO 360 Animal Physiology (3)	
BIO 361 Animal Physiology Laboratory (2)	
— or —	
PLB 308 Plant Physiology (4)	
CHM 113 General Chemistry <i>SQ</i>	4
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i>	5
MIC 205 Microbiology <i>SG</i>	3
MIC 206 Microbiology Laboratory <i>SG</i>	1
PHY 101 Introduction to Physics <i>SQ</i>	4
Upper-division elective*.....	4
Total.....	46–47

* The elective is BIO 202 if BIO 201 is taken.

Secondary Education Course Work

BIO 480 Methods of Teaching Biology.....	3
BIO 482 Advanced Methods of Teaching Biology.....	3
EDC 350 Educational Technology I: Applications.....	1
EDC 351 Educational Technology II: Instruction and Evaluation.....	1
EDC 352 Educational Technology III: Design.....	1
EDC 494 ST: Professional Knowledge.....	2
EDP 303 Human Development <i>L</i>	3
EDP 310 Educational Psychology <i>SB</i>	3
RDG 301 Literacy and Instruction in the Content Areas.....	3
SED 403 Middle and Secondary School Principles, Curriculum, and Methods.....	3
SED 478 Student Teaching in Secondary Schools.....	10–12

SED 496 Field Experience.....	0
SPE 394 ST: Inclusion Practices at the Secondary Level.....	3
Total.....	36–38

Strongly Recommended

MCE 446 Understanding the Culturally Diverse Child <i>C</i>	3
SPE 311 Orientation to Education of Exceptional Children <i>SB</i> ...	3

Ecological Restoration Concentration

The ecological restoration concentration, composed of 65 semester hours, focuses on rehabilitation and management practices that improve the ecological structure and function of degraded ecosystems. Restoration activities may involve all ecosystem components including soils, water, vegetation, and wildlife. The goals of restoration are to restore ecological integrity and to meet societal needs for sustainable and functional ecosystems. The restoration process includes identifying the causes of degradation, devising methods and goals for the restoration effort, developing management strategies for restoring sites, monitoring changes at sites and assessing restoration success.

Ecological Restoration Concentration Requirements

ABS 150 Environmental Conservation.....	3
ABS 207 Applied Plant Taxonomy.....	3
ABS 225 Soils.....	3
ABS 226 Soils Laboratory.....	1
ABS 368 Plant Propagation.....	3
ABS 370 Ecology: Individuals, Populations, and Communities...3	
ABS 372 Ecology: Ecosystems and Landscapes.....	3
ABS 380 Restoration and Wildlife Plants.....	3
ABS 381 Natural Resources Policy.....	3
ABS 402 Vegetation and Wildlife Measurement.....	3
ABS 430 Watershed Management.....	3
or ABS 481 Riparian and Wetland Restoration (3)	
ABS 433 Riparian and Wetland Ecology.....	3
ABS 440 Ecological Restoration Techniques.....	3
ABS 441 Restoration Planning Practicum.....	1
ABS 480 Ecosystem Management and Planning <i>L</i>	3
ABS 482 Ecology and Planning for Restoration.....	3
ABS 483 Restoration Planning Practicum.....	2
ABS 485 GIS in Natural Resources.....	3
ABS 490 Environmental Resources Seminar.....	1
CHM 101 Introductory Chemistry <i>SQ</i>	4
CHM 231 Elementary Organic Chemistry <i>SQ</i>	3
Approved upper-division electives.....	8
Total.....	65

Note: If General Studies courses are carefully chosen with assistance from an advisor, then up to an additional 17 semester hours of electives can be chosen.

Urban Horticulture Concentration

Urban horticulture focuses on the relationship of plants and people in cities with an emphasis on the biology of plants applied to human landscapes. Urban horticulture students learn and practice principles that create pleasing environments in which people work and live. Urban horticulture graduates are qualified to plan or manage environmentally sustainable amenity landscapes or grow amenity trees, shrubs and ground covers, turf, and bedding plants. Students also gain expertise in plant identification, plant propagation, irrigation, fertilization, and pest management, as well as urban forestry and horticultural education.

ABS 225 Soils	3
ABS 226 Soils Laboratory.....	1
ABS 484 Internship	3
CHM 101 Introductory Chemistry <i>SQ</i>	4
CHM 231 Elementary Organic Chemistry <i>SQ</i>	3
PGM 466 Integrated Pest Control	2
PLB 260 Plants in Cities: Introduction to Urban Horticulture <i>SG</i>	4
PLB 308 Plant Physiology	4
PLB 362 Landscape Plants.....	3
PLB 364 Urban Forestry	3
PLB 370 Environmental Landscape Management.....	3
PLB 372 Turf Management.....	3
or PLB 472 Greenhouse/Nursery Management (3)	
PLB 414 Plant Pathology <i>L</i>	3
Approved upper-division electives.....	26
Total	65

Wildlife Habitat Management Concentration

The wildlife habitat management concentration, composed of 65 semester hours, focuses on the connectivity between wildlife, ecology, and habitat management. This study requires an understanding of the interrelations between the atmosphere, water, vegetation, and wildlife. The goal of wildlife habitat management is to create conditions that ensure sustainable wildlife populations. Achieving this goal requires identification of existing wildlife populations, determination of site potential for sustainable wildlife populations, creation of sustainable conditions for wildlife populations, and the monitoring of wildlife populations for future generations.

Wildlife Habitat Management Concentration Requirements

ABS 150 Environmental Conservation.....	3
ABS 207 Applied Plant Taxonomy	3
ABS 355 Vertebrate Zoology.....	4
ABS 370 Ecology: Individuals, Populations, and Communities.....	3
ABS 374 Introduction to Wildlife Management.....	3
ABS 375 Conservation Biology	3
ABS 376 Wildlife Ecology	3
ABS 381 Natural Resources Policy	3
ABS 402 Vegetation and Wildlife Measurement.....	3
ABS 435 Ecological Modeling	3
ABS 440 Ecological Restoration Techniques	3
ABS 470 Mammalogy	3
ABS 471 Ornithology	3
ABS 475 Habitat Management for Small Wildlife.....	3
ABS 476 Big Game Habitat Management.....	3
ABS 480 Ecosystem Management and Planning <i>L</i>	3
ABS 485 GIS in Natural Resources.....	3
ABS 490 Environmental Resources Seminar	1
CHM 101 Introductory Chemistry <i>SQ</i>	4
CHM 231 Elementary Organic Chemistry <i>SQ</i> *	3
Approved upper-division electives.....	5
Total	65

* Both CHM 231 and 235 must be taken to secure *SQ* credit.

Note: If General Studies courses are carefully chosen with assistance from an advisor, then up to an additional 17 semester hours of electives can be chosen.

B.I.S. CONCENTRATION

A concentration in applied biological sciences is available under the Bachelor of Interdisciplinary Studies (B.I.S.)

degree, a program intended for the student who has academic interests that might not be satisfied with existing majors. Building on two academic concentrations (or one double concentration) and an interdisciplinary core, students in the B.I.S. program take active roles in creating their educational plans and defining their career goals. For more information, see “Bachelor of Interdisciplinary Studies,” page 116.

GRADUATE PROGRAMS

Faculty associated with the Applied Biological Sciences program also offer programs leading to M.S. degrees in Environmental Resources and Plant Biology. The faculty also participate with the Graduate College and the Colleges of Architecture and Environmental Design and Liberal Arts and Sciences in programs leading to Ph.D. degrees in Environmental Design and Planning, with a concentration in Planning or Plant Biology. See the *Graduate Catalog* for requirements.

APPLIED BIOLOGICAL SCIENCES (ABS)

ABS 130 Introduction to Environmental Science. (4)

fall
Introduces resources, their physical and chemical properties, classification, energy dynamics, and the role they play in environmental quality. Lecture, lab.
General Studies: SQ

ABS 150 Environmental Conservation. (3)

fall
Principles of environmental conservation from ecological, global, and historical perspectives.

ABS 201 Human Anatomy and Physiology I. (4)

fall, spring, summer
Structure and dynamics of the human mechanism. Lecture, lab.
General Studies: SG

ABS 202 Human Anatomy and Physiology II. (4)

fall, spring, summer
Continuation of ABS 201. Lecture, lab. Prerequisite: ABS 201 or instructor approval.

ABS 207 Applied Plant Taxonomy. (3)

spring
Introduces identification of vascular plants emphasizing seed plants. Surveys seed plant families. Lecture, lab, field trips. Prerequisite: BIO 187.

ABS 225 Soils. (3)

fall
Fundamental properties of soils and their relation to plant growth and the nutrition of man and animals. Relation of soils to environmental quality. Prerequisite: CHM 101 or 113 (or its equivalent).

ABS 226 Soils Laboratory. (1)

fall
Selected exercises to broaden the background and understanding of basic soil principles. Lab. Fee. Pre- or corequisite: ABS 225.

ABS 260 Fundamentals of Urban Horticulture. (4)

fall
Principles and practices of horticulture, emphasizing development, growth, and propagation of horticultural plants and environmental factors that affect these processes. Lecture, lab. Fee. Prerequisites: BIO 187 or PLB 108.
General Studies: SG

L literacy and critical inquiry / *MA* mathematics / *CS* computer/statistics/ quantitative applications / *HU* humanities and fine arts / *SB* social and behavioral sciences / *SG* natural science—general core courses / *SQ* natural science—quantitative / *C* cultural diversity in the United States / *G* global / *H* historical / See “General Studies,” page 85.

EAST COLLEGE

ABS 310 General Genetics. (4)

fall and spring

Studies classical and molecular aspects of transmission, mutation, and function of genetic material. Prerequisite: BIO 187.

ABS 320 Plant Physiology. (4)

spring

Concepts of plant function: carbon metabolism, energy acquisition, regulation of growth and development, stress responses, and water and nutrient uptake. Lecture, lab. Fee. Prerequisites: BIO 187 and CHM 101 (or their equivalents).

ABS 330 Developmental Anatomy. (3)

selected semesters

General developmental biology (embryology) and comparative structure of organ systems, illustrated mainly by vertebrate examples. Prerequisite: BIO 187.

ABS 340 Cell Biology. (3)

selected semesters

Survey of major topics in cell biology, including structural, biochemical, and molecular aspects of cell function. Prerequisite: BIO 187.

ABS 350 Applied Statistics. (3)

fall and spring

Statistical methods with applications in the biological sciences and natural resource management. Uses computers and the internet. Internet. Prerequisite: MAT 117 (or its equivalent).

General Studies: CS

ABS 352 Animal Physiology. (3)

selected semesters

Physiological mechanisms of the higher vertebrates. Prerequisites: BIO 187; CHM 101; MAT 117.

ABS 353 Animal Physiology Laboratory. (1)

selected semesters

Experimental laboratory studies of physiological mechanisms in animals and model systems. Lab. Fee. Prerequisites: CHM 115; MAT 117. Pre- or corequisite: ABS 352.

ABS 355 Vertebrate Zoology. (4)

spring

Classification, anatomy, and physiology of the vertebrates. Lecture, lab. Prerequisites: BIO 188 and CHM 101 (or their equivalents).

ABS 360 Southwest Home Gardening. (2)

fall and spring

Multimedia course for nonmajors surveying contemporary topics in Southwest home horticulture, including landscaping, flower and vegetable gardening, citriculture, interiorscaping, and others.

ABS 362 Landscape Plants and Design. (4)

spring

Identification, design, and use of plants in urban landscapes. Lecture, lab. Fee. Prerequisite: ABS 260 (or its equivalent).

ABS 363 Landscape Practices. (4)

fall

Installation, irrigation, and maintenance of amenity plants in urban landscapes with an emphasis on integrated environmental landscape technologies. Lecture, lab. Fee. Prerequisite: ABS 260 (or its equivalent).

ABS 364 Urban Forestry. (4)

fall

Care, maintenance, and valuation of the urban forest, including public and private landscape codes. Lecture, lab. Prerequisite: ABS 260 (or its equivalent).

ABS 366 Indoor Plants. (3)

fall or spring

Identification, culture, and use of container-grown plants for interior environments. Prerequisite: ABS 260 or instructor approval.

ABS 367 Urban Parks. (4)

spring

Overview of the management and maintenance of private and public parks, urban greenspaces, and recreational areas. Fee.

ABS 368 Plant Propagation. (3)

spring

Theory and application of sexual and asexual propagation techniques. Considers plant materials used both for urban horticulture and ecological restoration applications. 2 hours lecture, 3 hours lab. Fee. Prerequisite: BIO 188.

ABS 370 Ecology: Individuals, Populations, and Communities. (3)

fall

Interactions between organisms and their environments, structure, and dynamics of populations and communities with emphasis on vegetation. Lecture, field trips. Prerequisite: BIO 188.

ABS 372 Ecology: Ecosystems and Landscapes. (3)

spring

Structure and function of ecosystems, interactions of pattern and process in landscapes. Lecture, lab, field trips. Prerequisite: ABS 370.

ABS 374 Introduction to Wildlife Management. (3)

fall

Managing wildlife in the Southwest, including life histories of small game, fur bearers, big game, and selected nongame specials. Lecture, field trips.

ABS 375 Conservation Biology. (3)

spring

Principles of conservation biology, management of threatened species and ecosystems, biodiversity patterns with emphasis on issues in the Southwest. Lecture, field trips. Fee.

ABS 376 Wildlife Ecology. (3)

spring

Examines ecological principles underlying wildlife population dynamics with emphasis on physiology, genetics, nutrition, and habitat factors. Lecture, lab, 1 weekend field trip. Prerequisite: ABS 370.

ABS 378 Wildlife Nutrition. (3)

fall

Principles of nutrient metabolism in wildlife species, with emphasis on understanding the interaction of wildlife with their environment. Prerequisites: BIO 188; CHM 101.

ABS 380 Restoration and Wildlife Plants. (3)

fall

Important wildland plants, including invasive and endangered species, wildlife food species, and species used for ecosystem restoration. Lecture, lab. Prerequisite: ABS 207 or 260.

ABS 381 Natural Resources Policy. (3)

fall

Policies and regulations affecting management of natural resources, with emphases on wildlife and ecological restoration.

ABS 402 Vegetation and Wildlife Measurement. (3)

spring

Vegetation inventory, sampling, monitoring, and evaluation. Methods of estimating wildlife populations, activity, and home ranges. Lecture, lab, 1 weekend field trip. Prerequisites: ABS 207, 350, 370.

ABS 425 Soil Classification and Management. (3)

selected semesters

Principles of soil genesis, morphology, and classification. Presents management and conservation practices. Prerequisite: ABS 225 (or its equivalent).

ABS 430 Watershed Management. (3)

selected semesters

Hydrologic, physical, biological, and ecological principles applied to watershed management. Impact of ecosystem manipulations on water yield and quality. Lecture, 1 weekend field trip. Prerequisite: ABS 225.

ABS 433 Riparian and Wetland Ecology. (3)

selected semesters

Functions and components of riparian and wetland ecosystems and the management of these systems. Lecture, field trips. Prerequisite: ABS 370.

ABS 434 Soil Ecology. (3)

selected semesters

Soils viewed in an ecosystem context, soil-plant relationships, nutrient budgets, and abiotic factors that influence soil processes. Lecture, lab, field trips. Prerequisites: ABS 225, 226, 370.

ABS 435 Ecological Modeling. (3)

fall

Simulation modeling as a tool to study ecological processes and human impact on ecosystems and organisms. Lecture, lab. Prerequisites: ABS 350, 370.

ABS 440 Ecological Restoration Techniques. (3)

fall

Techniques for ecological restoration, riparian and wetland restoration, and monitoring restoration success. Prerequisites: ABS 370, 380.

ABS 441 Ecological Restoration Practicum. (1)

fall

Field experience in the evaluation and monitoring of implemented ecological restoration projects. Lab, field trips. Fee. Pre- or corequisites: ABS 440.

ABS 450 Methods of Teaching Biology. (3)

fall

Methods of instruction, experimentation, organization, and presentation of appropriate content in biology. Prerequisite: 20 hours in the biological sciences.

ABS 451 Advanced Methods of Teaching Biology. (3)

spring

Design, delivery, and evaluation of student-centered, inquiry-based lessons for high school biology students. Learning cycle. Prerequisite: ABS 450.

ABS 452 Plant Pathology. (3)

spring

Identification and control of biotic and abiotic factors that cause common disease problems to plants. Prerequisite: BIO 187 or instructor approval

General Studies: L

ABS 460 Organic Gardening. (2)

fall

Applied principles and practices of organic gardening in the low desert, including environmental impacts of modern food production. Lecture, lab. Fee. Prerequisite: ABS 260.

ABS 462 Greenhouse/Nursery Management. (4)

spring

Greenhouse structures, environment, and nursery operations. Includes irrigation, nutrition, and other principles relative to production of nursery crops. Lecture, lab. Fee. Prerequisite: ABS 260.

ABS 463 Sports and Recreation Turf. (4)

fall

Maintenance and operation of large areas such as golf courses, athletic fields, and park areas. Lecture, lab. Prerequisite: ABS 260 (or its equivalent).

ABS 465 Senior Enterprise Project. (2)

fall and spring

Selection and completion of an urban horticulture project with faculty advisor approval related to the graduate's field of study. Prerequisite: senior standing.

ABS 470 Mammalogy. (3)

fall

Classification and biology of mammals, emphasizes North America. Pre- or corequisite: ABS 355.

ABS 471 Ornithology. (3)

spring

Classification and biology of birds, emphasizing North America. Lecture, lab. Fee. Prerequisite: ABS 355.

ABS 475 Habitat Management for Small Wildlife. (3)

fall

Habitat management considerations and practices for small game and nongame wildlife species in North America. Lecture, field trips. Fee. Prerequisites: ABS 370, 376, 380.

ABS 476 Big Game Habitat Management. (3)

spring

Habitat management considerations and practices for big game wildlife species in North America. Prerequisites: ABS 370, 376.

ABS 480 Ecosystem Management and Planning. (3)

selected semesters

Principles of ecosystem management, with emphasis on economic and policy constraints on the planning process. Risk assessment and

management. Lecture, 1 weekend field trip. Prerequisite: senior standing or instructor approval.

General Studies: L

ABS 481 Riparian and Wetland Restoration. (3)

fall

Principles and problems in the restoration of degraded riparian and wetland ecosystems. Construction of wetlands. Prerequisites: ABS 433, 440.

ABS 482 Ecology and Planning for Restoration. (3)

spring

Ecological principles and resource planning processes applied to restoration of degraded landscapes. Prerequisites: ABS 225, 372, 440.

ABS 483 Restoration Planning Practicum. (2)

spring

Field experience in ecological restoration techniques, including analysis of problems, selection of mitigation techniques, and planning for implementation. Lab, extended field trip over spring break. Fee. Pre- or corequisite: ABS 482.

ABS 484 Internship. (1–12)

selected semesters

ABS 485 GIS in Natural Resources. (3)

fall

Principles of Geographic Information Systems (GIS) utilized in natural resource management. Use of computers for spatial analysis of natural resources. Lecture, lab. Prerequisite: ABS 350 (or its equivalent).

ABS 490 Environmental Resources Seminar. (1)

fall and spring

Current literature and significant developments involving environmental resources. May be repeated for credit.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.

ENVIRONMENTAL RESOURCES (ERS)

ERS 191 First-Year Seminar. (1–3)

selected semesters

ERS 294 Special Topics. (1–4)

selected semesters

ERS 484 Internship. (1–12)

selected semesters

ERS 489 Undergraduate Research. (1–3)

fall and spring

Undergraduate research under the supervision of an environmental resources faculty member. Prerequisite: junior or senior status.

ERS 492 Honors Directed Study. (1–6)

selected semesters

ERS 493 Honors Thesis. (1–6)

selected semesters

ERS 494 Special Topics. (1–4)

selected semesters

ERS 498 Pro-Seminar. (1–7)

selected semesters

ERS 499 Individualized Instruction. (1–3)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.

L literacy and critical inquiry / **MA** mathematics / **CS** computer/statistics/quantitative applications / **HU** humanities and fine arts / **SB** social and behavioral sciences / **SG** natural science—general core courses / **SQ** natural science—quantitative / **C** cultural diversity in the United States / **G** global / **H** historical / See "General Studies," page 85.

Faculty of Applied Psychology

www.east.asu.edu/ecollege/appliedpsych

480/727-1515

CNTR 78

Roger W. Schvaneveldt, Faculty Head

Professors: Cooke, Schvaneveldt

Assistant Professor: Gray

APPLIED PSYCHOLOGY—B.S.

This major offers a traditional psychology core leading to graduate school preparation and/or to applications in human factors with emphasis on human-computer interaction, aviation, or manufacturing. Although most careers in psychology require graduate training, there are some employment opportunities for B.S. students in applied settings. For example, there is a need for individuals who can help deal with problems of usability of products and systems. The Applied Psychology program offers courses and experiences to prepare students for these positions. The rigor of the major also provides strong preparation for further graduate study in psychology. The program serves students in other ASU East programs such as manufacturing engineering technology, aeronautical management technology, information management technology, and business administration.

Graduation Requirements

The completion of 120 semester hours—including First-Year Composition, General Studies (see “General Studies,” page 85), and major requirements—leads to the B.S. degree. The major allows for at least 21 semester hours of electives. The major requirements for the B.S. degree in Applied Psychology consist of a 28-semester-hour core of psychology courses, 12 semester hours in applied psychology, and 18 semester hours of related course work.

Core Courses. Core courses provide a general background in the basic scientific areas of psychology and provide a culminating experience to integrate the varied studies.

PGS 101 Introduction to Psychology <i>SB</i>	3
PGS 350 Social Psychology <i>SB</i>	3
PSY 230 Introduction to Statistics <i>CS</i>	3
PSY 290 Research Methods <i>L/SG</i>	4
PSY 323 Sensation and Perception	3
PSY 324 Memory and Cognition.....	3
PSY 325 Physiological Psychology	3
PSY 330 Statistical Methods <i>CS</i>	3
PSY 477 Applied Psychology Capstone Experience*	3
or HON 493 Honors Thesis (3)	
Total	28

* This PSY course is offered only by ASU East. All other PSY courses listed above are offered by both campuses.

Applied Psychology Courses. Students work with an advisor to select courses in Applied Psychology emphasizing human-computer interaction, aviation, training, manufacturing, or methods. Course work must include a minimum of four of the following courses:

AMT 410 Aviation Safety and Human Factors	3
PGS 471 Psychological Testing	3
PSY 320 Learning and Motivation.....	3
PSY 360 Cognitive Science*	3
PSY 390 Experimental Psychology <i>L</i>	3
PSY 437 Human Factors <i>L</i>	3
PSY 438 Human-Computer Interaction*	3
PSY 439 Training and Skill Acquisition*	3
PSY 440 Industrial/Organizational Psychology*	3
PSY 448 Human Factors in Transportation*.....	3
PSY 449 Human Factors in Sports*	3
PSY 494 Special Topics	1-4

* This PSY course is offered only by ASU East. All other PSY courses listed above are offered by ASU East and ASU Main.

Related Course Work

BIO course with a lab	4
MAT 210 Brief Calculus <i>MA</i>	3
or a higher MAT course (3)	
Computer skills course.....	3
Writing skills course	3
Courses selected in consultation with an advisor	5
Total	18

Minor in Applied Psychology

The minor in applied psychology consists of 22 semester hours with at least 12 being upper-division courses. The following are required courses that must be completed with a grade of “C” or higher:

PGS 101 Introduction to Psychology <i>SB</i>	3
PSY 230 Introduction to Statistics <i>CS</i>	3
or equivalent statistics course	
PSY 290 Research Methods <i>L/SG</i>	4
PSY 437 Human Factors	3
or PSY 438 Human-Computer Interaction (3)	
or PSY 440 Industrial/Organizational Psychology (3)	
Additional hours of upper-division PSY and/or PGS courses	9
A maximum of three semester hours from the following courses can be used to satisfy minor requirements:	
PGS 399 Supervised Research	3
PGS 499 Individualized Instruction	3
or PSY 499 Individualized Instruction (3)	
PSY 492 Honors Directed Study.....	3

Note: A minimum of three classes (two of which are in the upper division) must be taken in residence at ASU.

For more information about program requirements and courses, call an East College advisor at 480/727-1515, send e-mail to east.college@asu.edu, or access the Web site at www.east.asu.edu/ecollege/appliedpsych.

For PGS courses and additional PSY courses, see “Department of Psychology,” page 428.

PSYCHOLOGY (SCIENCE AND MATHEMATICS) (PSY)

The courses listed are offered only by ASU East. For more PSY courses that may be offered by ASU East, see "Department of Psychology" under "College of Liberal Arts and Sciences."

E PSY 360 Cognitive Science. (3)

once a year

Examines cognition from the varied perspectives of philosophy, linguistics, psychology, computer science (artificial intelligence), and neuroscience. Lecture, discussion. Prerequisite: PSY 324.

E PSY 438 Human-Computer Interaction. (3)

once a year

Theories, methods, and findings concerning the usability of computer systems and the design of effective user interfaces. Lecture, discussion, projects. Prerequisite: PSY 437.

E PSY 439 Training and Skill Acquisition. (3)

once a year

Theories, methods, and findings concerning the acquisition of skilled performance and the design of effective training systems. Lecture, discussion, projects. Prerequisite: PSY 437.

E PSY 440 Industrial/Organizational Psychology. (3)

once a year

Examines personnel selection, performance assessment, job and workplace design, job satisfaction, organizational behavior, management systems, and industrial safety. Lecture, discussion, projects. Prerequisite: PSY 230 (or an equivalent statistics course).

E PSY 448 Human Factors in Transportation. (3)

selected semesters

Examines human performance and human-machine design issues in aviation and ground transportation. Lecture, lab. Pre- or corequisite: PSY 323.

E PSY 449 Human Factors in Sport. (3)

selected semesters

Examines how psychological principles can be applied to enhance the performance of athletes and coaches. Lecture, discussion. Pre- or corequisites: PSY 320, 323.

E PSY 477 Applied Psychology Capstone Experience. (3)

fall, spring, summer

Applied psychology from a systems perspective. Requires a report based on research and/or applied work as a culminating experience. Lecture, discussion, projects. Prerequisite: senior standing.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Faculty of Business Administration

www.east.asu.edu/ecollege/businessadmin

480/727-1515

CNTR 76

Roger W. Hutt, Faculty Head

Professors: Daneke, Edwards, Kagan, Marquardt, Shultz, Thor

Associate Professors: Hutt, Patterson, Richards

Assistant Professors: Manfredo, Skilton

Senior Lecturer: Watson

BUSINESS ADMINISTRATION—B.S.

The B.S. degree in Business Administration offers a survey of contemporary business disciplines and additional

depth in at least three disciplines. The curriculum enables students to gain essential business competencies, knowledge of business disciplines and methods, and appreciation for contemporary business environments and cultures. Students prepare for careers in business, industry, or government, as well as for career advancement and entrepreneurial enterprises. This program operates under the umbrella of the ASU Main W. P. Carey School of Business AACSB International accreditation, but it is offered through East College.

A total of 120 semester hours is required for graduation with a minimum of 45 semester hours of upper-division credit. As part of the undergraduate degree program, students complete the General Studies requirement (see "General Studies," page 85.)

Requirements for the Business Administration major consist of 30 semester hours of lower-division core and skill courses, 22 semester hours of upper-division core courses, one three-semester-hour capstone course, and 18 semester hours of approved electives. All of the upper-division business courses (with the exception of nine semester hours) must be taken at ASU East.

Business Administration Core (22 Semester Hours)

BUS 394 ST: Professional Development.....	1
FIN 300 Fundamentals of Finance	3
IBS 300 Principles of International Business G.....	3
LES 305 Legal, Ethical, and Regulatory Issues in Business.....	3
MGT 300 Organizational Management and Leadership	3
MKT 300 Principles of Marketing.....	3
SCM 300 Global Supply Operations.....	3
TWC 447 Business Reports L.....	3
Total	22

Capstone Course (Three Semester Hours)

MGT 440 Small Business and Entrepreneurship.....	3
or MGT 460 Strategic Leadership (3)	

Approved Electives (18 Semester Hours)

Total	18
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Students select 18 semester hours of electives toward a goal of building upon and integrating prior and current course work. This set of courses, which must be approved by the Business Administration program head, allows students to study a subset of business problems or issues as well as focus on their career interests.

Approved electives include courses in ASU East industry-specific business programs (Agribusiness, Information and Management Technology, and Aeronautical Management Technology).

For the latest information about application, admissions, program requirements, and courses, call an East College advisor at 480/727-1515, or access the Web site at www.east.asu.edu/ecollege/businessadmin.

Minor in Small Business

The minor in small business is in the process of transferring from the W. P. Carey School of Business, ASU Main, to the faculty of Business Administration in East College at ASU East. For more information, call 480/727-1515.

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See "General Studies," page 85.

B.I.S. Concentration

A concentration in small business is available under the Bachelor of Interdisciplinary Studies (B.I.S.) degree, a program intended for the student who has academic interests that might not be satisfied with existing majors. Building on two academic concentrations (or one double concentration) and an interdisciplinary core, students in the B.I.S. program take active roles in creating their educational plans and defining their career goals. For more information, see “Bachelor of Interdisciplinary Studies,” page 116.

Faculty of Education

www.east.asu.edu/ecollege/education

480/727-1103

COMM2 101

Bette S. Bergeron, Faculty Head

Professor: Bergeron

Senior Lecturer: Wenhart

Lecturers: Gryder, Hopper, Prest

ELEMENTARY EDUCATION—B.A.E.

Program Overview

The Elementary Education program at ASU East is unique in its focus on intensive field experiences, practical application of current theory, and emphasis on technology. The newly revised curriculum is also focused on and directly aligned with Arizona’s standards for teachers. Courses are arranged sequentially and taken with peer cohorts in four semester-long blocks. Each semester Elementary Education students are immersed in field experiences that directly link with course discussions and assignments. Course instructors have taught in a variety of K–8 settings and can therefore augment class experiences with practical applications. Current educational technologies are incorporated into course delivery and assignments. Additionally, students have the opportunity to choose between the daytime Elementary Education program at the ASU East campus or participate in one of the campus’s district-based evening cohorts.

Graduation Requirements

A total of 120 semester hours is required for graduation with a minimum of 45 semester hours of upper-division credit. As part of the undergraduate degree program, students will complete ASU General Studies (see “General Studies,” page 85) requirements. In addition, Elementary Education students are required to complete 18 semester hours in an academic specialization, which is tailored to an individual student’s academic strengths (e.g., math, science, social studies, English). The remaining program hours, which specifically focus on the teaching profession, are out-

lined below. Students must first be admitted to the ASU East Elementary Education program before enrolling in the Professional Preparation Program courses (Blocks I–IV).

Foundations (15 semester hours)*

ECD 314 The Developing Child.....	3
EDP 310 Educational Psychology <i>SB</i>	3
MCE 446 Understanding the Culturally Diverse Child <i>C</i>	3
MTE 180 Theory of Elementary Mathematics.....	3
SPE 311 Orientation to Education of Exceptional Children <i>SB</i> ...	3

* For foundation courses, see “College of Education,” page 180.

Professional Preparation Program*

Block I

EDC 320 Integrated Learning Experience I: Learning Climate	2
EDC 330 Literacy I: Emerging Literacy and Phonemic Awareness	3
EDC 340 Schooling and Social Context <i>L</i>	3
EDC 350 Educational Technology I: Applications	1
EDC 351 Educational Technology II: Instruction and Evaluation	1
EDC 352 Educational Technology III: Design	1
EDC 474 Field Experience	0–1

Block II

EDC 325 Integrated Learning Experience II: Instructional Design and Implementation	2
EDC 335 Literacy II: Intermediate Literacy and Phonetic Principles.....	3
EDC 345 Math Methods for the Elementary Classroom	3
EDC 355 Accommodating Instruction for Diverse Learners.....	3
EDC 474 Field Experience	0–1

Block III

EDC 420 Integrated Learning Experience III: Assessment	2
EDC 430 Literacy III: Interventions	3
EDC 440 Science Methods for the Elementary Classroom	3
EDC 450 Social Studies Methods for the Elementary Classroom	3
EDC 474 Field Experience	0–1

Block IV

EDC 425 Integrated Learning Experience IV: Professional Knowledge	2
EDC 484 Student Teaching in the Elementary School	10–12

* Block courses can only be taken upon admission to the Elementary Education program.

Postbaccalaureate Program. Individuals who hold a bachelor’s degree from an accredited institution are encouraged to participate in the Elementary Education program as non-degree graduate students. Postbaccalaureate students complete the same professional preparation program courses as outlined above, which are augmented by the students’ unique life and work experiences.

In addition to participation in any of the four-semester undergraduate Elementary Education programs, postbaccalaureate students also have the option of an accelerated program. This intensive 13-month program begins each May, and is offered in conjunction with the Williams Community School located adjacent to the ASU East campus. The application deadline for this specific program is April 15.

For more information, call 480/727-1103.

Application. Applications for the ASU East Elementary Education programs are due October 15 for spring admission, and May 15 for fall admission. Students eligible for admission must meet the following criteria:

1. admission to ASU East;
2. a minimum cumulative GPA of 2.50;
3. completion of at least 56 semester hours at the time of admission (undergraduate degree-seeking students); or, completion of a bachelor’s degree from an accredited institution (postbaccalaureate students);
4. evidence of competence in written English.

Applications include two letters of recommendation and a résumé outlining work with school-age children and/or their families. Students should call the ASU East Teacher Education Office at 480/727-1103 for complete admission packet information and eligibility requirements.

State Certification. Students who successfully complete the undergraduate or postbaccalaureate routes to Elementary Education teacher preparation at ASU East are recommended for K–8 certification in the State of Arizona pending the completion of all other requirements mandated by the state. These additional requirements include, but are not limited to, successful completion of all appropriate areas of the Arizona Education Proficiency Assessment and course work in the United States and Arizona constitutions. Because of the possibility that requirements for state certification may change, students are urged to maintain close contact with their education advisor.

Advising Information. It is important for all students to work closely with an ASU East academic advisor to ensure that their overall curriculum is coherent and best reflects their unique academic talents. For the latest information about application, admissions, program requirements, and courses, access the Web site at www.east.asu.edu/ecollege/elementaryed, or call the ASU East Teacher Education Office at 480/727-1103.

Applied Biological Sciences Concentration

Program Overview. Applied Biological Sciences majors can complete requirements for state certification in Secondary Biology through a concentration in applied biological sciences/secondary education. See “**Applied Biological Sciences/Secondary Education Concentration**,” page 604. Students complete course work in the applied biology core, science content courses related to secondary biology, and courses specific to the secondary education curriculum and instruction. The program concludes with full-time student teaching in secondary science classrooms.

Application. Students interested in pursuing the applied biological sciences/secondary education concentration need to be admitted into the Teacher Education unit before taking the secondary methods courses (usually during the junior year). The following requirements for admission to the applied biological sciences/secondary education concentration mirror those of acceptance into other education programs at ASU East. Requirements for entry include

1. completion of 56 semester hours;

2. a 2.50 cumulative GPA;
3. a 2.50 GPA within the major (Applied Biological Sciences);
4. proficiency in written English, met in one of the following ways: (a) GPA of 3.00 in ENG 101 and 102 (or equivalent) or (b) successful completion of a written proficiency exam; and
5. formal application to the ASU East Education program, including two letters of recommendation and current résumé—the résumé and letters outlining the candidate’s experiences with adolescents and/or their families and show proficiency in the content (i.e., applied biological sciences).

Graduation Requirements. A total of 120 semester hours is required for graduation with a minimum of 45 semester hours of upper-division credit. As part of the undergraduate degree program, students will complete ASU General Studies (see “General Studies,” page 85). Courses specific to the applied biological sciences/secondary education concentration are outlined below:

Applied Biology Core

ABS 350 Applied Statistics <i>CS</i>	3
BIO 187 General Biology I <i>SG</i>	4
BIO 188 General Biology II <i>SG</i>	4
MAT 210 Brief Calculus <i>MA</i>	3
Total	14

Applied Biological Sciences/Secondary Education Concentration Requirements

ABS 150 Environmental Conservation.....	3
ABS 207 Applied Plant Taxonomy	3
ABS 355 Vertebrate Zoology.....	4
ABS 370 Ecology: Individuals, Populations, and Communities...3	
BIO 201 Human Anatomy and Physiology I <i>SG</i>	4
BIO 340 General Genetics.....	4
Choose between the course combinations below.....	4–5
BIO 360 Animal Physiology (3)	
BIO 361 Animal Physiology Laboratory (2)	
— or —	
PLB 308 Plant Physiology (4)	
CHM 113 General Chemistry <i>SG</i>	4
CHM 115 General Chemistry with Qualitative Analysis <i>SG</i>	5
MIC 205 Microbiology <i>SG</i>	3
MIC 206 Microbiology Laboratory <i>SG</i>	1
PHY 101 Introduction to Physics <i>SG</i>	4
Upper-division elective*	4
Total	45–46

* BIO 202 if BIO 201 is taken

Secondary Education Course Work

BIO 480 Methods of Teaching Biology.....	3
BIO 482 Advanced Methods of Teaching Biology.....	3
EDC 350 Educational Technology I: Applications	1
EDC 351 Educational Technology II: Instruction and Evaluation	1
EDC 352 Educational Technology III: Design	1
EDC 494 ST: Professional Knowledge.....	2

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See “General Studies,” page 85.

EAST COLLEGE

EDP 303 Human Development <i>L</i>	3
EDP 310 Educational Psychology <i>SB</i>	3
RDG 301 Literacy and Instruction in the Content Areas	3
SED 403 Middle and Secondary School Principles, Curriculum, and Methods	3
SED 478 Student Teaching in Secondary Schools	10–12
SED 496 Field Experience	0
SPE 394 ST: Inclusion Practices at the Secondary Level	3
Total	36–38

Strongly Recommended

MCE 446 Understanding the Culturally Diverse Child <i>C</i>	3
SPE 311 Orientation to Education of Exceptional Children <i>SB</i> ...	3

Advising Information. Students interested in the applied biological sciences/secondary education concentration must participate in dual advising—both applied biological sciences and education. Education advising is required at the time a student seeks admission to the Education unit. However, students are encouraged to seek advisement from Education as soon as they decide to pursue the secondary education concentration. For more information about application, admission, program requirements, and courses, visit the ASU East Teacher Education Office, COMM2, call 480/727-1103, or access the Web site at www.east.asu.edu/ecollege/education.

ELEMENTARY EDUCATION (EDC)

EDC 320 Integrated Learning Experience I: Learning Climate. (2)

fall and spring

Explores factors contributing to a positive and productive classroom learning environment. Interactive forum.

EDC 325 Integrated Learning Experience II: Instructional Design and Implementation. (2)

fall and spring

Design and implementation of developmentally appropriate instruction, and the alignment of instruction with district and state academic standards. Interactive forum. Prerequisite: EDC 320.

EDC 330 Literacy I: Emerging Literacy and Phonemic Awareness. (3)

fall and spring

Development of language from birth to age 8, and appropriate strategies for promoting growth in speaking, listening, reading, and writing. Applied inquiry. Corequisite: EDC 474.

EDC 335 Literacy II: Intermediate Literacy and Phonetic Principles. (3)

fall and spring

Strategies for teaching literacy in intermediate elementary classrooms, the application of phonetic principles to instruction, and integrating literacy across disciplines. Applied inquiry. Prerequisite: EDC 330. Corequisite: EDC 474. Pre- or corequisite: EDC 325.

EDC 340 Schooling and Social Context. (3)

fall and spring

Seminar addressing foundational issues in education, including the culture of schooling, current social contexts, and educational law. Interactive forum.

General Studies: L

EDC 345 Math Methods for the Elementary Classroom. (3)

fall and spring

Developmentally appropriate practices for teaching and assessing mathematics in grades K–8. Applied inquiry. Fee. Prerequisite: MTE 180. Corequisite: EDC 474. Pre- or corequisite: EDC 325.

EDC 350 Educational Technology I: Applications. (1)

fall and spring

Module focused on basic technological skills needed for managing classroom instruction. Lab.

EDC 351 Educational Technology II: Instruction and Evaluation. (1)

fall and spring

Module focused on technology as an instructional medium, evaluation, and effective classroom use. Lab. Prerequisite: EDC 350.

EDC 352 Educational Technology III: Design. (1)

fall and spring

Module focused on instructional design utilizing a variety of technologies, including multimedia. Lab. Prerequisite: EDC 351.

EDC 355 Accommodating Instruction for Diverse Learners. (3)

fall and spring

Identifying and accommodating learners with special needs, including classroom adaptations in instruction and assessment. Forum, practicum. Prerequisite: SPE 311. Corequisite: EDC 474. Pre- or corequisite: EDC 325.

EDC 420 Integrated Learning Experience III: Assessment. (2)

fall and spring

Principles related to classroom assessment, including the alignment of assessment to curriculum, test interpretation, and a variety of assessment techniques. Interactive forum. Prerequisite: EDC 325.

EDC 425 Integrated Learning Experience IV: Professional Knowledge. (2)

fall and spring

Explores issues related to professional knowledge, including interdisciplinary instruction and the impact of the community on students' learning. Interactive forum. Prerequisite: EDC 420. Corequisite: EDC 484.

EDC 430 Literacy III: Interventions. (3)

fall and spring

Strategies for accommodating students struggling with learning, with a focus on the areas of literacy acquisition and assessment. Forum, practicum. Prerequisites: EDC 335, 355. Corequisite: EDC 474. Pre- or corequisite: EDC 420.

EDC 440 Science Methods for the Elementary Classroom. (3)

fall and spring

Developmentally appropriate practices for teaching and assessing sciences in grades K–8. Applied inquiry. Fee. Prerequisites: EDC 325, 345. Corequisite: EDC 474. Pre- or corequisite: EDC 420.

EDC 450 Social Studies Methods for the Elementary Classroom. (3)

fall and spring

Developmentally appropriate practices for teaching and assessing social studies in grades K–8. Applied inquiry. Prerequisites: EDC 325, 335. Corequisite: EDC 474. Pre- or corequisite: EDC 420.

EDC 455 Diverse Learners in the K–8 Classroom. (3)

fall, spring, summer

Identifies and implements instructional practices for students with diverse needs in the elementary classroom. Laws related to special populations. Interactive forum. Prerequisite: approval of the ASU East Education Office.

EDC 460 Principles of Curriculum and Instruction in the K–8 Classroom. (3)

fall, spring, summer

Current research and practices related to the K–8 curriculum, including application of motivation and learning theories, lesson development, and assessment. Interactive forum. Prerequisite: approval of the ASU East Education Office.

EDC 465 Literacy Instruction in the K–8 Classroom. (3)

fall, spring, summer

Principles of a developmentally appropriate elementary literacy curriculum and related instructional practices. Encompasses reading, language arts, writing, and oral expression. Interactive forum. Prerequisite: approval of the ASU East Education Office. Corequisite: EDC 474.

EDC 474 Field Experience. (0–1)

fall and spring

Applies course content in a K–8 school. Emphasizes observation, classroom management, planning and delivery of instruction, and assessment. Practicum. Corequisite: all methods courses in the teacher preparation program must be taken with Field Experience.

EDC 475 Social Studies Instruction in the K–8 Classroom. (3)
fall, spring, summer

Principles of a developmentally appropriate social studies curricula and related instructional practices. Emphasizes cultural diversity and implications of a global society. Interactive forum. Prerequisite: approval of the ASU East Education Office.

EDC 480 Theory of Mathematics and Science Instruction. (3)
fall, spring, summer

Examines theoretical and conceptual frameworks of elementary mathematics and science instruction. Emphasizes academic content standards and prerequisite knowledge. Fee. Prerequisite: approval of the ASU East Education Office.

EDC 484 Student Teaching in the Elementary School. (10–12)
fall and spring

Supervised teaching in the area of specialization. Capstone internship in curriculum, instruction, and classroom management. Internship. Prerequisites: 2.50 GPA; completion of professional course sequence; approval of ASU East Education Office. Corequisite: EDC 425.

EDC 485 Science Instruction in the K–8 Classroom. (3)
fall, spring, summer

Principles of a developmentally appropriate science curricula and related instructional practices, with an emphasis on learner-centered methodologies. Fee. Prerequisites: EDC 480 (or instructor approval); approval of the ASU East Education Office. Corequisite: EDC 474.

EDC 494 Special Topics. (1–4)
selected semesters

Topics may include the following:

- Professional Knowledge

EDC 495 Mathematics Instruction in the K–8 Classroom. (3)
fall, spring, summer

Principles of a developmentally appropriate mathematics curricula and related instructional practices, including a range of learning theories and their application. Fee. Prerequisites: EDC 480 (or instructor approval); approval of the ASU East Education Office. Corequisite: EDC 474.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see “Omnibus Courses,” page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see “Graduate-Level Courses,” page 56.

Department of Exercise and Wellness

www.east.asu.edu/ecollege/wellness

480/727-1945

CLRB

William J. Stone, Chair

Professors: Burkett, Corbin, Stone

Associate Professor: Swan

Assistant Professors: Adams, Phillips, Tudor-Locke

Lecturer: Woodruff

EXERCISE AND WELLNESS—B.S.

The B.S. degree in Exercise and Wellness offers two concentrations: (1) exercise and wellness and (2) health promotion. Exercise and Wellness students study physical

activity and other healthy lifestyles as they relate and contribute to optimal health and wellness. The exercise and wellness concentration is designed to prepare professionals and scholars in exercise and physical activity leadership as well as in wellness education. Areas of study include the kinesiological and physiological foundations of physical activity, exercise testing and prescription, as well as nutrition, stress management, social/cultural issues, and factors involved in health behavior change. The health promotion concentration is designed to prepare professionals and scholars in health and wellness promotion and disease prevention and management. Areas of study include epidemiology, health behavior change, prevention of chronic disease, program development and evaluation, as well as nutrition, stress management, social/cultural issues, and substance abuse. Students in both concentrations are exposed to the latest research and practice designed to enhance fitness, wellness, and healthy living including both laboratory and field experiences. A unique aspect of both degree options in the Exercise and Wellness program is an outstanding internship program that provides preprofessional experience in all segments of fitness, wellness, health promotion, and the allied health professions in metropolitan Phoenix or elsewhere in the country.

Career opportunities range broadly across the several sectors of the industry related to fitness, wellness, health promotion, and the health professions. Those settings include worksite/corporate, clinical/medical, community/educational, and the private/commercial sector. The degree is also ideal preparation for advanced study in health professions such as cardiopulmonary rehabilitation, physical therapy, and athletic training, as well as graduate study in exercise and wellness and public health.

Graduation Requirements

A total of 120 semester hours is required for graduation with a minimum of 45 semester hours of upper-division credit. As part of the undergraduate degree program, students complete ASU General Studies requirements. For a list of courses that meet ASU General Studies requirements, see “General Studies Courses,” page 87.

Exercise and Wellness students are required to complete the following courses:

Required core courses

EXW 300 Foundations of Exercise and Wellness <i>L/SB</i>	3
EXW 310 Computer Skills and Technology for Exercise and Wellness <i>CS</i>	3
EXW 342 Health Behavior Change	3
EXW 450 Cultural and Social Issues in Exercise and Wellness <i>SB, C</i>	3
EXW 484 Exercise and Wellness Internship.....	6
NTR 241 Human Nutrition	3
Total	21

Each EXW core course has specific prerequisite courses that must be taken before taking the respective core course. These prerequisite courses include the following:

L literacy and critical inquiry / **MA** mathematics / **CS** computer/statistics/quantitative applications / **HU** humanities and fine arts / **SB** social and behavioral sciences / **SG** natural science—general core courses / **SQ** natural science—quantitative / **C** cultural diversity in the United States / **G** global / **H** historical / See “General Studies,” page 85.

EAST COLLEGE

BIO 201 Human Anatomy and Physiology I <i>SG</i>	4
BIO 202 Human Anatomy and Physiology II.....	4
CHM 101 Introductory Chemistry <i>SQ</i>	4
or any equivalent chemistry	
COM 225 Public Speaking <i>L</i>	3
PGS 101 Introduction to Psychology <i>SB</i>	3
Total	18

Exercise and Wellness Concentration. The following EXW courses are required of all students in the exercise and wellness concentration:

EXW 212 Instructional Competency Laboratory	6
EXW 315 Physiological Foundations of Movement	3
EXW 320 Program Development and Leadership.....	3
EXW 330 Kinesiological Foundations of Movement.....	3
EXW 400 Stress Management for Wellness	3
EXW 420 Exercise Testing	3
EXW 425 Exercise Prescription	3
Elective*	3
Total	27

* Three semester hours must be selected from an approved list of concentration electives.

Health promotion Concentration. The following EXW courses are required of all students in the health promotion concentration:

EXW 320 Program Development and Leadership.....	3
EXW 325 Fitness for Life.....	3
EXW 346 Program Evaluation in Health Promotion.....	3
EXW 350 Substance Abuse and Addictive Behavior.....	3
EXW 400 Stress Management for Wellness	3
EXW 442 Physical Activity in Health and Disease <i>L</i>	3
EXW 444 Epidemiology	3
Elective*	6
Total	27

* Six semester hours must be selected from an approved list of concentration electives.

WELLNESS FOUNDATIONS MINOR

The minor in Wellness Foundations is appropriate for students in the BIS degree program. It consists of the following plus all prerequisite courses:

EXW 300 Foundations of Exercise and Wellness <i>L/SB</i>	3
EXW 325 Fitness for Life.....	3
EXW 342 Health Behavior Change	3
EXW 450 Cultural and Social Issues in Exercise and Wellness <i>SB, C</i>	3
EXW electives*.....	6
Total	18

* Six semester hours must be selected from an approved list of EXW electives. See an advisor for a list of approved electives.

B.I.S. CONCENTRATION

A concentration in wellness foundations is available under the Bachelor of Interdisciplinary Studies (B.I.S.) degree, a program intended for the student who has academic interests that might not be satisfied with existing majors. Building on two academic concentrations (or one

double concentration) and an interdisciplinary core, students in the B.I.S. program take active roles in creating their educational plans and defining their career goals. For more information, see “Bachelor of Interdisciplinary Studies,” page 116.

GRADUATE PROGRAMS

The faculty in the Department of Exercise and Wellness offer programs leading to the M.S. degree in Exercise and Wellness. The department also participates with the Graduate College and College of Education in the program leading to the Ph.D. degree in Curriculum and Instruction with a concentration in Exercise and Wellness. See the *Graduate Catalog* for requirements.

EXERCISE AND WELLNESS (EXW)

EXW Note 1. A \$5.00 towel and locker fee is required each semester by students using towel and locker facilities for physical activity courses.

EXW Note 2. Physical activity instruction courses (EXW 105, 205, 305) may not be taken for audit. Excessive absences and/or tardiness are considered disruptive behavior.

EXW 100 Introduction to Health and Wellness. (3)

fall and spring

Current concepts in health, exercise, and wellness. Emphasis placed on personal health, theories, attitudes, beliefs, and behaviors. Cross-listed as HES 100/KIN 100. Credit is allowed only for EXW 100 or HES 100 or KIN 100.

General Studies: SB

EXW 105 Physical Activity Instruction: Beginning. (1)

fall, spring, summer

Beginning instruction in a variety of physical activities such as aerobics, aquatics, racquet sports, physical conditioning, and golf. “Y” grade only. May be repeated for credit. 3 hours per week. Activity. Fee. See EXW Notes 1, 2.

EXW 205 Physical Activity Instruction: Intermediate. (1)

fall and spring

Intermediate-level instruction in a variety of physical activities. Continuation of EXW 105. “Y” grade only. May be repeated for credit. 3 hours per week. Activity. Fee. See EXW Notes 1, 2.

EXW 212 Instructional Competency Laboratory. (2)

fall, spring, summer

Methods of instructing and leading fitness activities, including aerobic, resistance, and flexibility activities. May be repeated for credit. Lab. See EXW Note 1. Prerequisite: Exercise and Wellness major.

EXW 215 Physical Activity and Healthy Lifestyles. (1)

fall and spring

Applies principles of physical activity to personal fitness testing and program planning for people of all ages. Telecampus course. Not open to Exercise and Wellness majors or to students who have credit for EXW 325.

EXW 280 Global Issues in Exercise and Wellness. (3)

spring

Historical overview of health promotion and wellness models as they relate to minority, gender, social, cultural, economic, international, and environmental issues.

General Studies: G

EXW 300 Foundations of Exercise and Wellness. (3)

fall and spring

Analyzes research in various disciplines which contribute to health promotion and wellness.

General Studies: L/SB

EXW 301 Concepts of Fitness and Wellness. (1)*fall and spring*

Guidelines for achieving health benefits of physical activity and other healthy lifestyles. Telecampus course. Not open to Exercise and Wellness majors or to students who have credit for EXW 325.

EXW 305 Physical Activity Instruction: Advanced. (1)*fall and spring*

Advanced-level instruction in a variety of physical activities. Continuation of EXW 105. May be repeated for credit. "Y" grade only. 3 hours per week. Activity. Fee. See EXW Notes 1, 2.

EXW 310 Computer Skills and Technology for Exercise and Wellness. (3)*spring*

Use of computers to statistically analyze data and design presentations of findings. Design of health promotion educational applications and presentations. Lecture, lab. Prerequisite: MAT 117.

*General Studies: CS***EXW 311 Special Populations in Exercise and Wellness. (3)***fall*

Introduces the challenged population and surveys the agencies that work with special populations.

EXW 315 Physiological Foundations of Movement. (3)*spring*

Studies human movement with emphasis on physiological function of the body in response to physical activity and fitness training. Lecture, lab. Fee. Prerequisites: BIO 201, 202.

EXW 320 Program Development and Leadership. (3)*fall*

Principles of planning, organizing, promoting, and leading fitness and wellness programs. Prerequisites: COM 225; Exercise and Wellness major.

EXW 325 Fitness for Life. (3)*fall and spring*

Physical fitness and benefits of exercise with emphasis on self-evaluation and personalized program planning for a lifetime. Not open to Exercise and Wellness majors or to students who have credit for EXW 215 or 301.

EXW 330 Kinesiological Foundations of Movement. (3)*spring*

Studies and considers human movement with emphasis on kinesiology principles and their application to movement and fitness. Lecture, lab. Prerequisites: BIO 201, 202.

EXW 342 Health Behavior Change. (3)*fall*

Examines major theories of health behavioral change. Develops intervention strategies and techniques employed to facilitate health behavioral change. Prerequisite: PGS 101.

EXW 346 Program Evaluation in Health Promotion. (3)*fall*

Introduces and applies theory-based concepts and methods of program evaluation in health promotion. Prerequisite: EXW 320. Pre- or corequisites: EXW 300, 310.

EXW 350 Substance Abuse and Addictive Behavior. (3)*spring*

Studies addictive substances, their pharmacology and effects. Psychosocial risk factors for, and consequences of, substance abuse. Lecture, discussion, individual and group study.

EXW 380 Body Image and Wellness. (3)*fall*

Explores body image in American culture from physical, psychological, historical, and societal perspectives. Prerequisites: NTR 241; PGS 101.

EXW 400 Stress Management for Wellness. (3)*fall*

Examines the stress response and management from a behavioral perspective as it pertains to individuals or groups. Prerequisite: PGS 101.

EXW 420 Exercise Testing. (3)*fall*

Theoretical basis and practical application of pre-exercise screening, exercise testing, estimates of energy expenditure, and interpretation of results. Lecture, lab. Fee. Prerequisites: EXW 315; current CPR certification.

EXW 425 Exercise Prescription. (3)*fall*

Theoretical basis for and application of general principles of exercise prescription to various ages, fitness levels, and health states. Prerequisites: EXW 320, 330. Pre- or corequisite: EXW 420.

EXW 442 Physical Activity in Health and Disease. (3)*spring*

Examines the role of physical activity and fitness in the development of morbidity and mortality throughout the human life span. Prerequisite: EXW 315.

*General Studies: L***EXW 444 Epidemiology. (3)***spring*

Introduces epidemiological concepts and research literature, including physical activity, nutrition, tobacco, alcohol, injury prevention, and safe sex. Prerequisites: EXW 300, 310, 320. Pre- or corequisites: EXW 325, 350.

EXW 450 Cultural and Social Issues in Exercise and Wellness. (3)*spring*

Examines contemporary cultural and social issues in physical activity. Focus on theories of social behavior, racial, ethnic, and cultural differences. Prerequisite: PGS 101.

*General Studies: SB, C***EXW 460 Resistance Training Application and Theory. (3)***fall*

Fosters critical thinking as it applies to resistance training theory. Pre- or corequisite: EXW 315.

EXW 484 Exercise and Wellness Internship. (6)*fall, spring, summer*

Supervised practicum experience in approved exercise and wellness/health promotion agencies. Field work. Prerequisites: EXW 315, 320, 420. Pre- or corequisite: EXW 425.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.



The Exercise and Wellness Lab at ASU East

Tim Trumble photo

Faculty of Human Health Studies

www.east.asu.edu/ecollege/humanhealth

480/727-1065

CLRB 102

William L. Mermis, Faculty Head

HUMAN HEALTH STUDIES—B.A. AND B.S.

The baccalaureate degrees in human health studies examine the multiple dimensions of human health, including psychological, social, biological, spiritual, economic, and emotional dimensions. Different perspectives on health and health care are examined as well as how those perspectives influence changes in belief structures and behavior. Students engage in a critical examination of the alternative approaches to health care and health promotion.

The degrees in human health studies provide students with the general knowledge and intellectual competencies to pursue many different careers and graduate studies in human services or health professions. Students planning to seek admission to medical school or other postbaccalaureate practitioner training that requires an extensive background in mathematics and science benefit from the B.S. program.

Graduation Requirements

To graduate with either a B.A. or a B.S. in Human Health Studies, students must complete a minimum of 120 semester hours (45 upper-division hours), including the university General Studies requirements. Both the B.A. and B.S. degree programs require 45 semester hours of major requirements consisting of a 15 semester hour core of Human Health Studies courses, a 12 semester hour concentration, and 18 semester hours of related course work.

The difference between the B.A. and B.S. programs lies in the mathematics and science requirements. Both B.A. and B.S. students must take one semester of general biology with a lab and two semesters of human anatomy and physiology with labs. The B.S. program requires additional mathematics courses (through brief calculus) and the following science courses:

CHM 113 General Chemistry <i>SQ</i>	4
CHM 116 General Chemistry <i>SQ</i>	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
PHY 111 General Physics <i>SQ</i> *	3
PHY 112 General Physics <i>SQ</i> *	3
PHY 113 General Physics Laboratory <i>SQ</i> *	1
PHY 114 General Physics Laboratory <i>SQ</i> *	1

* Both PHY 111 and 113 or 112 and 114 must be taken to secure *SQ* credit.

HUMAN HEALTH STUDIES (HHS)

HHS 100 Introduction to Holistic Health. (3)

selected semesters

Studies holistic health in a bio-psycho-socio-cultural context for health promotion and wellness.

HHS 194 Special Topics. (1–4)

selected semesters

HHS 294 Special Topics. (1–4)

selected semesters

HHS 300 Overview of Complementary Health Systems. (3)

selected semesters

Identifies and describes major approaches to complementary health models in the context of holistic health. Prerequisite: HHS 100.

HHS 302 Evidence-Based Complementary Health Modalities. (3)

selected semesters

Investigates complementary practices in the context of scholarly knowledge and standards for health care. Prerequisite: HHS 100.

HHS 394 Special Topics. (1–4)

selected semesters

HHS 400 Community-Based Complementary Health Services. (3)

selected semesters

Examines recent developments in community-based health and human services from a holistic perspective. Lecture, service learning. Prerequisite: HHS 100.

HHS 402 Work, Health, and the Family. (3)

selected semesters

Examines issues and programs in the contemporary workplace and society. Future directions for the family and its health.

HHS 403 Community Mental Health and Human Services. (3)

selected semesters

Examines concepts, issues, and programs in community mental health and the delivery of human services.

HHS 405 Seminar in Holistic Health. (3)

selected semesters

Integrates concepts and issues in holistic health within philosophical, historical, political, economic, and cultural frameworks. Prerequisite: HHS 100.

HHS 494 Special Topics. (1–4)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Faculty of Multimedia Writing and Technical Communication

www.east.asu.edu/ecollege/multimedia

480/727-1190

CNTR 80

Barry M. Maid, Faculty Head

Professor: Maid

Associate Professor: Barchilon

MULTIMEDIA WRITING AND TECHNICAL COMMUNICATION—B.S.

In the Multimedia Writing and Technical Communication program, students learn how to produce, to design, and to manage information using both traditional and leading edge technologies.

1. Students learn to communicate, both orally and in writing, across audiences and cultures.
2. Students become aware of issues of ethics in technical communications.
3. Students gain an awareness of the global nature of technical communication—both culturally and economically—and develop the ability to evaluate print, oral, and electronic sources.
4. Students gain an understanding of appropriate technical genres and learn to demonstrate technical editing skills in all work.
5. Students become able to incorporate appropriate visual elements and design in written documents and oral presentations and to work in appropriate media.

The program serves students who wish to pursue careers as technical writers, technical editors, Web page and intranet page designers, multimedia designers, desktop publishers, publications managers, and information designers.

GRADUATION REQUIREMENTS

To graduate with a B.S. degree in Multimedia Writing and Technical Communication, students must complete a minimum of 120 semester hours, including university graduation requirements and the requirements of the major.

Multimedia Writing and Technical Communication Core

TWC 301 General Principles of Multimedia Writing <i>L</i>	3
TWC 401 Principles of Technical Communication <i>L</i>	3
TWC 411 Principles of Visual Communication <i>L</i>	3
TWC 421 Principles of Writing with Technology <i>L</i>	3
TWC 431 Principles of Technical Editing <i>L</i>	3
TWC 490 Capstone.....	3
Total	18

Major Electives. Fifteen semester hours are considered electives in the major (TWC). At least six of which need to

be in genre courses, such as TWC 443 Proposal Writing or TWC 447 Business Reports. An Internship (TWC 484) or supervised work experience is strongly recommended.

For information about program requirements and courses, access the Web at www.east.asu.edu/ecollege, or call an East College advisor at 480/727-1515.

Related Area. Students select a related area consisting of 12 semester hours of study in one other discipline. At least nine of these 12 semester hours must be in the upper division. Suggested disciplines might be, but are not limited to, applied psychology, business administration, or computer graphics. Students, with the help of an advisor, may also develop a coherent interdisciplinary related area.

BACHELOR OF APPLIED SCIENCE—B.A.S.

A Bachelor of Applied Science is also offered with a concentration in multimedia writing and technical communication. The B.A.S. degree is a “capstone” degree for the Associate of Applied Science degree. The B.A.S. degree exposes students to advanced concepts and diverse critical thinking skills that prepare them for future career opportunities and professional advancement.

Admission. Admission to the B.A.S. degree program is restricted to students holding an A.A.S. degree or equivalent from a regionally accredited U.S. postsecondary educational institution. A GPA of 2.00 or higher is required for all resident applicants and a 2.50 for nonresident applicants.

Degree Requirements. In addition to the A.A.S. degree, the B.A.S. in Applied Science through East College consists of 60 semester hours of upper-division (300-level and above) courses, with 30 semester hours in residence.

Assignable credit.....	6
B.A.S. core	15
General Studies	19
MWTC concentration	20
Total	60

General Studies Curriculum. The B.A.S. curriculum builds on the general education content of the A.A.S. degree. Additional General Studies (L, CS, and awareness areas) are met with courses in the core or concentration. General Studies courses focus on contextual learning.

L	3
MA	3
HU	3
HU or SB	3
SB	3
SG	4
Total	19

Assignable Credit. Assignable credit offers students the flexibility within the curriculum to take the prerequisite courses needed for success. The courses (six semester hours) are determined by the student and an advisor.

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See “General Studies,” page 85.

EAST COLLEGE

B.A.S. Core. The area core (15 semester hours) is focused on management and organization, professional communication, qualitative analysis, and computer competency.

Multimedia Writing and Technical Communication Concentration. In consultation with an advisor, students select 20 semester hours of upper-division TWC courses.

CERTIFICATE PROGRAMS

An undergraduate Multimedia Writing and Technical Communication Certificate is available and requires 18 semester hours.

For students who have already completed a baccalaureate degree, a Postbaccalaureate Certificate in Multimedia Writing and Technical Communication is available that also requires 18 semester hours.

For more information about both certificate programs, call the East College advisor at 480/727-1515, or access the Web site at www.east.asu.edu/ecollege/multimedia.

B.I.S. CONCENTRATION

A concentration in multimedia writing and technical communication is available under the Bachelor of Interdisciplinary Studies (B.I.S.) degree, a program intended for the student who has academic interests that might not be satisfied with existing majors. Building on two academic concentrations (or one double concentration) and an interdisciplinary core, students in the B.I.S. program take active roles in creating their educational plans and defining their career goals. For more information, see “Bachelor of Interdisciplinary Studies,” page 116.

MULTIMEDIA WRITING AND TECHNICAL COMMUNICATION (TWC)

TWC 194 Special Topics. (1–4)
selected semesters

TWC 200 Impact of Communications Technology on Society. (3)
fall and spring
Organizational issues and development of technical communication. Activities include research, evaluations, and presentation of oral arguments in support of positions. Prerequisites: both ENG 101 and 102 or only ENG 105.
General Studies: L

TWC 301 General Principles of Multimedia Writing. (3)
fall and spring
Introduces writing in a variety of media, understanding the consequences of integrating media, and effective editing techniques. Prerequisite: First-Year Composition.
General Studies: L

TWC 351 Technical Writing and Editing. (3)
fall and spring
Effective style, format, and organization of technical material; editing principles and practices; copyediting versus substantive editing; and document management. Prerequisite: ENG 102.

TWC 400 Technical Communications. (3)
fall, spring, summer
Planning and preparing technical publications and oral presentations based on directed library research related to current technical topics. Prerequisites: completion of first-year English requirements; a General Studies L course; senior standing with a major in College of Technology and Applied Sciences.
General Studies: L

TWC 401 Principles of Technical Communication. (3)
fall and spring
Basic information design principles to produce effective written, oral, and electronic technical communication. Understanding of rhetorical and audience analysis. Pre- or corequisite: TWC 301.
General Studies: L

TWC 403 Writing for Professional Publication. (3)
selected semesters
Analyzes the market and examines the publication process, including the roles of the author, editor, and reviewer. Pre- or corequisite: TWC 401.

TWC 411 Principles of Visual Communication. (3)
fall and spring
Basic principles of visual communication in print and electronic media. Understanding graphic and document design, including typography and color. Pre- or corequisite: TWC 401.
General Studies: L

TWC 421 Principles of Writing with Technology. (3)
fall and spring
Understanding historical and social impact of technology on writing, with emphasis on multimedia design, computer-mediated communication, and hypertext. Pre- or corequisite: TWC 401.
General Studies: L

TWC 431 Principles of Technical Editing. (3)
fall and spring
Basic principles of technical editing (for print and electronic media), including copyediting, reviews, standards, style, and project management. Pre- or corequisite: TWC 401.
General Studies: L

TWC 443 Proposal Writing. (3)
once a year
Develops persuasive strategies and themes for researching and writing professional proposals. Pre- or corequisite: TWC 401.

TWC 444 Manual and Instructional Writing. (3)
once a year
Design and development of a user manual, writing instructions, improving graphics and page design, and usability testing. Pre- or corequisite: TWC 401.

TWC 445 Computer Documentation. (3)
once a year
Introduces writing documentation for the computer industry. Pre- or corequisite: TWC 401.

TWC 446 Technical and Scientific Reports. (3)
once a year
Introduces strategies, formats, and techniques of presenting information to technical and scientific audiences. Pre- or corequisite: TWC 401.
General Studies: L

TWC 447 Business Reports. (3)
once a year
Introduces strategies, formats, and techniques of presenting information to business and other workplace audiences. Pre- or corequisite: TWC 401.
General Studies: L

TWC 484 Internship. (3)
fall and spring
Applies classroom work in a supervised workplace environment. Pre- or corequisite: TWC 411 or 421 or 431.

TWC 490 Capstone. (3)
fall and spring
Development of a professional portfolio, creation of a “culminating document,” and synthesis of undergraduate experience. Prerequisite: instructor approval.

TWC 494 Special Topics. (1–4)
selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see “Omnibus Courses,” page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see “Graduate-Level Courses,” page 56.

Department of Nutrition

www.east.asu.edu/ecollege/nutrition

480/727-1728

HSC 1386

Linda A. Vaughan, Chair

Professors: Johnston, Vaughan

Assistant Professors: Hampl, Hutchins, Winham, Woolf

Lecturers: Dixon, Hall

NUTRITION—B.S.

The B.S. degree in Nutrition offers three concentrations: dietetics, human nutrition, and food and nutrition management. The dietetics concentration provides students with a comprehensive range of nutrition, foods, and science courses that meet the academic (didactic) requirements necessary to become a registered dietitian. This concentration has been granted full accreditation as a Didactic Program in Dietetics (DPD) by the Commission on Accreditation for Dietetics Education of the American Dietetic Association. Graduates of a DPD may apply for Dietetic Internships to establish eligibility to write the Dietetic Registration examination.

The human nutrition concentration provides a sound foundation in the basic sciences and nutrition, but no food service courses are required. This program is often used by students who, while not seeking the credential of Registered Dietitian, are working towards a career in nutrition research or completing a premedical/pre dental program of study. The food and nutrition management concentration provides a number of nutrition, foods, and business courses and is offered to students with an interest in food production, nutrition program management, and food/nutrition marketing.

Accreditation. The B.S. degree in Nutrition with a concentration in dietetics has been granted full accreditation as a Didactic Program in Dietetics (DPD) by the Commission on Accreditation for Dietetics Education of the American Dietetic Association. For more information, call 312/899-0040, or write

COMMISSION ON ACCREDITATION FOR
DIETETICS EDUCATION
AMERICAN DIETETIC ASSOCIATION
216 W JACKSON BLVD
CHICAGO IL 60606-6995

Dietetics Concentration. The following NTR courses are required of all students in the dietetics concentration:

NTR 142 Applied Food Principles	3
NTR 150 Introduction to Professions in Nutrition and Dietetics.....	1

NTR 241 Human Nutrition	3
NTR 340 Applications in Human Nutrition.....	3
NTR 341 Introduction to Planning Therapeutic Diets	3
NTR 343 Food Service Purchasing.....	3
NTR 344 Nutrition Services Management <i>L</i>	3
NTR 350 Nutrition Counseling.....	3
NTR 400 Nutrition and Health Promotion.....	3
NTR 440 Advanced Human Nutrition I.....	3
NTR 441 Advanced Human Nutrition II	3
NTR 444 Medical Nutrition Therapy.....	3
NTR 445 Quantity Food Production.....	3
NTR 446 Human Nutrition Assessment Lecture/Laboratory	3
NTR 448 Community Nutrition <i>L</i>	3
Total	43

In addition to the required NTR courses, the following related courses are required to complete the academic requirements of the Didactic Program in dietetics:

BCH 361 Principles of Biochemistry.....	3
BCH 367 Elementary Biochemistry Laboratory.....	1
BIO 201 Human Anatomy and Physiology I <i>SG</i>	4
BIO 202 Human Anatomy and Physiology II.....	4
CHM 113 General Chemistry <i>SQ</i>	4
CHM 116 General Chemistry <i>SQ</i>	4
CHM 231 Elementary Organic Chemistry <i>SQ</i> ¹	3
CHM 235 Elementary Organic Chemistry Laboratory <i>SQ</i> ¹	1
MIC 205 Microbiology <i>SG</i> ²	3
MIC 206 Microbiology Laboratory <i>SG</i> ²	1
Statistics course.....	3
Technical writing course	3
Total	34

¹ Both CHM 231 and 235 must be taken to secure *SQ* credit.

² Both MIC 205 and 206 must be taken to secure *SG* credit.

Additional supporting courses in the social sciences are required for completion of the DPD and must be selected in consultation with the Nutrition academic advisor.

Human Nutrition Concentration. The following NTR courses are required of all students in the human nutrition concentration:

NTR 142 Applied Food Principles	3
NTR 241 Human Nutrition	3
NTR 340 Applications in Human Nutrition.....	3
NTR 341 Introduction to Planning Therapeutic Diets	3
NTR 440 Advanced Human Nutrition I.....	3
NTR 441 Advanced Human Nutrition II	3
NTR 444 Medical Nutrition Therapy.....	3
NTR 446 Human Nutrition Assessment Lecture/Laboratory	3
Total	24

An additional six semester hours from the Department of Nutrition are required to complete this concentration. A maximum of three semester hours of Independent Study may be used to satisfy this requirement. Students select these courses in consultation with the Nutrition academic advisor.

L literacy and critical inquiry / *MA* mathematics / *CS* computer/statistics/ quantitative applications / *HU* humanities and fine arts / *SB* social and behavioral sciences / *SG* natural science—general core courses / *SQ* natural science—quantitative / *C* cultural diversity in the United States / *G* global / *H* historical / See "General Studies," page 85.

In addition to the required NTR courses, the following related courses are required in order to complete the academic requirements of this concentration:

BCH 361 Principles of Biochemistry.....	3
BCH 367 Elementary Biochemistry Laboratory.....	1
BIO 201 Human Anatomy and Physiology I <i>SG</i>	4
BIO 202 Human Anatomy and Physiology II.....	4
CHM 113 General Chemistry <i>SQ</i>	4
CHM 116 General Chemistry <i>SQ</i>	4
CHM 231 Elementary Organic Chemistry <i>SQ</i> ¹	3
CHM 235 Elementary Organic Chemistry Laboratory <i>SQ</i> ¹	1
MIC 205 Microbiology <i>SG</i> ²	3
MIC 206 Microbiology Laboratory <i>SG</i> ²	1
Total	28

¹ Both CHM 231 and 235 must be taken to secure *SQ* credit.

² Both MIC 205 and 206 must be taken to secure *SG* credit.

Food and Nutrition Management Concentration. The following NTR courses are required of all students in the food and nutrition management concentration:

NTR 100 Introductory Nutrition.....	3
or NTR 241 Human Nutrition (3).....	
NTR 142 Applied Food Principles.....	3
NTR 300 Computer Applications in Nutrition <i>CS</i>	3
NTR 343 Food Service Purchasing.....	3
NTR 344 Nutrition Services Management <i>L</i>	3
NTR 345 Development of Healthy Cuisines.....	3
NTR 351 Nutrition and Health Communications.....	3
NTR 401 Professional Practice in Food Service Management.....	3
NTR 445 Quantity Food Production.....	3
Total	27

An additional three semester hours from the Department of Nutrition are required to complete this concentration. A maximum of three semester hours of Independent Study may be used to satisfy this requirement. Students select these courses in consultation with the Nutrition academic advisor.

In addition to the required NTR courses, the following related courses are required to complete the academic requirements of this concentration:

CHM 101 Introductory Chemistry <i>SQ</i>	4
MIC 205 Microbiology <i>SG</i> ¹	3
MIC 206 Microbiology Laboratory <i>SG</i> ¹	1
Business or technical writing course.....	3
Management (AGB 310, or BUS 301, or COB 380, or MGT 300, 380, or 394).....	3
Marketing (AGB 320, COB 382, or MKT 300 or 394).....	3
Other agrribusiness or business courses ²	6
Total	23

¹ Both MIC 205 and 206 must be taken to secure *SG* credit.

² Courses taken to fulfill the final six credit business requirement should be taken from courses with the following prefixes: ACC, AGB, BUS, COB, CIS, CSE, ECN, FIN, GBS, HSA, IBS, MGT, MKT, QBA, SCM, and TWC. Students select these courses in consultation with the Nutrition academic advisor.

MINORS

The faculty of the Department of Nutrition also offers minors in Food and Nutrition Management and Human Nutrition, each requiring 18 semester hours. At least 12 of the 18 must be in upper-division courses.

Food and Nutrition Management. The Food and Nutrition Management minor requires that students take the following courses:

NTR 100 Introductory Nutrition.....	3
or NTR 241 Human Nutrition (3).....	
NTR 142 Applied Food Principles.....	3
NTR 300 Computer Applications in Nutrition <i>CS</i>	3
NTR 343 Food Service Purchasing.....	3
NTR 344 Nutrition Services Management <i>L</i>	3
NTR 445 Quantity Food Production.....	3
Total	18

Human Nutrition. The Human Nutrition minor requires that students take the following courses:

NTR 241 Human Nutrition.....	3
NTR 340 Applications in Human Nutrition.....	3
NTR 341 Introduction to Planning Therapeutic Diets.....	3
NTR 440 Advanced Human Nutrition I.....	3
NTR 441 Advanced Human Nutrition II.....	3
NTR 444 Medical Nutrition Therapy.....	3
Total	18

Additional upper-division (or graduate) courses may be selected from among the following:

NTR 346 Sports Nutrition.....	3
NTR 348 Cultural Aspects of Food <i>C</i>	3
NTR 350 Nutrition Counseling.....	3
NTR 351 Nutrition and Health Communications.....	3
NTR 446 Human Nutrition Assessment Lecture/Laboratory.....	3
NTR 448 Community Nutrition <i>L</i>	3
NTR 450 Nutrition in the Life Cycle I <i>SB</i>	3
NTR 451 Nutrition in the Life Cycle II.....	3

B.I.S. CONCENTRATION

Concentrations in (1) food and nutrition management and (2) human nutrition are available under the Bachelor of Interdisciplinary Studies (B.I.S.) degree, a program intended for the student who has academic interests that might not be satisfied with existing majors. Building on two academic concentrations (or one double concentration) and an interdisciplinary core, students in the B.I.S. program take active roles in creating their educational plans and defining their career goals. For more information, see "Bachelor of Interdisciplinary Studies," page 116.

APPLIED SCIENCE—B.A.S.

Food Service Management Concentration. The B.A.S. degree with a concentration in food service management is designed to complement and enhance the educational preparation of students holding an A.A.S. degree from a regionally accredited U.S. postsecondary educational institution. The concentration is particularly designed for students holding an A.A.S. degree in culinary or hospitality science. The degree prepares students for careers in food production, service, management, and marketing. With additional educa-

tion and/or professional training, students may also become credentialed as certified dietary managers, school food service and nutrition specialists, or registered sanitarians.

Admission. Admission to the B.A.S. degree program is restricted to students holding an A.A.S. degree from a regionally accredited U.S. postsecondary educational institution. A GPA of 2.00 or higher is required for all resident applicants and a 2.50 is required for nonresident applicants.

Degree Requirements. The B.A.S. degree consists of 60 semester hours of upper-division (300 level and above) courses, with 30 hours in residence. A total of 120 semester hours are required for graduation.

A.A.S. degree	60
Assignable credit.....	6
B.A.S. core	15
General Studies	19
Concentration	20
Total	120

General Studies Curriculum. The B.A.S. curriculum builds on the general education content of the A.A.S. degree. Additional General Studies (L, CS, and awareness areas) are met with courses in the core or concentration. General Studies courses focus on contextual learning.

L	3
MA	3
HU	3
HU/SB	3
SB	3
SG	4
Total	19

Required Core Courses

NTR 300 Computer Applications in Nutrition CS	3
NTR 343 Food Service Purchasing.....	3
NTR 344 Nutrition Services Management L	3
NTR 345 Development of Healthy Cuisines	3
NTR 348 Cultural Aspects of Food C	3
NTR 401 Professional Practice in Food Service Management.....	3
NTR 445 Quantity Food Production	3
Marketing course	3
NTR electives.....	6
Statistics course.....	3
Technical communications course	3
Total	36

Assignable Credit. Assignable credit offers students the flexibility within the curriculum to take the prerequisite courses needed for success. It also allows students to take additional technical electives. The courses are determined by the student and the advisor.

NUTRITION (NTR)

NTR 100 Introductory Nutrition. (3)

fall, spring, summer

Basic concepts of human nutrition. Recent controversies in nutrition and how food choices affect personal health.

NTR 142 Applied Food Principles. (3)

fall and spring

Applied scientific principles of food preparation and production. 2 hours lecture, 3 hours lab. Fee.

NTR 150 Introduction to the Professions in Nutrition and Dietetics. (1)

fall and spring

Introduces the professions of nutrition and dietetics; their history, practice, and future; credentials, ethics, and standards of practice.

NTR 241 Human Nutrition. (3)

fall, spring, summer

Principles of human nutrition. Emphasizes nutrient metabolism and the relationships between diet and disease. Prerequisite: CHM 101 (or its equivalent).

NTR 300 Computer Applications in Nutrition. (3)

spring

Introduces nutrition and food software, including dietary assessment and analysis, food inventory and control, and telecommunications.

Lecture, computer lab. Prerequisites: NTR 100 (or 241), 341 strongly recommended; basic computer literacy.

General Studies: CS

NTR 340 Applications in Human Nutrition. (3)

spring

Applications of nutrient metabolism through case studies and product evaluations; special topics in human nutrition. Prerequisites: BIO 202; NTR 241.

NTR 341 Introduction to Planning Therapeutic Diets. (3)

fall and summer

Cultural, health, and economic aspects of diet planning. Assessment of food and diet composition. Review of common therapeutic diets.

Fee. Prerequisite: NTR 100 or 241 (or its equivalent).

NTR 343 Food Service Purchasing. (3)

fall

Introduces purchasing systems, bid processes, receiving and storage procedures, and regulatory agencies involved in the food service industry. Prerequisite: NTR 142.

NTR 344 Nutrition Services Management. (3)

fall and spring

Organization, administration, and management of food and nutrition services in hospitals and other institutions. Possible field trips. Prerequisite: NTR 100 or 241 (or its equivalent).

General Studies: L

NTR 345 Development of Healthy Cuisines. (3)

fall

Principles and applications of nutrition and medical nutrition therapy; development of healthy cuisines in health and disease states. Prerequisite: NTR 100 or 241 or instructor approval.

NTR 346 Sports Nutrition. (3)

fall and summer

Nutritional needs of recreational and elite athletes; energy balance; nutrient metabolism during activity; fluid-electrolyte regulation; evaluation of ergogenic supplements. Prerequisites: BIO 202; NTR 241.

NTR 348 Cultural Aspects of Food. (3)

spring and summer

Origins, development, and diversity of food preferences and dietary habits; food patterns and attitudes of global populations and U.S. immigrants. Prerequisite: NTR 100 or 241 (or its equivalent).

General Studies: C

NTR 350 Nutrition Counseling. (3)

spring

Counseling techniques in nutrition; interpersonal and communication skills in clinical and community sites; nutrition education for individuals and populations. Lecture, lab. Prerequisites: NTR 100 (or 241) and 142 (or their equivalents).

NTR 351 Nutrition and Health Communications. (3)

fall

Approaches of nutrition and health communications; development of nutrition and health communication materials for selected target audiences. Prerequisite: NTR 100 or 241.

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See “General Studies,” page 85.

EAST COLLEGE

NTR 400 Nutrition and Health Promotion. (3)

fall and spring

Role of nutrition in health promotion; application of academic knowledge in field practicum; components of professional development. Lecture, practicum. Prerequisites: NTR 341, 440 (or 441 or 444); senior standing in dietetics or human nutrition.

NTR 401 Professional Practice in Food Service Management. (3)

spring

Applies academic knowledge in food service management to field practicum; develops practical skills in planning, purchasing, production, management. Lecture, practicum. Prerequisites: NTR 343; senior standing in food and nutrition management. Pre- or corequisite: NTR 344.

NTR 440 Advanced Human Nutrition I. (3)

fall

Metabolic reactions and interrelationships of vitamins, minerals, and water. Prerequisites: BIO 202 and CHM 231 and NTR 241 (or their equivalents).

NTR 441 Advanced Human Nutrition II. (3)

spring

Metabolic reactions and interrelationships of carbohydrate, lipid, and protein. Prerequisites: BCH 361 and BIO 202 and NTR 241 and 341 (or their equivalents). CHM 231 strongly recommended.

NTR 442 Experimental Foods. (3)

selected semesters

Food product development techniques, food evaluation and testing, and investigation of current research into food composition. 2 hours lecture, 3 hours lab. Fee. Prerequisites: CHM 231; NTR 142.

NTR 444 Medical Nutrition Therapy. (3)

spring and summer

Principles of medical nutrition therapy for prevention and treatment of disease and promotion of health. Prerequisites: BIO 201 and 202 and NTR 341 (or their equivalents). CHM 231 strongly recommended.

NTR 445 Quantity Food Production. (3)

fall and spring

Standardized methods of quantity food preparation, operation of institutional equipment, institutional menu planning, quantity food experiences. Fee. Prerequisites: NTR 100 (or 241) and 142 (or their equivalents).

NTR 446 Human Nutrition Assessment Lecture/Laboratory. (3)

fall and spring

Clinical and biochemical evaluation of nutritional status. 2 hours lecture, 3 hours lab. Fee. Prerequisites: BCH 361, 367; NTR 440 (or 441).

NTR 448 Community Nutrition. (3)

fall and spring

Food-related behaviors; organization and delivery of nutrition services; program design, implementation, and evaluation strategies; nutrition assessment of populations. Prerequisite: NTR 241 (or its equivalent).

General Studies: L

NTR 450 Nutrition in the Life Cycle I. (3)

fall

Emphasizes nutritional needs and problems during pregnancy, lactation, infancy, and childhood. Prerequisite: NTR 100 or 241 (or its equivalent).

General Studies: SB

NTR 451 Nutrition in the Life Cycle II. (3)

spring

Nutritional requirements and nutrition-related disorders of adolescence, middle adulthood, and later life. Prerequisite: NTR 100 or 241 (or its equivalent).

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.



Maintaining fairways and greens is taught in the classroom and on the course.

Tim Trumble photo

College of Technology and Applied Sciences

www.east.asu.edu/ctas

Albert L. McHenry, Ph.D., Dean

PURPOSE

The College of Technology and Applied Sciences (CTAS) helps students develop knowledge and skill in technological fields that qualify them for career positions and leadership responsibility in industry, government, and commercial enterprise. Each student is guided to select a major that addresses short-term employment goals through state-of-the-art technological preparation. Long-term career aspirations are supported through the development of a strong base in mathematics, science, engineering, and technical principles, coupled with a solid foundation in liberal arts and a commitment to lifelong learning.

Engineering technology programs offer professional preparation through a B.S. degree that stresses state-of-the-art technological applications. Special emphasis is placed on the development of knowledge and skill in applied mathematics, natural sciences, and engineering principles with formal laboratory experiences. This mixed educational approach provides the basis for both employment and a long-term career evolution.

The other CTAS technology programs provide the opportunity for students to develop knowledge and skill in solving broad-scale industrial problems, operating modern technological systems, and managing personnel in the implementation of processes and production. Programs of study focus on the latest technologies in areas such as aviation flight training and management, environmental technology management, graphic information technology, fire service management, and industrial management.

Each student is encouraged to participate in creative activities through a close relationship with a faculty mentor. Learning through execution of the scientific method, using both inductive and deductive processes in applied research activities, is essential for both faculty and students.

ORGANIZATION

The College of Technology and Applied Sciences is composed of the following four academic units:

Department of Aeronautical Management Technology
Department of Electronics and Computer Engineering Technology

Department of Information and Management Technology

Department of Mechanical and Manufacturing Engineering Technology

DEGREE PROGRAMS

See the “College of Technology and Applied Sciences Baccalaureate Degrees and Majors” table, page 624. For graduate degrees, see the “College of Technology and

Applied Sciences Graduate Degrees and Majors” table, page 625.

The College of Technology and Applied Sciences offers programs leading to the B.S. degree and B.A.S. degree. The college also offers the Master of Science in Technology (M.S.T.) degree. For more information on courses, faculty, and programs in the M.S.T. degree, see the *Graduate Catalog*.

ACCREDITATION

Undergraduate B.S. degree 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, Inc. For additional information, call 410/347-7700 or write

TECHNOLOGY ACCREDITATION COMMISSION OF
THE ACCREDITATION BOARD FOR
ENGINEERING AND TECHNOLOGY INC
111 MARKET PLACE SUITE 1050
BALTIMORE MD 21202-7102

Both the professional flight and the air transportation management concentrations in the Department of Aeronautical Management Technology are fully accredited by the Council on Aviation Accreditation. For more information call 334/844-2431, send e-mail to caa@auburn.edu, or write

COUNCIL ON AVIATION ACCREDITATION
3410 SKYWAY DRIVE
AUBURN AL 36830

The Bachelor of Science in Industrial Technology Degree including the environmental technology management, graphic information technology, and industrial technology management concentrations is fully accredited by the National Association of Industrial Technology (NAIT). For more information, call 734/677-0720, e-mail nait@nait.org, or write

NATIONAL ASSOCIATION OF INDUSTRIAL
TECHNOLOGY
3300 WASHTENAW AVENUE SUITE 220
ANN ARBOR MI 48104-4200

ADMISSION—B.S. DEGREE

The College of Technology and Applied Sciences admits first-year students who meet the undergraduate admission

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See “General Studies,” page 85.

COLLEGE OF TECHNOLOGY AND APPLIED SCIENCES

College of Technology and Applied Sciences Baccalaureate Degrees and Majors

Major	Degree	Concentration	Administered By
Aeronautical Management Technology*	B.S.	Air transportation management, professional flight	Department of Aeronautical Management Technology
Applied Science	B.A.S.	Aviation maintenance management technology, aviation management technology, computer systems administration, digital media management, digital publishing, emergency management, fire service management, instrumentation, manufacturing technology and management, microcomputer systems, municipal operations management, operations management, semiconductor technology, software technology applications, technical graphics	Bachelor of Applied Science Advisory Committee
Computer Engineering Technology*	B.S.	Computer hardware technology, embedded systems technology, software technology	Department of Electronics and Computer Engineering Technology
Electronics Engineering Technology*	B.S.	Electronic systems, microelectronics, telecommunications	Department of Electronics and Computer Engineering Technology
Industrial Technology	B.S.	Environmental technology management, graphic information technology, industrial technology management	Department of Information and Management Technology
Manufacturing Engineering Technology*	B.S.	Manufacturing engineering technology, mechanical engineering technology	Department of Mechanical and Manufacturing Engineering Technology
Mechanical Engineering Technology*	B.S.	Aeronautical engineering technology, automation engineering technology, mechanical engineering technology	Department of Mechanical and Manufacturing Engineering Technology

* This major requires more than 120 semester hours to complete.

requirements of Arizona State University. See “Undergraduate Admission,” page 59. High school precalculus, physics, and chemistry are recommended. Transfer applicants must meet the university requirements for transfer students as specified under “Transfer Credit,” page 62, with the exception that Arizona resident transfer students must have a 2.25 GPA.

Students admitted to a B.S. degree program in CTAS begin study under one of two student classifications, professional or preprofessional.

Professional Status

First-year students (new freshmen) are admitted to CTAS with professional status if they meet the general aptitude criteria for admission and have no deficiencies in the basic competency requirements for admission. First-year students admitted upon completion of the GED are admitted with professional status if they have also achieved the minimum ACT or SAT scores required for undergraduate admission to the university.

Students transferring from other ASU colleges are admitted to CTAS with professional status if they have no remaining admissions deficiencies and meet the required GPA.

Transfer students from other institutions must meet the minimum admission requirements for college transfer students as described under “Transfer Credit,” page 62. The

CTAS also requires resident transfer students to have a cumulative GPA of 2.25.

All international students must have a minimum 500 TOEFL score to be admitted with professional status.

Preprofessional Status

All other students are admitted with preprofessional status and may apply for professional status after they have removed the deficiency that disallows awarding professional status. Students with preprofessional status may not register for 300- and 400-level courses in the college until they have been awarded professional status. See an advisor for details.

Transfer Credit

Credit for courses taken at a community college or another four-year institution is awarded according to the guidelines under “Transfer Credit,” page 62. Students who are transferring from an Arizona community college and have been in continuous residence may continue under the catalog in effect at the time of their entrance into the community college. Students should be aware that some course work that transfers to ASU may not be applicable toward CTAS degree requirements. Students should confer with an advisor. The College of Technology and Applied Sciences maintains a cooperative agreement with most Arizona community colleges and with selected out-of-state colleges and universities to structure programs that are directly transfer-

College of Technology and Applied Sciences Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Technology	M.S.Tech.	Aeronautical engineering technology, manufacturing engineering technology, mechanical engineering technology	Department of Mechanical and Manufacturing Engineering Technology
		Aviation human factors, aviation management technology	Department of Aeronautical Management Technology
		Computer systems engineering technology, electronic systems engineering technology, instrumentation and measurement technology, microelectronics engineering technology	Department of Electronics and Computer Engineering Technology
		Environmental technology management, fire service administration, information technology, management of technology	Department of Information and Management Technology
		Global technology and development, security engineering technology	College of Technology and Applied Sciences

able into the technology programs at ASU East. For assistance in the transfer from Arizona community colleges, transfer guides are available at www.asu.edu/provost/articulation.

Courses taken more than five years before admission to a CTAS degree program are not normally accepted for transfer credit at the option of the department in which the applicant wishes to enroll. Courses completed within the five years preceding admission are judged as to their applicability to the student’s curriculum.

ADMISSION—B.A.S. DEGREE

Admission to the B.A.S. degree program is restricted to students holding an A.A.S. degree from a regionally accredited U.S. postsecondary educational institution. A GPA of 2.00 or higher is required for all resident applicants and a 2.50 for nonresident applicants.

ADVISING

New incoming and transfer students should seek initial advising from the academic advisor in the Dean’s Office. CTAS students are then assigned faculty advisors who assist them with planning a program of study in the department of their major. The college requires that students consult with advisors before registering each semester. Advisors should be made aware of any employment obligations or special circumstances that may affect a student’s ability to successfully handle a full course load. CTAS students may register for a maximum of 19 semester hours per semester. Any student wishing to take more than the maximum must petition the CTAS Standards Committee and have an approval on file before registering for an overload.

GRADUATION REQUIREMENTS

Students must meet all university graduation requirements given in “University Graduation Requirements,” page 81, as well as degree requirements of their major in the College of Technology and Applied Sciences. For detailed

information on the degree requirements of a major in CTAS, refer to that department’s individual description.

COLLEGE STANDARDS

Pass/Fail Grades

The College of Technology and Applied Sciences does not offer pass/fail grades. Courses graded on a pass/fail basis do not count toward degree credit in CTAS. Students may request credit for pass/fail courses by petitioning the CTAS Standards Committee.

Entry into Upper-Division Courses (B.S. Degree)

Before enrolling in courses at the 300 level and above, CTAS students must be in the professional status within the college. Students who are not in good academic standing must petition the CTAS Standards Committee. Students enrolled in another ASU college may not register for any 300- and 400-level CTAS courses unless those courses are required in the degree program and the students have the proper course prerequisites.

ACADEMIC STANDARDS

Retention. A student is expected to make satisfactory progress toward completion of degree requirements to continue enrollment in the College of Technology and Applied Sciences. Any one of the following conditions is considered unsatisfactory progress and results in the student’s being placed on probationary status:

1. a semester with a GPA less than or equal to 1.50;
2. two successive semesters with GPAs less than 2.00; or
3. an ASU cumulative GPA less than 2.00.

A student on probation is subject to disqualification if (1) a semester GPA of 2.25 is not attained and the

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See “General Studies,” page 85.

COLLEGE OF TECHNOLOGY AND APPLIED SCIENCES

cumulative GPA is below 2.00 at the end of the probationary semester or (2) the student is placed on probation for two consecutive semesters and is unable to achieve the standard GPAs stated in number one.

Students on academic probation are not allowed to register for more than 13 semester hours. Probationary students may not register for the semester following the semester in which they were declared probationary without a special permit from an advisor in the dean's office. Special permits are given only after the registrar records grades for the current semester.

Disqualification. During a semester on academic probation, a student who fails to meet the retention standards is disqualified. Students may request a review of their disqualification status by contacting the CTAS associate dean in the Academic Center Building (CNTR), room 10. Any disqualified student who is accepted by another college at ASU may not register for courses in CTAS unless the courses are required in the new major. Disqualified students who register for courses in CTAS may be withdrawn from these courses any time during the semester.

Reinstatement. The college does not accept an application for reinstatement until the disqualified student has remained out of the college for at least a 12-month period. Merely having remained in disqualified status for this period of time does not, in itself, constitute a basis for reinstatement. Proof of ability to do satisfactory college work in the chosen discipline is required; for example, completing pertinent courses in the discipline at a community college with higher-than-average grades.

STUDENT RESPONSIBILITIES

Course Prerequisites. Students should consult the *Schedule of Classes* and the catalog for course prerequisites. Students who register for courses without the designated prerequisites may be withdrawn without their consent at any time before the final examination. The instructor, the chair of the department, or the dean of the college may initiate such withdrawals. In such cases, students do not receive monetary reimbursement. Such withdrawals are considered to be unrestricted as described under "Unrestricted Course Withdrawal," page 75, and do not count against the number of restricted withdrawals allowed.

SPECIAL PROGRAMS

Academic Recognition. Students completing baccalaureate degree requirements receive the appropriate honors designations on their diplomas consistent with the requirements specified by the university.

Students in the college are encouraged to seek information concerning entry into honor societies that enhance their professional stature. Tau Alpha Pi is the engineering technology honor society, and Alpha Eta Rho is available for aeronautical management technology students.

Barrett Honors College. The College of Technology and Applied Sciences participates in the programs of the Barrett Honors College, which provides enhanced educational experiences to academically superior undergraduate stu-

dents. Participating students can major in any academic program. For more information see "The Barrett Honors College," page 120.

Scholarships. Information and applications for academic scholarships for continuing students may be obtained by contacting departmental offices. Other scholarships may be available through the university Student Financial Assistance Office.

ROTC Students. Students pursuing a commission through either the Air Force or Army ROTC program must take from 12 to 20 semester hours of courses in the Department of Aerospace Studies or Department of Military Science. To preclude excessive overloads, these students should plan on at least one additional semester to complete degree requirements. Because of accreditation requirements, aerospace studies (AES) or military science (MIS) courses are not accepted in the engineering technology majors.

ENGINEERING TECHNOLOGY CORE (ETC)

ETC 100 Languages of Technology. (4)

fall and spring

Introduces computer-aided design, programming, modeling, and technical documentation. Lecture, lab.

General Studies: CS

ETC 191 First-Year Seminar. (1–3)

selected semesters

ETC 194 Special Topics. (1–4)

selected semesters

ETC 211 Applied Engineering Mechanics: Statics. (3)

fall and spring

Vectors, forces and moments, force systems, equilibrium, analysis of basic structures and structural components, friction, centroids, and moments of inertia. Prerequisites: MAT 260; PHY 111, 113.

ETC 340 Applied Thermodynamics and Heat Transfer. (3)

fall and spring

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.

ETC 492 Honors Directed Study. (1–6)

selected semesters

ETC 493 Honors Thesis. (1–6)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

GLOBAL TECHNOLOGY AND DEVELOPMENT (GTD)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.

SECURITY ENGINEERING TECHNOLOGY (SET)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.

Department of Aeronautical Management Technology

eastair.east.asu.edu

480/727-1381

SIM 205

William K. McCurry, Chair

Professors: Gesell, McCurry

Associate Professors: Jackson, Karp, Turney

Assistant Professor: Pearson

Lecturers: O'Brien, Tripp

PURPOSE

Graduates are prepared for entry into the aviation and aerospace industry in productive, professional employment or, alternatively, for graduate study. Curricula emphasize principles underlying the application of technical knowledge as well as current technology, preparing the graduate to adapt to the rapid and continual changes in aviation and aerospace technology.

ADMISSION

New and transfer students who have been admitted to the university and who meet the requirements for admission to the College of Technology and Applied Sciences may be admitted without separate application to the Department of Aeronautical Management Technology only in the Bachelor of Applied Sciences concentrations or to the Bachelor of Science air transportation management concentration. Admission to the Bachelor of Science professional flight concentration requires an additional admission process. Transfer credits are reviewed by department faculty advisors. To be acceptable for department credit, transfer courses must be equivalent in both content and level of offering. No flight experience or theoretical training courses beyond the Private Pilot Certificate are accepted.

DEGREES

The faculty in the Department of Aeronautical Management Technology offer a B.S. degree in Aeronautical Management Technology with concentrations in professional flight and air transportation management. A B.A.S. degree in Applied Science is also offered with concentrations in aviation maintenance management technology and aviation management technology.

A Master of Science in Technology degree is offered for graduate study with concentrations in aviation management technology and aviation human factors. For more information, see the *Graduate Catalog*.

AERONAUTICAL MANAGEMENT TECHNOLOGY—B.S.

The Aeronautical Management Technology curricula are 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, aircraft performance and 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 two concentrations: professional flight and air transportation management, both of which have been accredited by the Council on Aviation Accreditation. The concentrations are described separately on the following pages.

All degree requirements are shown on curriculum check sheets for the concentrations that are available by visiting the department or by accessing the department Web site at eastair.east.asu.edu. Requirements include First-Year Composition, university General Studies (see "General Studies," page 85), and the Aeronautical Management Technology Core. Note that all three General Studies awareness areas are required. Consult an advisor for an approved list of courses. Refer to individual concentration degree requirements for additional required courses. Students must complete each Aeronautical Management Technology course with a grade of "C" or higher.

Aeronautical Management Technology Core

AMT 101 Introduction to Aeronautical Management Technology.....	1
AMT 182 Private Pilot Ground School	3
AMT 201 Air Traffic Control	3
AMT 220 Aviation Meteorology	3
AMT 280 Aerospace Structures, Materials, and Systems	4
AMT 287 Aircraft Powerplants	4
AMT 308 Air Transportation G	3
AMT 350 Aircraft Design, Performance, and Avionics	3
AMT 396 Aviation Professional	1
AMT 410 Aviation Safety and Human Factors	3
AMT 442 Aviation Law/Regulations.....	3
ETC 100 Languages of Technology CS	4
TWC 400 Technical Communications L	3
Total	38

Professional Flight Concentration

Flight training is certified by the Federal Aviation Administration. Students in the professional flight concentration must pass an FAA medical examination before flying solo. An FAA Class I medical examination is required for admission. It is recommended that a medical examination be completed by an aviation medical examiner of the student's choice before application for admission.

This program is designed for students who are seriously interested in becoming professional airline pilots. Because of limited space, the program selection process is

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See "General Studies," page 85.

COLLEGE OF TECHNOLOGY AND APPLIED SCIENCES

academically competitive. Only those applicants who meet the subject matter and quality requirements and who submit their applications by the appropriate deadlines will be considered for admission.

The ASU Professional Flight program is the initial phase of the qualification/application process to become an airline first officer. Individuals seeking admission to the program will need to participate in a secondary application process. The secondary process will assess a candidate's FAA-certified First Class medical qualification; driving record; work and/or personal references; and cognitive, psychomotor skill, and psychological test results. It will also include a personal interview. The secondary application deadlines are typically nine months before the beginning of the appropriate semester.

Total program costs, which include aircraft, flight instructor time, flight training devices, simulator time, tests, fees, and tuition, require careful financial planning. Students must make satisfactory progress throughout both the flight and academic areas to be considered for continued advancement in the program. To proceed at a satisfactory pace through the flight training program, students should expect and plan to fly during the winter intersession and the summer session to complete the program.

For more information, requirements, and specific application procedures, access the AMT Department Web site at eastair.east.asu.edu.

Flight instruction costs are not included in university tuition and fees. The estimated cost of flight training is \$45,000 in addition to normal university costs.

Degree Requirements

Professional flight students are required to complete 128 semester hours with a 2.00 cumulative GPA, including a minimum of 50 semester hours of upper-division courses. All degree requirements are shown on the student's curriculum check sheet.

Concentration Requirements

In addition to the required courses for First-Year Composition, university General Studies (see "General Studies," page 85), and the Aeronautical Management Technology core, the following additional courses are required for the professional flight management concentration:

AMT 100 Flight Safety I	1
AMT 200 Flight Safety II	2
AMT 214 Commercial/Instrument Ground School I.....	3
AMT 300 Flight Safety III.....	2
AMT 322 Commercial/Instrument Ground School II	3
AMT 382 Air Navigation	3
AMT 385 Flight Instructor Ground School.....	3
AMT 387 Multiengine Pilot Ground School	1
AMT 392 Flight Instructor Instrument Ground School.....	3
AMT 400 Flight Safety IV.....	1
AMT 408 National Aviation Policy	3
AMT 482 Airline Instrument Procedures	3
AMT 489 Airline Administration	3
AMT 496 Airline Aircraft Systems Capstone.....	3
ECN 111 Macroeconomic Principles <i>SB</i>	3
or ECN 112 Microeconomic Principles <i>SB</i> (3)	
PGS 101 Introduction to Psychology <i>SB</i>	3
STP 420 Introductory Applied Statistics <i>CS</i>	3

Technical electives or internship.....	6
Total	49

Suggested Course Pattern for Freshmen

First Semester

AMT 100 Flight Safety I	1
AMT 101 Introduction to Aeronautical Management Technology.....	1
AMT 182 Private Pilot Ground School	3
AMT 220 Aviation Meteorology	3
ENG 101 First-Year Composition.....	3
MAT 260 Technical Calculus I <i>MA</i>	3
Total	14

Second Semester

AMT 214 Commercial/Instrument Ground School I.....	3
AMT 322 Commercial/Instrument Ground School II	3
ENG 102 First-Year Composition	3
ETC 100 Languages of Technology <i>CS</i>	4
PHY 111 General Physics <i>SQ*</i>	3
PHY 113 General Physics Laboratory <i>SQ*</i>	1
Total	17

* Both PHY 111 and 113 must be taken to secure *SQ* credit.

Air Transportation Management Concentration

The air transportation management concentration is designed to prepare graduates for managerial and supervisory positions throughout the air transportation industry. An in-depth technical education is included along with broad exposure to business and management courses. This program of study is interdisciplinary in nature and prepares the aeronautical career-oriented student for positions such as air traffic control specialist, air carrier manager, airport manager, and general aviation operations manager.

Degree Requirements

Air transportation management students are required to complete 128 semester hours with a 2.00 cumulative GPA, including a minimum of 50 semester hours of upper-division courses. All degree requirements are shown on the student's curriculum check sheet.

Concentration Requirements

In addition to the required courses for First-Year Composition, university General Studies (see "General Studies," page 85), and the Aeronautical Management Technology core, the following additional courses are required in the airway science management concentration:

ACC 230 Uses of Accounting Information I.....	3
AMT 408 National Aviation Policy	3
AMT 444 Airport Management and Planning.....	3
AMT 489 Airline Administration	3
AMT 491 Aviation Management Capstone	3
ECN 111 Macroeconomic Principles <i>SB</i>	3
or ECN 112 Microeconomic Principles <i>SB</i> (3)	
IMC 346 Management Dynamics	3
ITM 343 Occupational Safety and Ergonomics.....	3
ITM 430 Ethical Issues in Technology.....	3
ITM 452 Industrial Human Resource Management.....	3
ITM 456 Introduction to Organized Labor	3
ITM 480 Organizational Effectiveness.....	3
PGS 101 Introduction to Psychology <i>SB</i>	3
STP 420 Introductory Applied Statistics <i>CS</i>	3

DEPARTMENT OF AERONAUTICAL MANAGEMENT TECHNOLOGY

Technical electives or internship.....	7
Total	49

Suggested Course Pattern for Freshmen

First Semester

AMT 101 Introduction to Aeronautical Management Technology.....	1
AMT 182 Private Pilot Ground School	3
AMT 220 Aviation Meteorology	3
ENG 101 First-Year Composition.....	3
MAT 260 Technical Calculus I <i>MA</i>	3
Total	13

Second Semester

ENG 102 First-Year Composition	3
ETC 100 Languages of Technology <i>CS</i>	4
PGS 101 Introduction to Psychology <i>SB</i>	3
PHY 111 General Physics <i>SQ*</i>	3
PHY 113 General Physics Laboratory <i>SQ*</i>	1
General Studies elective.....	3
Total	17

* Both PHY 111 and 113 must be taken to secure SQ credit.

APPLIED SCIENCE—B.A.S.

The Bachelor of Applied Science degree is a “capstone” degree for the Associate of Applied Science degree. The B.A.S. degree exposes students to advanced concepts and diverse critical thinking skills that prepare students for future career opportunities and professional advancement.

Admission

Admission to the B.A.S. degree program is restricted to students holding an A.A.S. degree from a regionally accredited U.S. postsecondary educational institution. A GPA of 2.00 or higher is required for all resident applicants and a 2.50 for nonresident applicants.

Degree Requirements

The B.A.S. degree in the College of Technology and Applied Sciences consists of 60 semester hours of upper-division (300 level and above) courses, with 30 hours in residence.

A.A.S. degree.....	60
Assignable credit.....	6
B.A.S. core.....	15
General Studies	19
Technical concentration	20
Total	120

General Studies Curriculum

The B.A.S. curriculum builds on the general education content of the A.A.S. degree. Additional General Studies (L, CS, and awareness areas) are met with courses in the core concentration. General Studies courses focus on contextual learning.

L.....	3
MA.....	3
HU.....	3
HU or SB	3
SB.....	3

SG	4
Total	19

Assignable Credit

Assignable credit allows space in the curriculum for prerequisite courses needed to succeed in the program. The courses are determined by the student and the advisor.

B.A.S. Core

The area core is focused on management and organization, professional communication, quantitative analysis, and computer competency.

GIT 335 ST: Computer Systems Technology.....	3
IMC 346 Management Dynamics	3
or ITM 344 Industrial Organization (3) or ITM 452 Industrial Human Resource Management (3)	
IMC 470 Project Management	3
STP 420 Introductory Applied Statistics <i>CS</i>	3
TWC 400 Technical Communications <i>L</i>	3
Total	15

Technical Concentrations

Aviation Maintenance Management Technology. This concentration is for those students who have completed an airframe and powerplant certification as part of their A.A.S. degree. Students receive an orientation in management practices that prepares them for progressively more responsible positions in the field of aviation maintenance management.

Aviation Management Technology. This concentration is for those students who have received training and education in some aspect of the air transportation industry (other than aviation maintenance), such as flight certificates and ratings as part of their A.A.S. degree. Students receive an orientation in management practices that prepares them for progressively more responsible positions in the field of aviation management.

STUDENT ORGANIZATIONS

The department hosts the local chapter of Alpha Eta Rho, an international professional aviation fraternity open to all students with an interest in aviation. The American Association for Airport Executives is open to all students with an interest in airport management. The Student Advisory Council is a leadership organization that facilitates student communication with faculty, departmental leaders, and university administrative personnel. The Precision Flight Team competes in regional and national flying safety competitions. The Women in Aviation International organization is open to all students.

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See “General Studies,” page 85.

AERONAUTICAL MANAGEMENT TECHNOLOGY (AMT)

AMT Note 1. Flight instruction costs are not included in university tuition and fees.

AMT 100 Flight Safety I. (1)

fall, spring, summer

Supervised private pilot flight training and flight safety briefings. Requires continuous enrollment until completion of the FAA Private Pilot Certificate. Lecture, lab. Fee. See AMT Note 1. Pre- or corequisites: both AMT 182 and 220 (or their equivalents).

AMT 101 Introduction to Aeronautical Management Technology. (1)

fall and spring

Facilitates entry into Aeronautical Management Technology programs. Emphasizes *General Catalog* and concentration requirements, registration, careers, and ASU East facilities.

AMT 182 Private Pilot Ground School. (3)

fall, spring, summer

Ground school preparation for Private Pilot Certificate. Aerodynamics, navigation, performance, and regulations. Lecture, lab. Corequisite: AMT 220.

AMT 194 Special Topics. (1-4)

selected semesters

AMT 200 Flight Safety II. (2)

fall, spring, summer

Supervised commercial instrument flight training and safety briefings. Requires continuous enrollment until completion of FAA Commercial Pilot Certificate with Instrument Rating. Lecture, lab. Fee. See AMT Note 1. Prerequisites: AMT 100; Private Pilot Certificate. Pre- or corequisite: AMT 214 or 322.

AMT 201 Air Traffic Control. (3)

fall

Ground and air operations; weather services communications and routing; flight plans, IFR operations, departures and arrivals; and airport conditions and emergencies. Prerequisite: AMT 182.

AMT 214 Commercial/Instrument Ground School I. (3)

fall and spring

Ground school leading to FAA Instrument Pilot Rating/Commercial Pilot Certificate (part 1 of 2). 10 hours ground trainer included. Lecture, lab. Fee. Pre- or corequisites: AMT 182, 220.

AMT 220 Aviation Meteorology. (3)

fall, spring, summer

Evaluation, analysis, and interpretation of atmospheric phenomena. Low- and high-altitude weather from the pilot's viewpoint. Corequisite: AMT 182.

AMT 280 Aerospace Structures, Materials, and Systems. (4)

fall

Basic aerodynamics, incompressible/compressible airflow, wind tunnel testing, wing theory; analysis of aircraft structures; properties and applications of materials, and aircraft systems. Lecture, lab. Fee. Prerequisites: PHY 111, 113.

AMT 287 Aircraft Powerplants. (4)

spring

Theory and performance analysis of gas turbine and reciprocating aircraft engines. Engine accessories, systems, and environmental control. Lecture, lab. Prerequisites: PHY 111, 113.

AMT 300 Flight Safety III. (2)

fall, spring, summer

Supervised instructor flight training and safety briefings. Requires continuous enrollment until completion of FAA Flight Instructor Certificate with Instrument Instructor Rating. Lecture, lab. Fee. See AMT Note 1. Prerequisite: AMT 200. Pre- or corequisite: AMT 385.

AMT 308 Air Transportation. (3)

fall

Studies the historical and international development of air transportation and its social, political, and economic impact upon global interrelationships. Prerequisite: junior standing.

General Studies: G

AMT 322 Commercial/Instrument Ground School II. (3)

fall and spring

Ground school leading to FAA Instrument Pilot Rating/Commercial Pilot Certificate (part 2 of 2). 10 hours ground trainer included. Lecture, lab. Fee. Prerequisite: AMT 100 or instructor approval. Pre- or corequisite: AMT 214.

AMT 350 Aircraft Design, Performance, and Avionics. (3)

spring

Fundamentals of aircraft design, turboprop and turbojet performance, principles of electricity, AC/DC circuits, and operation of transport category aircraft avionics systems. Lecture, lab. Prerequisites: AMT 280, 287.

AMT 360 Introduction to Helicopter Technology. (3)

selected semesters

Introduces the working functions of modern rotary wing aircraft, rotary wing flight theory, aerodynamics, controls, flight, and power requirements. Prerequisites: PHY 111, 113.

AMT 370 Air Freight Operations. (3)

selected semesters

Air freight operations in National Aviation System; ramp operations, loading, weight and balance, and administration of airside and ground-side operations. Prerequisite: junior standing.

AMT 382 Air Navigation. (3)

spring

Theory and application of modern advanced navigation and flight instrument systems. Introduces crew resource management in multi-place cockpits. Lecture, lab. Prerequisite: AMT 322. Pre- or corequisite: AMT 200 or instructor approval.

AMT 385 Flight Instructor Ground School. (3)

fall and spring

Ground school in preparation for the FAA Flight Instructor Certificate. Lecture, lab. Pre- or corequisite: AMT 200.

AMT 387 Multiengine Pilot Ground School. (1)

fall and spring

Ground school preparation for the FAA Multiengine Rating. Lecture, lab. Fee. See AMT Note 1. Prerequisite: AMT 200 or instructor approval.

AMT 391 Multiengine Instructor Ground School. (2)

selected semesters

Ground school preparation for the FAA Multiengine Flight Instructor Rating. Lecture, lab. See AMT Note 1. Prerequisites: AMT 300, 387, 400.

AMT 392 Flight Instructor Instrument Ground School. (3)

fall and spring

Ground school preparation for the FAA Instrument Flight Instructor Rating. Lecture, lab. See AMT Note 1. Prerequisites: AMT 200, 385.

AMT 395 Multiengine Land, Airplane Flight Instructor Rating. (1)

selected semesters

Normal and emergency flight operations. Instruction techniques and procedures for light multiengine land, airplane. Requires CFIAME Rating for course completion. Lecture, lab. See AMT Note 1. Prerequisite: AMT 391.

AMT 396 Aviation Professional. (1)

fall and spring

Career focus for management and flight students, including internships, résumé writing, interviews, and employment search in aviation industry. Prerequisite: junior standing.

AMT 400 Flight Safety IV. (1)

fall, spring, summer

Multiengine and crew training and safety briefings. Requires continuous enrollment until completion of rating and multicrew training. Lecture, lab. Fee. See AMT Note 1. Prerequisite: AMT 300. Pre- or corequisite: AMT 387.

AMT 408 National Aviation Policy. (3)

fall

Examines aviation and airspace policies and policy process, including agencies involved in formulation, implementation, and evaluation of aviation policy. Prerequisite: junior standing.

AMT 410 Aviation Safety and Human Factors. (3)

fall

Aviation accident prevention, human factors, life support, fire prevention, accident investigation, and crash survivability. Development and

analysis of aviation safety programs. Prerequisites: junior standing; completion of 1 semester of General Studies L requirement.

AMT 412 Air Transportation Research. (1)

fall

Surveys practical research methodology in use in the air transportation industry. Topics include planning and design considerations.

AMT 419 Aviation Logistical Management. (3)

spring

Surveys FAA requirements for personnel and facilities. Topics include parts supply, quality control, product liability, pricing, profitability, and administration. Lecture, lab. Prerequisite: junior standing.

AMT 442 Aviation Law/Regulations. (3)

fall

Aviation within context of U.S. Common Law system. Public law, administrative rule making, sovereignty, enforcement, and case law analysis. Prerequisite: junior standing.

AMT 444 Airport Management and Planning. (3)

spring

Orientation to administration and management of modern public airports, including overview of planning, funding, and development of airport facilities. Prerequisite: junior standing.

AMT 482 Airline Instrument Procedures. (3)

fall

Advanced instrument flight using airline instrument procedures and airline crew and cockpit resource management. Lecture, lab. Prerequisites: a combination of AMT 200 and 322 and 382 or only instructor approval.

AMT 484 Aeronautical Internship. (1–12)

fall, spring, summer

Work experience assignment with aerospace industry commensurate with student's program. Special project guidance by industry with university supervision. Prerequisites: advisor approval; junior standing.

AMT 489 Airline Administration. (3)

spring

Administrative organizations, economics of airline administration, operational structure, and relationship with federal government agencies. Prerequisite: junior standing.

AMT 490 Regional Jet Operations. (3)

fall and spring

Regional jet aircraft systems and flight procedures. Includes theoretical education for regional airline commercial passenger operations. Lecture, lab. Prerequisites: professional pilot major; instructor approval.

AMT 491 Aviation Management Capstone. (3)

spring

Integration and overview of management tools, current business problems and topics related to aviation industry. Group project with industry and government and business partners. Prerequisite: senior standing.

AMT 494 Special Topics. (1–4)

selected semesters

AMT 496 Airline Aircraft Systems Capstone. (3)

spring

Commercial airline aircraft systems and flight procedures. Includes theoretical education for large, commercial passenger aircraft. Lecture, lab. Prerequisite: senior standing.

AMT 498 Pro-Seminar. (1–7)

selected semesters

AMT 499 Individualized Instruction. (1–3)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.

Department of Electronics and Computer Engineering Technology

www.east.asu.edu/ctas/ecet

480/727-1029

TECH 101

Timothy E. Lindquist, Chair

Professors: Lindquist, McHenry, Munukutla, Robertson

Associate Professors: Koehnemann, Macia, Millard, Sundararajan, Zeng

Assistant Professor: Gannod

Senior Lecturer: Whitehouse

PURPOSE

The Department of Electronics and Computer Engineering Technology prepares graduates to apply scientific and engineering knowledge, methods, and techniques in support of technological applications in electronics and computer engineering activities and processes.

The engineering technology curriculum is applications oriented and builds upon a background of applied science and mathematics, including the concepts and applications of calculus. Graduates are prepared to produce practical, workable, and safe solutions to technologically challenging problems. Graduates are employed in the electronics and computer industries with responsibilities such as designing, installing and operating technical systems, analyzing and (re) engineering systems that embed computer hardware and software for unique applications, developing and producing products, managing manufacturing processes, and providing customer support for technical products and systems.

DEGREES

The faculty in the Department of Electronics and Computer Engineering Technology offer the B.S. degree in Electronics Engineering Technology (B.S./EET) and the B.S. degree in Computer Engineering Technology (B.S./CET).

For students holding an A.A.S. degree, the department offers the B.A.S. degree with a major in Applied Science. Five concentrations are available: computer systems administration, instrumentation, microcomputer systems, semiconductor technology, and software technology applications.

A Master of Science in Technology degree program with concentrations in electronics engineering technology, computer systems engineering technology, instrumentation and

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See "General Studies," page 85.

COLLEGE OF TECHNOLOGY AND APPLIED SCIENCES

measurement technology, and microelectronics engineering technology is available for qualified B.S. graduates. See the *Graduate Catalog* for more information.

Electronics Engineering Technology—B.S.

Students interested in the B.S. degree in Electronics Engineering Technology may choose to specialize in one of the following three concentrations: electronic systems, microelectronics, and telecommunications.

The *electronic systems* concentration is aimed at preparing persons for careers in control, electronics, instrumentation, and power systems applications. This concentration allows a student to develop a broad-based knowledge of electrical/electronic fundamentals with an applications perspective.

The *microelectronics (UET)* concentration combines applied electronics, monolithic and hybrid integrated circuit processing and applications, device and component fabrication, and manufacturing. The objective of this concentration is to prepare persons to assume positions in the area of microelectronics manufacturing with immediately applicable knowledge as well as to develop a strong foundation of electronic fundamentals and methods. Graduates of this concentration secure positions in processing, manufacturing operations, and applications areas in industry as members of the diverse scientific engineering team.

The *telecommunications* concentration encompasses the fundamentals of information and signal processing, modern bandwidth-efficient digital radio analysis with RF and microwave circuits and systems. Applications include telephone pulse code modulation, cable TV, fiber optic links, and satellite transmission circuits and systems.

The departmental curriculum is organized into two categories, technical studies and General Studies. Technical studies consist of core areas and the concentration specialty area. General Studies consist of courses selected to meet the university General Studies requirement (see “General Studies,” page 85) as well as the math/science requirement of TAC of ABET. Note that all three General Studies awareness areas are required. Consult an advisor for an approved list of courses.

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. A minimum of 128 semester hours with a 2.00 cumulative GPA is required for graduation. Complete program of study guides with typical four-year patterns are available from the department.

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 the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, the professional accrediting agency for such curricula.

ELECTRONICS ENGINEERING TECHNOLOGY—B.S. DEGREE REQUIREMENTS

In addition to the courses listed for First-Year Composition and university General Studies, the following courses are required.

Engineering Technology Core

The following courses are required as part of the engineering technology core:

ETC 100 Languages of Technology CS	4
ETC 211 Applied Engineering Mechanics: Statics	3
ETC 340 Applied Thermodynamics and Heat Transfer	3
Total	10

Electronics Engineering Technology Core and Major Requirements

CET 100 Object-Oriented Software Development I	3
CET 150 Digital Systems I CS	4
CET 250 Digital Systems II	4
CET 354 Microcomputer Architecture and Programming	4
EET 208 Electric Circuit Analysis I	4
EET 301 Electric Circuit Analysis II	4
EET 310 Electronic Circuits I	4
EET 372 Communication Systems	4
EET 396 Professional Orientation*	1
EET 407 Energy Conversion and Applications	4
EET 410 Electronic Circuits II	4
UET 331 Electronic Materials	3
UET 415 Electronic Manufacturing Engineering Principles	3
Total	46

* Students must take EET 396 the semester in which they are enrolled in the 87th hour of credit (ASU plus transfer hours). If the 87th hour occurs in summer session, students should take EET 396 the prior spring semester.

Electronics Engineering Technology Concentrations

Electronic Systems

CET 383 Shell and Script Programming with UNIX	3
EET 406 Control System Technology	4
EET 430 Instrumentation Systems	4
EET 460 Power Electronics	4
Approved technical electives	7
Total	22

Microelectronics

CHM 116 General Chemistry SQ	4
UET 416 Dopant Control Technology	3
UET 417 Monolithic Integrated Circuit Laboratory	2
UET 418 Systems on Silicon	4
UET 421 IC Device Characterization	3
UET 432 Semiconductor Packaging and Heat Transfer	3
Approved technical elective	3
Total	22

Telecommunications

CET 473 Digital/Data Communications	4
EET 304 Transmission Lines in Computer Networks	3
EET 401 Digital Signal Processing for Multimedia	3
EET 470 Communication Circuits	4
Approved technical electives	7
Total	21

DEPARTMENT OF ELECTRONICS AND COMPUTER ENGINEERING TECHNOLOGY

Electronics Engineering Technology
Program of Study
Typical First- and Second-Year Sequence

First Year

First Semester

CET 150 Digital Systems I <i>CS</i>	4
ENG 101 First-Year Composition	3
MAT 170 Precalculus <i>MA</i>	3
PHY 111 General Physics <i>SQ</i> ¹	3
PHY 113 General Physics Laboratory <i>SQ</i> ¹	1
Total	14

Second Semester

ENG 102 First-Year Composition	3
ETC 100 Languages of Technology <i>CS</i>	4
MAT 260 Technical Calculus I <i>MA</i>	3
PHY 112 General Physics <i>SQ</i> ²	3
PHY 114 General Physics Laboratory <i>SQ</i> ²	1
HU, SB, or awareness area course	3
Total	17

Second Year

First Semester

CET 256 C Programming for Engineering Technology	3
CHM 113 General Chemistry <i>SQ</i>	4
ECN 111 Macroeconomic Principles <i>SB</i>	3
EET 208 Electric Circuit Analysis I	4
MAT 261 Technical Calculus II <i>MA</i>	3
Total	17

Second Semester

EET 301 Electric Circuit Analysis II	4
ETC 211 Applied Engineering Mechanics: Statics	3
MAT 262 Technical Calculus III <i>MA</i>	3
L1 course	3
HU, SB, or awareness area course	3
Total	16

¹ Both PHY 111 and 113 must be taken to secure *SQ* credit.

² Both PHY 112 and 114 must be taken to secure *SQ* credit.

COMPUTER ENGINEERING TECHNOLOGY—
B.S. DEGREE REQUIREMENTS

Students interested in the B.S. degree in Computer Engineering Technology (B.S./CET) may choose to specialize in one of the following three concentrations: computer hardware technology, embedded systems technology, and software technology.

The *computer hardware technology* concentration is designed to provide students with an opportunity to develop broad-based knowledge and skills in digital systems, interfacing techniques and computer hardware applications.

The *embedded systems technology* concentration prepares students for the application, interconnection, design, analysis, and realization of systems that involve both software and hardware components. This concentration balances the hardware concerns of computer engineering with the processes and technologies involved in producing reliable software solutions.

The *software technology* concentration prepares students for careers in software applications in the context of an industry in which software solutions are increasingly dis-

tributed, using object-oriented languages and frameworks, and in which the Internet, Web and wireless technologies play an important role.

Each student must satisfy the courses listed for First-Year Composition and the university General Studies requirement. In addition, the following courses are required.

Lower-Division Core

CET 100 Object-Oriented Software Development I	3
CET 150 Digital Systems I <i>CS</i>	4
CET 200 Object-Oriented Software Development II	3
EET 208 Electric Circuit Analysis I	4
ETC 100 Languages of Technology <i>CS</i>	4
Core total	18

Major

CET 326 Programming Languages for Technology with C/C++ and Visual BASIC	4
CET 354 Microcomputer Architecture and Programming	4
CET 364 Computer Architecture	3
CET 383 Shell and Script Programming with UNIX	3
EET 396 Professional Orientation	1
UET 415 Electronic Manufacturing Engineering Principles	3
Total	18

Computer Hardware Technology Concentration

CET 350 Digital Systems II	4
CET 452 Digital Logic Applications	4
CET 456 Assembly Language Applications	3
CET 458 Digital Computer Networks	3
CET 473 Digital/Data Communications	4
CET 486 Hardware Description Languages: VHDL	3
EET 301 Electric Circuit Analysis II	4
EET 310 Electronic Circuits I	4
EET 372 Communication Systems	4
EET 401 Digital Signal Processing for Multimedia	3
Technical electives	9
Total	45

Embedded Systems Technology Concentration

CET 230 Applied Data Structures	3
CET 350 Digital Systems II	4
CET 386 Operating Systems Principles	3
CET 420 Foundations of Distributed Web-Based Applications in Java	3
CET 452 Digital Logic Applications	4
CET 456 Assembly Language Applications	3
CET 458 Digital Computer Networks	3
or CET 459 Internet Networking Protocols (3)	
CET 486 Hardware Description Languages: VHDL	3
EET 301 Electric Circuit Analysis II	4
EET 401 Digital Signal Processing for Multimedia	3
Technical electives	12
Total	45

Software Technology Concentration

CET 230 Applied Data Structures	3
CET 386 Operating Systems Principles	3
CET 400 Software Engineering Technology	3
CET 420 Foundations of Distributed Web-Based Applications in Java	3

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See “General Studies,” page 85.

COLLEGE OF TECHNOLOGY AND APPLIED SCIENCES

Choose two of the following courses.....	6
CET 425 Server Software Programming (3)	
CET 427 Distributed Objects with Java and CORBA (3)	
CET 428 Web-Client User Interface Programming (3)	
CET 441 Software for Personal Digital Assistants (3)	
CET 433 Database Technology	3
CET 459 Internet Networking Protocols.....	3
CET 488 Systems Administration of UNIX.....	3
CET 489 Network Administration with TCP/IP.....	3
Technical electives	15
Total	45

Computer Engineering Technology Program of Study Typical First- and Second-Year Sequence

First Year

First Semester

ENG 101 First-Year Composition.....	3
ETC 100 Languages of Technology <i>CS</i>	4
MAT 170 Precalculus <i>MA</i>	3
PHY 111 General Physics <i>SQ</i> ¹	3
PHY 113 General Physics Laboratory <i>SQ</i> ¹	1
Total	14

Second Semester

CET 100 Object-Oriented Software Development I	3
ENG 102 First-Year Composition.....	3
MAT 260 Technical Calculus I <i>MA</i>	3
PHY 112 General Physics <i>SQ</i> ²	3
PHY 114 General Physics Laboratory <i>SQ</i> ²	1
Total	13

Second Year

First Semester

CET 150 Digital Systems I <i>CS</i>	4
CET 200 Object-Oriented Software Development II	3
CHM 113 General Chemistry <i>SQ</i>	4
ECN 111 Macroeconomic Principles <i>SB</i>	3
MAT 261 Technical Calculus II <i>MA</i>	3
Total	17

Second Semester

CET 230 Applied Data Structures	3
CET 350 Digital Systems II	4
CET 383 Shell and Script Programming with UNIX.....	3
EET 208 Electric Circuit Analysis I.....	4
MAT 243 Discrete Mathematical Structures	3
or MAT 262 Technical Calculus III <i>MA</i> (3)	
Total	17

¹ Both PHY 111 and 113 must be taken to secure *SQ* credit.

² Both PHY 112 and 114 must be taken to secure *SQ* credit.

APPLIED SCIENCE—B.A.S.

The Bachelor of Applied Science degree is a “capstone” degree for the Associate of Applied Science degree. The B.A.S. degree exposes students to advanced concepts and diverse critical thinking skills that prepare them for future career opportunities and professional advancement.

Admission

Admission to the B.A.S. degree program is restricted to students holding an A.A.S. degree from a regionally accredited

U.S. postsecondary educational institution. A GPA of 2.00 or higher is required for all resident applicants and a 2.50 for nonresident applicants.

Degree Requirements

The B.A.S. degree in the College of Technology and Applied Sciences consists of 60 semester hours of upper-division (300-level and above) courses, with 30 semester hours in residence.

A.A.S. degree	60
Assignable credit.....	6
B.A.S. core.....	15
General Studies	19
Technical concentration	20
Total	120

General Studies Curriculum

The B.A.S. curriculum builds on the general education content of the A.A.S. degree. Additional General Studies (L, CS, and awareness areas) are met with courses in the core or concentration. General Studies courses focus on contextual learning.

L	3
MA	3
HU	3
HU or SB	3
SB	3
SG	4
Total	19

Assignable Credit

Assignable credit allows space in the curriculum for prerequisite courses needed to succeed in the program. The courses are determined by the student and the advisor.

B.A.S. Core

The area core focuses on management and organization, professional communication, quantitative analysis, and computer competency. The B.A.S. core consists of five courses and varies depending upon concentration.

Software Technology Applications Core

CET 354 Microcomputer Architecture and Programming	4
CET 386 Operating Systems Principles	3
EET 494 ST: Data Analysis.....	3
IMC 346 Management Dynamics	3
TWC 400 Technical Communications <i>L</i>	3
Total	16

Technical Concentrations

Computer Systems Administration. This concentration is designed to broaden and provide more in-depth knowledge in computer administration. Graduates from this concentration will be prepared to specify, install, maintain, and administer various computer and networking systems.

Instrumentation. This concentration studies instrumentation, power systems, and computer systems. The curriculum prepares the graduate to specify and prepare solutions for a wide variety of electrical and electronic instrumentation systems. Graduates from this concentration are primed for

DEPARTMENT OF ELECTRONICS AND COMPUTER ENGINEERING TECHNOLOGY

technical leadership positions in the various segments of the electronics industry.

Microcomputer Systems. This concentration prepares graduates for product specification and marketing positions in microcomputer applications. The B.A.S. degree provides additional technical skills in microcomputer systems to prepare graduates for responsible and productive positions in the support of computer systems.

Semiconductor Technology. This concentration prepares graduates for careers in the semiconductor industry. The B.A.S. degree provides graduates with an understanding of integrated circuit processing, mask making, packaging, and the software tools used in this industry.

Software Technology Applications. This concentration prepares graduates for careers in the software industry. The B.A.S. degree furnishes additional technical expertise in software technology to prepare graduates to design, specify, and provide software solutions for industry and the consumer market.

COMPUTER ENGINEERING TECHNOLOGY (CET)

CET 100 Object-Oriented Software Development I. (3)

fall

Basic concepts of object-oriented analysis, design, and programming using Java. Basic Java variables, expressions, arrays, statements, methods, and classes. Prerequisite: ETC 100.

CET 150 Digital Systems I. (4)

fall and spring

Number systems, Boolean algebra, combinational logic, K-maps, flip-flops, sequential circuits, state machines, and minimization techniques.

General Studies: CS

CET 191 First-Year Seminar. (1–3)

selected semesters

CET 200 Object-Oriented Software Development II. (3)

fall and spring

Object modeling with class and interaction diagrams; inheritance and run-time binding; introduces frameworks with Java collections and windowing. Prerequisite: CET 100.

CET 230 Applied Data Structures. (3)

fall

Introduces data structures: strings, stacks, queues, binary trees, recursion, searching, and sorting. Prerequisite: CET 200.

CET 256 C Programming for Engineering Technology. (3)

fall, spring, summer

Applied and practical problem solving using the C programming language. Prerequisite: ETC 100.

CET 294 Special Topics. (1–4)

selected semesters

CET 326 Programming Languages for Technology with C/C++ and Visual BASIC. (4)

fall and spring

Programming language design and implementation concepts through programming C/C++, Visual BASIC; execution, run-time management, data control, pointers, templates, multiple inheritance. Lecture, lab. Prerequisites: CET 150, 200.

CET 350 Digital Systems II. (4)

fall

Analysis and design of synchronous and asynchronous state machines. Introduces VHDL. Lecture, lab. Prerequisite: CET 150.

CET 354 Microcomputer Architecture and Programming. (4)

fall and spring

Microcomputer architecture, assembly language programming, I/O considerations, exception and interrupt handling. Introduces interfacing. Prerequisite: CET 150.

CET 364 Computer Architecture. (3)

fall

Processor performance, RISC/CISC, processor design and implementation, basic pipelining, memory hierarchy, I/O. Prerequisite: CET 200, 354.

CET 383 Shell and Script Programming with UNIX. (3)

fall and spring

UNIX operating system programming of shells, environment and 4th-generation languages and tools, such as sed, awk, perl, grep, make. Prerequisite: CET 100 or 256.

CET 386 Operating Systems Principles. (3)

spring

Fundamentals of operating systems, process management, scheduling and synchronization techniques, memory and file management, protection and security issues. Prerequisite: CET 256.

CET 400 Software Engineering Technology. (3)

spring

Software life-cycle models; project management; team development environments; software specification, design, implementation techniques and tools, validation, and maintenance; user documentation. Prerequisite: CET 326.

CET 401 Digital Signal Processing for Multimedia. (3)

fall

Applies DSP techniques to multimedia. Digital filter analysis and design. Time and frequency techniques. Computer applications. Cross-listed as EET 401. Credit is allowed for only CET 401 or EET 401. Prerequisites: EET 301; MAT 262.

CET 415 Applied Software Process. (3)

fall and spring

Applies software processes using Rational's Unified Process (RUP) and eXtreme Programming (XP), iterative and architecture-centric development. Credit is allowed for only CET 415 or 515. Prerequisite: CET 400.

CET 420 Foundations of Distributed Web-Based Applications in Java. (3)

fall and spring

Principles underlying design and implementation of distributed software components; sockets, protocols, threads, XML, serialization, reflection, security, and events. Prerequisites: CET 230, 386.

CET 425 Server Software Programming. (3)

once a year

Design and implementation of software servers, threaded socket servers, servers for distributed Web-based applications; security for the Web. Prerequisite: CET 420 or instructor approval.

CET 427 Distributed Objects with Java and CORBA. (3)

spring

Managing network objects with RMI and CORBA; frameworks for naming, discovering, and invocation, such as JNDI, JINI, and JavaSpaces. Prerequisite: CET 420 or instructor approval.

CET 428 Web-Client User Interface Programming. (3)

fall

Client-server model for window interfaces. Java Swing, Applets, markup and scripting languages; Web tools and related technologies. Prerequisite: CET 420 or instructor approval.

CET 433 Database Technology. (3)

fall

Introduces database technologies and DBMS, data models, and languages. Prerequisites: CET 230, 326.

CET 441 Software for Personal Digital Assistants. (3)

fall

Mobile computing using Java's K, Virtual Machine, MIDP for wireless applications; user interfaces, persistent data storage, and networking. Prerequisite: CET 420.

CET 452 Digital Logic Applications. (4)

spring

Design of sequential machines using system design techniques and complex MSI/LSI devices with lab. Prerequisite: CET 350.

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See "General Studies," page 85.

COLLEGE OF TECHNOLOGY AND APPLIED SCIENCES

CET 456 Assembly Language Applications. (3)

fall

Programming using BIOS and DOS routines. High-level language interfacing. Disk operations, TSR routines, and device drivers. Prerequisite: CET 354.

CET 457 Microcomputer Systems Interfacing. (4)

spring

Applications of microcomputer hardware and software. Special purpose controllers, interface design. Lecture, lab. Prerequisites: CET 354; EET 310.

CET 458 Digital Computer Networks. (3)

spring

Network hardware and software, topologies, protocols, OSI model, LANs, WANs Internet; basic concepts of packet switching, routing, error controlling. Prerequisites: CET 354; EET 372.

CET 459 Internet Networking Protocols. (3)

fall

Computer networking for application, transmission control and network layers using the Internet protocols as a model; reliability and security. Prerequisites: CET 200 (or 256), 354.

CET 473 Digital/Data Communications. (4)

fall

Signals, distortion, noise, and error detection/correction. Transmission and systems design. Interface techniques and standards. Lecture, lab. Prerequisites: CET 354; EET 372.

CET 484 Internship. (1-3)

selected semesters

CET 486 Hardware Description Languages: VHDL. (3)

spring

Introduces hardware description languages using VHDL. Techniques for modeling and simulating small digital systems using a VHDL simulator. Prerequisites: CET 350, 383.

CET 488 Systems Administration of UNIX. (3)

fall

Administration of UNIX, its processes, system calls, kernel, file structure, and interprocess communication using command line tools. Lecture, lab. Prerequisites: CET 383, 386.

CET 489 Network Administration with TCP/IP. (3)

spring

Writing C programs and shell scripts to create, control, and administer computer networks. Installation and maintenance of computer networks. Prerequisites: CET 383, 459.

CET 490 Reading and Conference. (1-12)

selected semesters

CET 492 Honors Directed Study. (1-3)

selected semesters

CET 493 Honors Thesis. (1-6)

selected semesters

CET 494 Special Topics. (1-4)

selected semesters

Topics may include the following:

- Computer Project

CET 498 Pro-Seminar. (1-3)

selected semesters

CET 499 Individualized Instruction. (1-3)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.

ELECTRONICS ENGINEERING TECHNOLOGY (EET)

EET 191 First-Year Seminar. (1-3)

selected semesters

EET 208 Electric Circuit Analysis I. (4)

fall and spring

Electrical models, AC/DC steady-state analysis of first and second order systems. Circuit theorems. Three-phase circuits. Lecture, lab. Pre- or corequisite: MAT 261.

EET 294 Special Topics. (1-4)

selected semesters

EET 301 Electric Circuit Analysis II. (4)

fall and spring

Analysis of continuous-time signals and linear systems of using Laplace and Fourier response of circuits. Lecture, lab. Prerequisite: EET 208. Pre- or corequisite: MAT 262.

EET 304 Transmission Lines in Computer Networks. (3)

spring

Theory and application of transmission lines in high-speed computer networks. Signal propagation and impedance matching. Lecture, lab, computer labs. Prerequisite: EET 301.

EET 310 Electronic Circuits I. (4)

fall and spring

Multistage amplifier, analysis, and design using models and computer simulation. Lecture, lab. Prerequisite: EET 208.

EET 372 Communication Systems. (4)

fall and spring

Systems analysis and design of AM, FM, PCM, and SSB communication systems. Noise and distortion performance of communication systems. Lecture, lab. Pre- or corequisites: EET 301, 310.

EET 394 Special Topics. (1-4)

selected semesters

EET 396 Professional Orientation. (1)

fall and spring

Technical, professional, economic, and ethical aspects of electronics/computer engineering technology practice and industrial organization. Lecture, projects. Prerequisite: junior standing.

EET 401 Digital Signal Processing for Multimedia. (3)

fall

Applies DSP techniques to multimedia. Digital filter analysis and design. Time and frequency techniques. Computer applications. Cross-listed as CET 401. Credit is allowed for only CET 401 or EET 401. Prerequisites: EET 301; MAT 262.

EET 403 PLCs, Sensors, and Actuators. (3)

spring

Applications, programming, and troubleshooting using PLCs. Interfacing to motors, sensors, and actuators. Fluid power principles. Lecture, lab, projects. Prerequisite: EET 208 (or equivalent electrical science course).

EET 406 Control System Technology. (4)

spring

Control system components, analysis of feedback control systems, stability, performance, and application. Lecture, lab, computer simulations. Prerequisites: EET 301; MAT 262.

EET 407 Energy Conversion and Applications. (4)

fall

Electricity, magnetism, mechanics, heat and units, and three-phase circuits. Electrical machines, transformers, generation, transmission, and distribution of electrical energy. Lecture, lab. Prerequisite: EET 208.

EET 410 Electronic Circuits II. (4)

fall and spring

Analysis and design of OP-amps, power amplifiers, and digital logic families. Feedback design using frequency response. Computer analysis and design. Lecture, lab. Prerequisites: EET 301, 310.

EET 422 Electronic Switching Circuits. (4)

once a year

Analysis and design of electronic circuits operating in a switching mode. Waveshaping, timing, and logic. Computer simulation. Lecture, lab. Prerequisites: CET 350; EET 301, 310.

EET 430 Instrumentation Systems. (4)

fall

Measurement principles and instrumentation, techniques. Signal and error analysis. Lecture, lab. Prerequisites: EET 301, 310.

DEPARTMENT OF ELECTRONICS AND COMPUTER ENGINEERING TECHNOLOGY

EET 460 Power Electronics. (4)

spring

Analyzes circuits for control and conversion of electrical power and energy. Lecture, lab. Prerequisites: EET 301, 310, 407.

EET 470 Communication Circuits. (4)

spring

Analysis and design of passive and active communication circuits. Coupling networks, filters, and impedance matching. Modulation and demodulation techniques. Computer solutions. Lecture, lab. Prerequisites: EET 372; MAT 262.

EET 482 Industrial Practice: Internship/Co-op. (1–4)

fall, spring, summer

Specially assigned or approved activities in electronic industries or institutions. Requires report. May be repeated for up to a maximum of 10 credits. Prerequisites: Electronics Engineering Technology major; junior or senior standing.

EET 484 Internship. (1–3)

selected semesters

EET 490 Electronics Project. (1–4)

fall, spring, summer

Individual or small group projects in applied electronics, with emphasis on laboratory practice or hardware solutions to practical problems. Prerequisite: instructor approval.

EET 492 Honors Directed Study. (1–3)

selected semesters

EET 493 Honors Thesis. (1–6)

selected semesters

EET 494 Special Topics. (1–4)

fall and spring

Topics may include the following:

- Data Analysis. (3)

EET 498 Pro-Seminar. (1–3)

selected semesters

EET 499 Individualized Instruction. (1–3)

selected semesters

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MICROELECTRONICS ENGINEERING TECHNOLOGY (UET)

UET 191 First-Year Seminar. (1–3)

selected semesters

UET 194 Special Topics. (1–4)

selected semesters

UET 294 Special Topics. (1–4)

selected semesters

UET 305 Introduction to Microelectronics. (3)

fall, spring, summer

Quantifies the role of microelectronics technology and its associated skills as drivers for electronics systems development. Lecture with strong Web preparation and support. Prerequisite: junior standing.

UET 331 Electronic Materials. (3)

fall

Physical, chemical, electromagnetic, and mechanical properties of electronic materials. Solid-state device characteristics and their material properties. Prerequisites: CHM 113; EET 208; PHY 112, 114.

UET 411 Layer Deposition Technology. (3)

spring

Fundamentals, applications, and vacuum technology of layer deposition processes used in IC fabrication. Lecture with Web support. Prerequisite: UET 331. Corequisite: UET 417.

UET 415 Electronic Manufacturing Engineering Principles. (3)

fall and spring

Electronic equipment design and fabrication principles and practice. Completion of electronics hardware design project and report. Lec-

ture, lab. Fee. Prerequisite: senior standing (113 hours) in Electronics Engineering Technology.

UET 416 Dopant Control Technology. (3)

fall

Design and practical realization of charge distribution in microelectronic devices including ion implantation and diffusion processes. Lecture with Web support. Prerequisite: UET 331. Corequisite: UET 417.

UET 417 Monolithic Integrated Circuit Laboratory. (2)

fall

Laboratory practice in the fabrication of integrated circuits. Lab. Prerequisite: UET 331. Corequisite: UET 416.

UET 418 Systems on Silicon. (4)

spring

Factors that drive integration on silicon, including logic, memory, and interfaces. Economics of system-level solutions. Lecture with Web support, lab, practical project. Prerequisite: UET 331.

UET 421 IC Device Characterization. (3)

fall

Design and operation of the major classes of semiconductor devices. Characterization by parameters and their extraction. Future technology trends. Lecture with Web support. Prerequisite: UET 331.

UET 424 Pattern Transfer Technology. (3)

spring

Maskmaking, lithography, and etch processes for integrated circuit fabrication. Lecture with Web support. Prerequisite: UET 331. Corequisite: UET 417.

UET 426 Software Tools for the Semiconductor Industry. (3)

spring

Introduces software tools commonly used in the semiconductor industry, such as SUPREM IV, PSPICE, VIEWLOGIC, and ICED. Prerequisite: UET 331.

UET 432 Semiconductor Packaging and Heat Transfer. (3)

spring

Packaging theory and techniques; hermetic and plastic assembly; thermal management; electrical characteristics and reliability. Prerequisites: ETC 340 and UET 331 (or their equivalents).

UET 437 Process Control and Validation. (3)

spring

Statistical process control and its application to IC fabrication. Design, control, and performance validation techniques throughout the manufacturing process. Lecture with Web support. Prerequisite: 300-level statistics course. Corequisite: UET 417.

UET 484 Internship. (1–3)

selected semesters

UET 485 Digital Testing Techniques. (3)

once a year

Hardware/software aspects of digital testing technology; systems, board, and logic testing and equipment. Lecture, lab. Prerequisites: CET 350; EET 310.

UET 492 Honors Directed Study. (1–3)

selected semesters

UET 493 Honors Thesis. (1–6)

selected semesters

UET 494 Special Topics. (1–4)

selected semesters

UET 498 Pro-Seminar. (1–3)

selected semesters

UET 499 Individualized Instruction. (1–3)

selected semesters

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L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See “General Studies,” page 85.

Department of Information and Management Technology

www.east.asu.edu/ctas/imt

480/727-1781

TECH 102

Thomas E. Schildgen, Chair

Professors: Duff, Hild, Sadowski, Schildgen

Associate Professors: Grossman, Hirata, Humble, Matson, Olson, Peterson

Assistant Professor: Kime

Senior Lecturer: Wilson

Lecturers: Dolin, Harris, Lestar

PURPOSE

The mission of the department is to prepare graduates who are able to develop and communicate technological solutions to industrial problems, to manage systems operations, to improve and evaluate products, to provide customer support, and to facilitate technology transfer in industry and government. Increased complexity and sophistication have created great demand for those individuals who possess a working knowledge of the technical phases of planning, testing, production, and fabrication of consumer and industrial products and equipment. Technology includes the application of science, systematic methods, procedures, machines, communication protocols, and materials control for the development, improvement, and implementation of state-of-the-art solutions to industrial problems.

DEGREES

The faculty in the Department of Information and Management Technology offer the B.S. degree in Industrial Technology, with concentrations in the following areas: environmental technology management, industrial technology management, and graphic information technology.

The Bachelor of Science in Industrial Technology Degree including the environmental technology management, graphic information technology, and industrial technology management concentrations is fully accredited by the National Association of Industrial Technology (NAIT). For more information, call 734/677-0720, e-mail nait@nait.org, or write

NATIONAL ASSOCIATION OF INDUSTRIAL
TECHNOLOGY
3300 WASHTENAW AVENUE SUITE 220
ANN ARBOR MI 48104-4200

For students holding an A.A.S. degree the department offers the B.A.S. degree in Applied Science, with concentra-

tions in digital media management, digital publishing, emergency management, fire service management, operations management, municipal operations management, and technical graphics.

A Master of Science in Technology degree is offered for graduate study. The department offers four concentrations for the graduate degree: environmental technology management, fire service administration, graphic information technology, and management of technology. For more information about the graduate program, see the *Graduate Catalog*.

INDUSTRIAL TECHNOLOGY—B.S.

The curriculum consists of First-Year Composition, university General Studies, and technical courses. Note that all three General Studies awareness areas are required. Consult with an advisor for an approved list of courses. The technical part of the curriculum includes a required Information and Management core, program concentration course work, and technical electives selected with approval of an advisor.

Information and Management Technology students are required to complete a minimum of 120 semester hours with a 2.00 cumulative GPA, including a minimum of 50 semester hours of upper-division courses to graduate.

Information and Management Core*	
ETC 100 Languages of Technology CS	4
GIT 233 Digital Publishing	3
IMC 331 Quality Assurance	3
IMC 346 Management Dynamics	3
IMC 396 Professional Orientation.....	1
IMC 470 Project Management	3
Total	17

* These courses are for the industrial technology management and graphic information technology concentrations.

Environmental Technology Management Concentration. The environmental technology management concentration prepares graduates to manage such challenging problems in industry as regulatory compliance, hazardous materials management, pollution prevention, and international environmental standards for manufacturing. The curriculum is designed to provide a unique blend of critical scientific, technical, and management skills; degree requirements encompass the development of a broad background in the natural sciences and mathematics, social and behavioral sciences, management theory, regulatory issues, and applied sciences. The program is purposely structured to facilitate transfer students who are searching for a degree program that builds upon a strong technical background and focuses on the environmental issues faced by industry.

Industrial Technology Management Concentration. The industrial technology management concentration prepares students for supervisory and administrative positions in industry, manufacturing, and public service organizations. Course work includes accounting, data analysis, economics, effective decision making, finance, international business, legal and ethical studies, marketing, operations management, and safety. Emphasis is placed on health and safety within the workplace.

The industrial technology management program may be articulated with a broad range of community college technical courses. Community college specializations in areas such as aeronautics, construction, electronics, fire science, police science, graphic information technology, hazardous materials and waste management, computer graphics, safety and health, human resource management, production management, and manufacturing may form a technical specialty area within the industrial technology management option. Consultation with an advisor is required to coordinate the course selection for transfer to this option.

Graphic Information Technology Concentration. The graphic information technology concentration prepares students for technical and management positions in the diverse graphic communication and information technology industries: digital printing and publishing; technical/digital media production; management of graphic information assets; quality assurance of graphic products; planning and evaluation of print, Internet, multimedia, and computer-based communications. This is an intensive 120-semester-hour graphic technology program of study emphasizing theory and hands-on laboratory practice. Students develop skills to plan and execute graphic solutions using visualization and sketching, engineering graphic standards, technical document design, higher-level graphic programming languages, computer drawing and illustration, multimedia and three-dimensional modeling, project management, quality assurance, and e-commerce practices.

The Graphic Information Technology Facility (GITF), located in the Technology Center, provides internship opportunities and exposes students to current production technology, problem-solving skills, cost analysis, and human resource issues. Graduates are able to present technical solutions using graphics in print and Internet publications, engineering documents, media-rich presentations, interactive training and instruction, models, and animations. Typical career opportunities include graphic operations management, sales and marketing, information technology support in graphics-related industries, graphic systems analysis, digital publishing (both print and online), and computer graphics content planning and creation.

CERTIFICATE PROGRAM IN HAZARDOUS MATERIALS AND WASTE MANAGEMENT

The Certificate Program in Hazardous Materials and Waste Management is designed to provide current and prospective employees of industry and government with a comprehensive and practical curriculum of study in hazardous materials management. The certificate program features instruction by ASU faculty, attorneys, and professionals who work in the specific area in which they teach. Participation in the certificate program is available in three options: a certificate program for nondegree students, a B.S. degree in Industrial Technology with a Certificate in Hazardous Materials and Waste Management, and a Master of Science in Technology degree with a Certificate in Hazardous Materials and Waste Management. Students must complete seven selected courses (five required and two electives) and earn a grade of “C” or higher to receive the certificate. Except for the introductory course, ETM 501 Principles of Hazardous

Materials and Waste Management, the remainder of the courses may be taken in any sequence.

B.I.S. CONCENTRATION

A concentration in hazardous materials and waste management is available under the Bachelor of Interdisciplinary Studies (B.I.S.) degree, a program intended for the student who has academic interests that might not be satisfied with existing majors. Building on two academic concentrations (or one double concentration) and an interdisciplinary core, students in the B.I.S. program take active roles in creating their educational plans and defining their career goals. For more information, see “Bachelor of Interdisciplinary Studies,” page 116.

APPLIED SCIENCE—B.A.S.

The Bachelor of Applied Science degree is a “capstone” degree for the Associate of Applied Science degree. The B.A.S. degree exposes students to advanced concepts and diverse critical thinking skills that prepare them for future career opportunities and professional advancement.

Admission

Admission to the B.A.S. degree program is restricted to students holding an A.A.S. degree from a regionally accredited U.S. postsecondary educational institution. A GPA of 2.00 or higher is required for all resident applicants and a 2.50 for nonresident applicants.

Degree Requirements

The B.A.S. degree in the College of Technology and Applied Sciences consists of 60 semester hours of upper-division (300 level and above) courses, with 30 hours in residence.

A.A.S. degree	60
Assignable credit.....	6
B.A.S. core.....	15
General Studies	19
Technical concentration	20
<hr/>	<hr/>
Total	120

General Studies Curriculum

The B.A.S. curriculum builds on the general education content of the A.A.S. degree. Additional General Studies (L, CS, and awareness areas) are met with courses in the core or concentration. General Studies courses focus on contextual learning.

L	3
MA	3
HU	3
HU or SB	3
SB	3
SG	4
<hr/>	<hr/>
Total	19

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See “General Studies,” page 85.

Assignable Credit

Assignable credit allows space in the curriculum for pre-requisite courses needed to succeed in the program. The courses are determined by the student and the advisor.

B.A.S. Core

The area core focuses on management and organization, professional communication, quantitative analysis, and computer competency.

GIT 335 Computer Systems Technology	3
IMC 346 Management Dynamics	3
ITM 452 Industrial Human Resource Management.....	3
or IMC 470 Project Management (3)	
MET 401 Quality Assurance	3
or STP 420 Introductory Applied Statistics CS (3)	
TWC 400 Technical Communications L	3
Total	15

Technical Concentrations

Operations Management Technology. The purpose of this technical concentration is to prepare supervisors for management functions in industry, manufacturing, and public service organizations. The B.A.S. degree provides the management and supervision content required for industry and governmental agencies.

Digital Media Management. This concentration prepares graduates for technical positions in industries implementing, planning, and producing interactive communications, integrated media, and multimedia for design, training, and marketing. Prospective students with A.A.S. degrees in areas such as multimedia, printing and publishing, commercial graphics, desktop publishing, or computer illustration may be interested in pursuing a digital media management concentration.

Technical Graphics. This concentration prepares graduates for positions in industries implementing technical and engineering graphics in computer-aided design and computer integrated manufacturing. A.A.S. degrees in drafting and design, computer-aided design, computer integrated manufacturing technology, mechanical technology, architectural technology, or construction technology may provide an excellent foundation for a technical graphics concentration.

Digital Publishing. This concentration prepares graduates for lead technical and entry-level management positions in the printing and publishing industry. A.A.S. degrees in multimedia, printing and publishing, commercial art, desktop publishing, or computer illustration may find that this technical concentration provides excellent opportunities.

Emergency Management. The concentration prepares graduates for positions in industry, municipal departments, and government agencies. The curriculum addresses the established Federal Emergency Management Administration (FEMA) guidelines, on-site emergency response contingency planning, first responder scene management, logistical analysis, and communications protocol.

Fire Service Management. This concentration prepares graduates for positions in industry, municipal departments, and governmental agencies. The curriculum addresses ser-

vices delivered by fire departments, fire service personnel development, zoning, planning, inspections, and arson investigations.

Municipal Operations Management. This concentration prepares students for supervisory and management functions within municipalities, public service organizations, or businesses that provide services to the public sector. The curriculum addresses quality assurance, ethical issues, leadership practices, operations management, project management, marketing, finance, public sector management, and organizational effectiveness.

GRAPHIC INFORMATION TECHNOLOGY (GIT)

GIT 135 Graphic Communications. (3)

fall and spring
Introduces the technologies involved in the design, image generation, transmission, and industrial production of multiple images for consumer utilization. Lecture, lab, field trips.

GIT 194 Special Topics. (1-4)

selected semesters

GIT 210 Creative Thinking and Design Visualization. (3)

fall and spring
Fundamental methods, concepts, and techniques of creative thinking, design visualization, and problem solving. Also includes communication, cultural, and societal influences. Lecture, lab. Prerequisite: ETC 100.

GIT 212 Computer-Aided Design and Drafting (CADD). (3)

fall and spring
CADD for product design, representation, and documentation; includes projection theory, descriptive geometry, graphics analysis, drafting standards, and precision dimensioning techniques. Lecture, lab. Prerequisite: ETC 100 (or its equivalent).
General Studies: CS

GIT 215 Introduction to Graphics Programming. (3)

fall
Introduces analyzing, planning, and executing graphic programs using industry-standard programming tools. Lecture, lab. Prerequisite: ETC 100 (or its equivalent).

GIT 230 Digital Illustration in Publishing. (3)

fall and spring
Raster and vector illustration in publishing. Lecture, lab. Pre- or corequisite: GIT 135.

GIT 233 Digital Publishing. (3)

fall and spring
Introduces software and hardware used for digital publishing and infographics. Lecture, lab. Pre- or corequisites: GIT 135, 210.

GIT 237 Web Content Design. (3)

spring
Introduces design principles for visual content on the World Wide Web; raster, vector, fonts, portable documents, color palettes, file formats. Lecture, lab. Prerequisite: GIT 135 (or its equivalent). Pre- or corequisite: GIT 233.

GIT 312 3D Computer Graphics Modeling and Representation. (3)

fall
3D solid modeling applications: concepts, techniques, data structures, modeling strategies, assemblies, geometric representation. Lecture, lab. Prerequisite: GIT 212.
General Studies: CS

GIT 313 Technical Illustration and Photorealistic Rendering. (3)

fall
Computer-generated graphics for technical illustration and design presentation: axonometric and perspective drawing; shading, shadowing, materials and textures; photorealistic rendering for PostScript output. Lecture, lab. Prerequisite: GIT 212.

GIT 314 Multimedia Design, Planning, and Storyboards. (3)

spring
Creative and conceptual process of content selection, planning, designing, flowcharting, storyboarding, proposing, configuring, proto-

DEPARTMENT OF INFORMATION AND MANAGEMENT TECHNOLOGY

typing, and presenting multimedia projects. Lecture, lab. Prerequisite: GIT 237.

GIT 333 Printing Technology. (3)

spring

Theory and application of sheet and web press technology for offset-lithography, flexography, screen process, and digital printing. Lecture, lab. Pre- or corequisite: GIT 135.

GIT 334 Image Capture and Manipulation. (3)

fall

Theory and application of image capture techniques used for all copy formats and conversion processes required for reproduction or dissemination. Lecture, lab. Prerequisite: GIT 233.

GIT 335 Computer Systems Technology. (3)

selected semesters

Survey of computer-based technology covering hardware, software, storage, networking, internet, telecommunications, and information systems. Lecture, lab. Prerequisite: junior standing.

GIT 337 Web Content Design. (3)

fall and spring

Introduces design principles for visual content on the World Wide Web; raster, vector, fonts, portable documents, color palettes, file formats. Lecture, lab. Pre- or corequisite: GIT 233.

GIT 352 Technical Presentations. (3)

spring

Technologies for planning, creating, and delivering individual and group presentations. Prerequisites: ENG 102; GIT 233.

GIT 394 Special Topics. (1–4)

selected semesters

GIT 411 Computer Animation. (3)

fall and spring

2D and 3D computer animation methods: project planning, scripting, storyboards, advanced modeling, lighting, materials mapping, and motion. Lecture, lab. Prerequisites: GIT 312, 334.

GIT 412 Multimedia Authoring, Scripting, and Production. (3)

fall and spring

Production of multimedia projects using industry-standard authoring applications: project management, client considerations, and project documentation; user interface design, interactivity, media, and databases. Lecture, lab. Prerequisite: GIT 314.

GIT 413 Professional Portfolio Design and Presentation. (3)

spring

Digital media portfolio design and production: planning, audience analysis, media selection, authoring, media formats, production, copyright considerations, marketing, and delivery. Lecture, lab. Prerequisites: GIT 314, 334.

GIT 414 Web Site Design and Internet/Web Technologies. (3)

spring

Web site design, authoring, standards, protocols, tools, and development techniques for commercial client-sided Web-based graphic information systems. Lecture, lab. Prerequisites: GIT 334, 337.

GIT 415 Computer Graphics: Business Planning and Management. (3)

spring

Implementation planning: feasibility and application studies; needs assessment and operational analysis techniques; organization, managerial, and technology considerations; business plan development. Lecture, lab, field trips. Prerequisite: senior standing in Information Technology (graphic information technology concentration).

GIT 417 Advanced Internet Programming. (3)

fall

Uses industry-standard programming languages and techniques to create interactive graphic information Web sites and applications. Lecture, lab. Prerequisite: GIT 414.

GIT 432 Graphic Industry Business Practices. (3)

selected semesters

Business practices related to press/prepress/Web industries; trade customs, cost analysis, marketing and management approaches. Lecture, lab, field trips. Prerequisite: GIT 414.

GIT 435 Web Management and E-commerce. (3)

spring

Internet Web site management, security, online databases, and new e-commerce business models. Lecture, lab. Prerequisite: GIT 414.

GIT 436 Gravure Technology. (3)

spring

In-depth study of the market profile and production sequences related to the gravure method of printing. Prerequisite: GIT 135.

GIT 437 Color Reproduction Systems. (3)

fall

Scientific analysis for the engineering of color reproduction systems and color models used in the graphics industry. Prerequisite: GIT 334.

GIT 441 Graphic Information Systems. (3)

selected semesters

Graphic information systems common to the workplace: graphic user interfaces for online databases, geographic, industrial, architectural, and management applications. Lecture, lab. Prerequisite: senior standing in Information Technology (graphic information technology concentration).

GIT 450 Digital Workflow in Graphic Industries. (3)

fall

Analyzes digital production systems for input, assembly, and output of graphic information to print and Web, including networking and job tracking. Lecture, lab. Prerequisite: GIT 334.

GIT 494 Special Topics. (1–4)

fall and spring

Topics may include the following:

- Computer Systems Applications. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.

ENVIRONMENTAL TECHNOLOGY MANAGEMENT (ETM)

ETM 301 Environmental Management. (3)

fall

Focuses on knowledge and skills necessary to manage environmental programs. Perspectives include regulatory, individual, corporate, and consulting. Pre- or corequisites: CHM 113; MAT 170.

ETM 302 Water and Wastewater Treatment Technology. (3)

selected semesters

Explores the development of treatment technologies. Addresses regulatory standards. Emphasizes theory and practice of system design, laboratory analysis standards and procedures. Prerequisites: CHM 113; MAT 170. Pre- or corequisite: ETM 301.

ETM 303 Environmental Regulations. (3)

fall and spring

Explores environmental laws, regulations, and directives. Addresses air, land, and water. Prerequisite: ETM 301.

ETM 360 Introduction to Emergency Management. (3)

fall

Emergency management theories. Comprehensive emergency management. Mitigation, preparedness, response, and recovery. Post-disasters and policy formation. Current FEMA all-hazards approach.

ETM 362 Managing Natural and Technological Disasters. (3)

spring

Federal, state, and local responses to emergencies. Management of mass casualties, evacuation, sheltering, and terrorism; declaration of emergency procedures.

ETM 363 Computer Applications in Emergency Management. (3)

spring

Explores specific computer programs which are currently in use for contingency planning, tracking chemical inventories, and response resources. Cross-listed as FSM 363. Credit is allowed for only ETM 363 or FSM 363.

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See "General Studies," page 85.

COLLEGE OF TECHNOLOGY AND APPLIED SCIENCES

ETM 364 Toxicology and Biohazards in Emergency Management. (3)

fall

Introduces poisons. Dose response routes of exposure and toxicokinetics. Diseases associated with natural disasters. Clinical presentation of treatments.

ETM 401 Hazardous Waste Management. (3)

fall and spring

Definition of hazardous waste, RCRA classification, and OSHA criteria. Overview of requirements and methods of waste management.

Prerequisite: ETM 301.

ETM 402 Unit Treatment Technologies. (3)

spring

Addresses various treatment technologies for contaminated air, water, and soil. Emphasizes design based upon medium, type of contamination, and concentration. Prerequisite: ETM 302.

ETM 406 Environmental Chemistry. (3)

fall and spring

Examines reactions, transport, and fates of hazardous chemicals in water, soil, air, and living organisms. Prerequisites: both CHM 113 and 115 or only CHM 114; MAT 170.

ETM 407 Occupational Hygiene. (3)

spring

Overview of occupational health hazards, including recognition, evaluation, and control. Includes regulatory status and health standards. Prerequisites: CHM 101 (or 113 or 114); MAT 170.

ETM 424 Comprehensive Emergency Management. (3)

summer

Addresses theory and management techniques for emergency preparedness, including mitigation, preparedness, response, and recovery. Pre- or corequisite: ETM 301.

ETM 426 Environmental Issues. (3)

spring

Explores the science and policy implications of contemporary problems that threaten the environment. Pre- or corequisites: CHM 113; MAT 170.

ETM 428 International Environmental Management. (3)

summer

Emphasizes technological and economic pressures experienced by developing countries. Prerequisite: ETM 301.

General Studies: G

ETM 460 Incident Management Systems and Emergency Operations Center. (3)

fall

Covers IMS, terminology, players, and management philosophy. EOC setup, activation, operation, and termination. EOC funding and politics. Cross-listed as FSM 460. Credit is allowed for only ETM 460 or FSM 460.

ETM 461 Contingency Planning. (3)

selected semesters

Provides understanding of techniques for in-house or on-site planning as well as community planning.

ETM 468 Simulation and Exercising. (3)

selected semesters

Requirements, planning, conduct, and critique of exercises related to emergency planning. Emphasizes realism using moulage and props.

ETM 494 Special Topics. (1–4)

spring

Topics may include the following:

- Bioremediation. (3)
Technical-regulatory and policy issues emanating from minetailing and animal waste. Lecture, case studies.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.

FIRE SERVICE ADMINISTRATION (FSA)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.

FIRE SERVICE MANAGEMENT (FSM)

FSM 304 Fire Personnel Management. (3)

fall

Promotion, personnel development, career and incentive systems, validation of physical requirements, managerial and supervisory procedures.

FSM 305 Quality Emergency Services. (3)

selected semesters

Covers quality issues relating to services delivered by progressive fire departments. Covers management of personnel and resources during organizational change.

FSM 306 Fire Prevention Organization and Management. (3)

selected semesters

Examines and evaluates the techniques, procedures, programs, and agencies involved in preventing fires.

FSM 363 Computer Applications in Emergency Management. (3)

spring

Explores specific computer programs which are currently in use for contingency planning, tracking chemical inventories, and response resources. Cross-listed as ETM 363. Credit is allowed for only ETM 363 or FSM 363.

FSM 400 Human Behavior and the Fire Threat. (3)

selected semesters

Proper ways of conducting post-fire interviews; emphasizes the psychological effects of communications during emergencies.

FSM 421 Political and Legal Consideration in Fire Science. (3)

spring

Study of legal and political considerations that affect the decision making of fire service managers.

FSM 425 Fire Service Administration. (3)

fall

Presents modern management and planning techniques that apply to organizing a fire department.

FSM 460 Incident Management Systems and Emergency Operations Center. (3)

fall

Covers IMS, terminology, players, and management philosophy. EOC setup, activation, operation, and termination. EOC funding and politics. Cross-listed as ETM 460. Credit is allowed for only ETM 460 or FSM 460.

FSM 494 Special Topics. (1–4)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.

INFORMATION AND MANAGEMENT CORE (IMC)

IMC 294 Special Topics. (1–4)

selected semesters

IMC 331 Quality Assurance. (3)

spring

Instrumentation and methodologies for materials testing and quality control in various manufacturing processes. Lecture, field trips.

DEPARTMENT OF INFORMATION AND MANAGEMENT TECHNOLOGY

IMC 346 Management Dynamics. (3)

fall and spring

Management challenges and the leadership skills needed to achieve organizational objectives in the changing industrial and technical environments. Prerequisite: junior standing.

IMC 396 Professional Orientation. (1)

fall and spring

Senior advisement, industry presentations, and career counseling.

IMC 470 Project Management. (3)

spring

Introduces techniques for managing small groups within larger organizations, including team building, motivating, planning, tracking activities, and computer tools. Prerequisites: ECN 111; IMC 346; ITM 344.

IMC 498 Pro-Seminar. (1–7)

selected semesters

IMC 499 Individualized Instruction. (1–3)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.

INDUSTRIAL TECHNOLOGY MANAGEMENT (ITM)

ITM 343 Occupational Safety and Ergonomics. (3)

fall

Health and safety movement, accident theories and effects, OSHA standards and liability, safeguarding, hazards, workers' compensation, ergonomics, and safety. Prerequisite: junior standing.

ITM 344 Industrial Organization. (3)

spring

Industrial organization concepts. Topics relate to industrial relations, governmental regulations, organizational structure, labor relations, human factors, and current industrial practices. Prerequisite: IMC 346.

ITM 345 Public Sector Management. (3)

fall and spring

Management in government and public agencies. Includes mission, planning and organizing to provide services, human resource issues, conflict resolution, coordination. Prerequisite: junior standing.

ITM 402 Legal Issues for Technologists. (3)

fall

American legal system and impact on technology management issues: contracts, torts, intellectual property, white collar crime, anti-trust, environmental, and employment.

ITM 405 Forecasting and Evolution of Technology. (3)

selected semesters

History and evolutionary nature of selected technologies, issues in the management of emerging technologies, and methods of technological forecasting. Prerequisite: IMC 346 (or its equivalent).

ITM 430 Ethical Issues in Technology. (3)

spring

Topics in social responsibility for industrial technology and engineering. Prerequisite: IMC 346.

ITM 440 Introduction to International Business. (3)

spring

International business principles and operations, including partnerships, trade agreements, currency issues, international sales, and cultural differences between countries. Prerequisite: IMC 346.

General Studies: G

ITM 445 Industrial Internship. (1–10)

fall, spring, summer

Work experience assignment in industry commensurate with student's program. Specialized instruction by industry with university supervision. Pass/fail. Prerequisites: advisor approval; junior standing; 2.50 GPA.

ITM 451 Industrial Distribution and Materials Management. (3)

selected semesters

Surveys topics in industrial distribution including, but not limited to, materials handling, purchasing, receiving, warehousing, traffic, inventory control, and shipping. Prerequisite: IMC 346 or ITM 343.

ITM 452 Industrial Human Resource Management. (3)

fall

Concepts and practices of human resource management in a global industrial environment. Prerequisite: IMC 346.

ITM 453 Safety Management. (3)

selected semesters

Development and management of safety programs, education and training, and relationships within an organization. Prerequisite: ITM 343 or instructor approval.

ITM 455 Industrial Marketing Concepts. (3)

selected semesters

Customer and sales strategies for industrial organizations, including current practice and future planning. Prerequisites: ECN 111; IMC 346; junior standing.

ITM 456 Introduction to Organized Labor. (3)

spring

Introduces labor relations, unions, federations, collective bargaining, grievances, and labor legislation. Prerequisites: IMC 346; ITM 344.

ITM 461 Operations Management. (3)

fall

Introduces supervisory principles as applied to production of goods and services. Prerequisites: IMC 346; ITM 344.

ITM 480 Organizational Effectiveness. (3)

spring

Human aspects of supervisory behavior in the industrial setting and how they influence efficiency, morale, and organizational practices. Prerequisite: IMC 346.

ITM 494 Special Topics. (1–4)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.

Department of Mechanical and Manufacturing Engineering Technology

www.east.asu.edu/ctas/mmet

480/727-1584

SIM 295

Scott G. Danielson, Chair

Professor: Collins

Associate Professors: Biekert, Danielson, Nam, Palmgren, Rajadas, Rogers

Assistant Professor: Post

PURPOSE

The Department of Mechanical and Manufacturing Engineering Technology emphasizes applied engineering practice through four-year degree programs in Manufacturing Engineering Technology and Mechanical Engineering Technology. Math and science principles are applied to the solution of technical problems in a lecture/laboratory environment.

Major emphasis is placed on reducing the amount of time required by industry to make the graduate productive in any area of work. The goal of the Manufacturing Engineering Technology program is to prepare students for employment in areas such as manufacturing engineering, manufacturing processes, automation, and quality control. The department actively supports the student chapter of the Society of Manufacturing Engineers.

The mechanical engineering technology program produces graduates with the ability to design, develop, implement, and improve machinery, workstations, and systems. The curriculum prepares graduates for many job opportunities in engineering design, manufacturing, and laboratory environments. Graduates are prepared to design and develop machines and related mechanical equipment. Aircraft and their components, automation as used in manufacturing, machine tools, materials handling systems, and industrial production equipment are just a few examples.

For more information about both programs, access the Web site at www.east.asu.edu/ctas/mmet.

ACCREDITATION

The B.S. degree in Manufacturing Engineering Technology and the B.S. degree in Aeronautical Engineering Technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (See “Accreditation,” page 623, for more information.)

DEGREES

The Department of Mechanical and Manufacturing Engineering Technology offers the B.S. degree in Manufacturing Engineering Technology and the B.S. degree in Mechanical Engineering Technology.

For students holding an A.A.S. degree, the department offers the B.A.S. degree with a concentration in manufacturing technology and management.

A Master of Science in Technology degree with concentrations in manufacturing engineering technology, mechanical engineering technology, and aeronautical engineering technology is offered for graduate study. See the *Graduate Catalog* for more information.

B.S. Degree Requirements

All degree requirements for programs are shown on curriculum check sheets. Requirements include First-Year Composition, University General Studies (see “General Studies,” page 85), and the Engineering Technology Core. Note that all three General Studies awareness areas are required. Consult an advisor for an approved list of courses. To graduate, students are required to complete a minimum of 128 semester hours with a 2.00 cumulative GPA, including at least 50 semester hours of upper-division courses.

Manufacturing Engineering Technology—B.S.

The B.S. degree in Manufacturing Engineering Technology requires 128 semester hours as specified below:

Engineering technology core	14
First-Year Composition	6
General Studies/department requirements	45
Manufacturing Engineering Technology major	51
Selected concentration	12
Total	128

The following courses constitute the Manufacturing Engineering Technology major and are required of all manufacturing engineering technology students. Refer to the specific concentrations for additional requirements.

Manufacturing Engineering Technology Major

EET 406 Control System Technology	4
MET 231 Manufacturing Processes	3
MET 300 Applied Material Science	3
MET 302 Welding Survey	3
MET 313 Applied Mechanics of Materials	3
MET 314 Applied Mechanics of Materials Laboratory	1
MET 331 Machine Design I	3
MET 341 Manufacturing Analysis	3
MET 344 Casting and Forming Processes	3
MET 345 Advanced Manufacturing Processes	3
MET 396 Manufacturing Professional Orientation	1
MET 401 Quality Assurance	3
MET 416 Applied Computer-Integrated Manufacturing CS	3
MET 443 CNC Computer Programming	3
MET 444 Production Tooling	3
MET 451 Introduction to Automation	3
MET 460 Manufacturing Capstone Project I	3
MET 461 Manufacturing Capstone Project II	3
Total	51

A student participating in the Manufacturing Engineering Technology program may select from two concentrations:

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING TECHNOLOGY

manufacturing engineering technology or mechanical engineering technology.

Manufacturing Engineering Technology Concentration.

This concentration is designed to prepare technologists with both conceptual and practical applications of processes, materials, and products related to manufacturing industries. Accordingly, this concentration provides additional preparation for students to meet the responsibilities in planning the processes of production, developing the tools and machines, and integrating facilities for production or manufacturing.

Required Courses

MET 409 Applied Engineering Economics	3
MET 442 Specialized Production Processes	3
Technical electives	6
Total	12

Mechanical Engineering Technology Concentration.

The primary objective of the mechanical engineering technology concentration is to offer manufacturing students an emphasis in mechanics and thermal sciences. Required courses are as follows:

AET 415 Gas Dynamics and Propulsion	3
MET 434 Applied Fluid Mechanics	3
MET 438 Machine Design II.....	3
Approved technical elective	3
Total	12

Mechanical Engineering Technology—B.S.

The B.S. degree in Mechanical Engineering Technology requires 128 semester hours as specified below:

Mechanical Engineering Technology major	63
Engineering technology core	14
First-year composition	6
General Studies/department requirements	45
Total	128

Students interested in the B.S. degree in Mechanical Engineering Technology choose one of the following three concentrations: mechanical, aeronautical, or automation engineering technology. Each concentration includes five courses for a total of 15 semester hours.

The mechanical engineering technology concentration builds a strong “base” of knowledge of the field and is available to students who do not desire a focused specialty area.

The aeronautical engineering technology concentration provides a specialty content area in aircraft airframe, propulsion, and aircraft production and operations. It prepares students for employment in areas such as aircraft design and manufacturing, aerodynamics, propulsion, and wind tunnel testing. However, aeronautical concentration graduates have a good general background in mechanical engineering technology and are not limited to employment opportunities in the aviation industry.

The automation engineering technology concentration provides specialty content in mechanical automation. Automated assembly and testing are major components of most modern, high volume mechanical systems and manufacturing operations. As a specialty area, this concentration

provides students with an opportunity to develop knowledge and skill in the broad area of automation. It also dovetails well with the semiconductor industry where most process tools are highly automated.

The following courses constitute the Mechanical Engineering Technology major and are required of all Mechanical Engineering Technology students.

Mechanical Engineering Technology Major

AET 210 Measurements and Testing	3
AET 312 Applied Engineering Mechanics: Dynamics	3
MET 150 Introduction to Engineering Technology	1
MET 230 Introduction to Engineering Materials	2
MET 231 Manufacturing Processes	3
MET 300 Applied Material Science.....	3
MET 309 Nondestructive Testing and Quality Assurance	1
MET 313 Applied Mechanics of Materials	3
MET 314 Applied Mechanics of Materials Laboratory	1
MET 331 Machine Design I.....	3
MET 345 Advanced Manufacturing Processes	3
MET 396 Manufacturing Professional Orientation.....	1
MET 401 Quality Assurance	3
MET 409 Applied Engineering Economics	3
MET 418 Composite Materials Manufacturing	3
MET 432 Thermodynamics.....	3
MET 434 Applied Fluid Mechanics	3
MET 460 Manufacturing Capstone Project I	3
MET 461 Manufacturing Capstone Project II.....	3
Concentration.....	15
Total	63

APPLIED SCIENCE—B.A.S.

The Bachelor of Applied Science degree is a “capstone” degree for the Associate of Applied Science degree. The B.A.S. degree exposes students to advanced concepts and diverse critical thinking skills that prepare them for future career opportunities and professional advancement.

Admission

Admission to the B.A.S. degree program is restricted to students holding an A.A.S. degree from a regionally accredited U.S. postsecondary educational institution. A GPA of 2.00 or higher is required for resident applicants and a 2.50 for nonresident applicants.

Degree Requirements

The B.A.S. degree in the College of Technology and Applied Sciences consists of 60 semester hours of upper-division (300 level and above) courses, with 30 hours in residence. A total of 120 semester hours is required for graduation.

A.A.S. degree	60
Assignable credit.....	7
B.A.S. core	15
General Studies	19
Technical concentration	19
Total	120

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See “General Studies,” page 85.

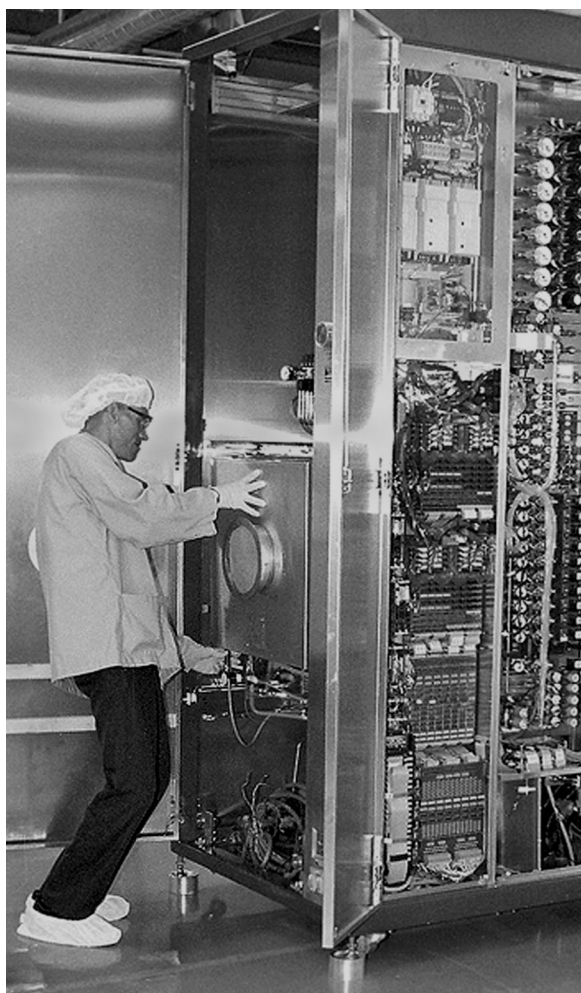
General Studies Curriculum

The B.A.S. curriculum builds on the general education content of the A.A.S. degree. Additional General Studies (L, CS and awareness areas) are met with courses in the core or concentration. General Studies courses focus on contextual learning.

L	3
MA	3
HU	3
HU or SB	3
SB	3
SG	4
Total	19

Assignable Credit

Assignable credit allows space in the curriculum for prerequisite courses needed to succeed in the program or additional technical electives. The courses are determined by the student and the advisor.



The vertical diffusion furnace is located in the Teaching Factory within the Technology Center at ASU East.

Tim Trumble photo

B.A.S. Core

The area core focuses on management and organization, professional communication, quantitative analysis, and computer competency.

IMC 470 Project Management	3
ITM 344 Industrial Organization	3
MET 401 Quality Assurance	3
MET 416 Applied Computer-Integrated Manufacturing CS	3
TWC 400 Technical Communications L	3
Total	15

Technical Concentration

Manufacturing Technology and Management. This concentration prepares supervisors and other personnel for technical and management positions in the manufacturing industry. The students increase their knowledge of manufacturing and gain insight into other areas, such as management, that support their professional growth.

MET 300 Applied Material Science	3
MET 302 Welding Survey	3
MET 341 Manufacturing Analysis	3
MET 344 Casting and Forming Processes	3
MET 345 Advanced Manufacturing Processes	3
MET 396 Manufacturing Professional Orientation	1
MET 444 Production Tooling	3
Total	19

AERONAUTICAL ENGINEERING TECHNOLOGY (AET)

AET 191 First-Year Seminar. (1-3)

selected semesters

AET 194 Special Topics. (1-4)

selected semesters

AET 210 Measurements and Testing. (3)

fall

Measurement systems, components, system response, and the characteristics of experimental data. Lecture, lab. Prerequisites: MET 230; PHY 112, 114.

AET 215 Mechanics of Aerospace Systems. (3)

spring

Basic physics of flight. Principles and design of aircraft systems and powerplants.

AET 294 Special Topics. (1-4)

selected semesters

AET 300 Aircraft Design I. (3)

fall

Applied aerodynamics, standard atmosphere, speed measurement, infinite and finite wings, airplane performance. Fee. Prerequisites: MAT 260; PHY 112, 114.

AET 310 Instrumentation. (3)

fall

Measurement systems, components, system response, and the characteristics of experimental data. Methods of collecting and analyzing data. Lecture, lab. Prerequisite: MAT 261. Pre- or corequisite: MET 313.

AET 312 Applied Engineering Mechanics: Dynamics. (3)

fall

Masses; motion kinematics; dynamics of machinery. Prerequisites: ETC 211; MAT 261.

AET 394 Special Topics. (1-4)

selected semesters

AET 396 Aerospace Professional Orientation. (1)

fall

Career focus for Aeronautical Engineering Technology students. Familiarization with the aerospace industry. Prerequisite: junior standing.

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING TECHNOLOGY

AET 415 Gas Dynamics and Propulsion. (3)

spring

Introduces compressible flow, internal and external flow, and aerothermodynamic analysis of propulsion systems. Prerequisite: MET 434.

AET 417 Aerospace Structures. (3)

fall

Analysis and design of aircraft and aerospace structures. Shear flow. Semimonocoque structures. Effects of dynamic loading. Prerequisites: AET 300, 312; MET 313.

AET 420 Applied Aerodynamics and Wind Tunnel Testing. (3)

fall

Introduces viscous and inviscid flow and their relationship to aircraft lift and drag. Wind tunnel design and testing. Lecture, lab. Prerequisites: AET 300; MET 434.

AET 432 Applied Heat Transfer. (3)

fall

Heat transfer by conduction, convection, and radiation. Applies heat transfer to engineering design problems. Prerequisite: ETC 340. Pre- or corequisite: MET 434 or instructor approval.

AET 484 Internship. (1–12)

selected semesters

AET 487 Aircraft Design II. (3)

spring

Basic aerodynamics and airplane performance analysis methods applied to practical design project. Prerequisite: AET 300.

AET 492 Honors Directed Study. (1–6)

selected semesters

AET 493 Honors Thesis. (1–6)

selected semesters

AET 494 Special Topics. (1–4)

selected semesters

AET 498 Pro-Seminar. (1–7)

selected semesters

AET 499 Individualized Instruction. (1–3)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see “Omnibus Courses,” page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see “Graduate-Level Courses,” page 56.

MECHANICAL AND MANUFACTURING ENGINEERING TECHNOLOGY (MET)

MET 150 Introduction to Engineering Technology. (1)

fall

Introduces mechanical, manufacturing, and aeronautical engineering technology. Covers aspects of the industries utilizing these majors.

MET 160 CADD and Solid Modeling. (1)

selected semesters

Uses 3-dimensional solid modeling software to model mechanical parts and produce valid engineering drawings, including use of GD and T. Lab.

MET 191 First-Year Seminar. (1–3)

selected semesters

MET 194 Special Topics. (1–4)

selected semesters

MET 230 Introduction to Engineering Materials. (2)

spring

Introduction to materials and their properties, emphasizing basic concepts and structures and how these properties relate to manufacturing and design.

MET 231 Manufacturing Processes. (3)

fall

Design documentation and material processes on plastics, ferrous and nonferrous materials, emphasizing orthographic projection, geometric dimensioning and tolerances. Lecture, lab. Prerequisite: MAT 117 or 170.

MET 294 Special Topics. (1–4)

selected semesters

MET 300 Applied Material Science. (3)

fall

Principles of materials science emphasizing concepts relevant to design, manufacturing, and use. Covers metals, polymers, ceramics, and composites. 2 hours lecture, 1 hour lab. Prerequisite: MET 230 or instructor approval.

MET 302 Welding Survey. (3)

fall

Theory and application of industrial welding processes; introductory welding metallurgy and weldment design; SMAW, GTAW, GMAW, oxy-acetylene, and brazing experiences. Lecture, lab. Prerequisite: junior or senior standing.

MET 309 Nondestructive Testing and Quality Assurance. (1)

fall

Part and material inspection using metrology and nondestructive inspection tools and techniques. Theory and application with use of pertinent standards. Lab. Prerequisite: MET 231.

MET 313 Applied Mechanics of Materials. (3)

spring

Stress, strain, stress-strain relations. Axial, shear, bending, torsional and combined loads and deflections. Prerequisite: ETC 211.

MET 314 Applied Mechanics of Materials Laboratory. (1)

spring

Measurements of loads and deformations relating stress and strain in axial, shear, bending, torsional, and combined loading configurations. 3 hours lab. Pre- or corequisite: MET 313.

MET 331 Machine Design I. (3)

fall

Applies mechanics to design of machine elements and structures. Stress analysis, failure modes, tolerances, cylindrical fits, and shaft design. Prerequisite: MET 313.

MET 341 Manufacturing Analysis. (3)

spring

Organizational and functional requirements for effective production. Analysis of industrial specifications, GDT, costs, and group technology. Writing assembly production plans. Prerequisite: MET 231.

MET 344 Casting and Forming Processes. (3)

spring

Analyzes various forming processes to determine load requirements necessary for a particular metal-forming operation. Information used to select equipment and design tooling. Metal casting processes and design of castings. Introduces powder metallurgy. Prerequisite: MET 300.

MET 345 Advanced Manufacturing Processes. (3)

spring

Material removal processes emphasizing advanced turning, milling, and machinability studies using cutting tools. CNC programming for machining and turning centers. Lecture, lab. Prerequisite: MET 231.

MET 394 Special Topics. (1–4)

selected semesters

MET 396 Manufacturing Professional Orientation. (1)

fall

Career focus for Manufacturing Engineering Technology students. Familiarization with the manufacturing industry. Prerequisite: junior standing.

MET 401 Quality Assurance. (3)

spring

Introduces statistical quality control methods design of experiments, sampling, gauge requirements, specifications, quality assurance tools emphasizing CNC-CMM programming. Lecture, lab. Prerequisite: junior standing.

L literacy and critical inquiry / MA mathematics / CS computer/statistics/ quantitative applications / HU humanities and fine arts / SB social and behavioral sciences / SG natural science—general core courses / SQ natural science—quantitative / C cultural diversity in the United States / G global / H historical / See “General Studies,” page 85.

COLLEGE OF TECHNOLOGY AND APPLIED SCIENCES

MET 409 Applied Engineering Economics. (3)

spring

Fundamentals of engineering economics in a practical, industry-based approach. Includes effects of depreciation, taxes, inflation, and replacement analysis. Lecture, computer lab experiences.

MET 415 Manufacturing Simulation. (3)

spring

Computer simulation of manufacturing operations. Discrete event simulation models range from individual processes to whole factories. Lecture, computer lab experiences. Prerequisite: MET 345.

MET 416 Applied Computer-Integrated Manufacturing. (3)

fall

Techniques and practices of computer-integrated manufacturing, with emphasis on computer-aided design and computer-aided manufacturing. Prerequisite: MET 345.

General Studies: CS

MET 418 Composites Materials Manufacturing. (3)

spring

Introduces composite materials and associated manufacturing issues, including tooling, processes, and quality control. Related issues, including testing and joining. Lecture, lab. Credit is allowed for only MET 418 or 518. Prerequisite: MET 300 or instructor approval.

MET 432 Thermodynamics. (3)

spring

Thermodynamics of mixtures. Combustion process. Applies thermodynamics to power and refrigeration cycles. Prerequisite: ETC 340.

MET 433 Thermal Power Systems. (4)

selected semesters

Analyzes gas power, vapor power, and refrigeration cycles. Components of air conditioning systems. Direct energy conversion. Psychrometry. Analyzes internal combustion engines and fluid machines. Lecture, lab. Prerequisite: MET 432 or instructor approval.

MET 434 Applied Fluid Mechanics. (3)

spring

Fluid statics. Basic fluid flow equations. Viscous flow in pipes and channels. Compressible flow. Applies fluid measurement and flow in conduits. Prerequisite: ETC 340.

MET 435 Alternate Energy Sources. (3)

selected semesters

Alternate energy systems, energy use and its impact on the environment, and demonstrating practical alternative energy sources to fossil fuels. Prerequisite: instructor approval.

MET 436 Turbomachinery Design. (3)

selected semesters

Applies thermodynamics and fluid mechanics to the analysis of machinery design and power cycle performance predictions. Prerequisites: ETC 340; MET 434.

MET 438 Machine Design II. (3)

spring

Applies mechanics to the design of machine elements and structures. Emphasizes basics of gears, springs, brakes, clutches, and bearings. Prerequisite: AET 312; MET 331.

MET 442 Specialized Production Processes. (3)

fall

Nontraditional manufacturing processes, emphasizing EDM, ECM, ECG, CM, PM, HERF, EBW, and LBW. Prerequisite: MET 231.

MET 443 CNC Computer Programming. (3)

fall

Theory and application of N/C languages using CAM software and CNC machine tools. Lecture, lab. Prerequisite: MET 345 or instructor approval.

MET 444 Production Tooling. (3)

fall

Design and fabrication of jigs, fixtures, and special industrial tooling related to manufacturing methods. Lecture, lab. Prerequisite: MET 345.

MET 451 Introduction to Automation. (3)

spring

Introduces automation. Topics include assembly techniques, fixed and flexible automation systems, robots, material-handling systems, sensors, and controls. Lecture, lab. Prerequisite: MET 345.

MET 452 Implementation of Robots in Manufacturing. (3)

selected semesters

Robotic workcell design, including end effectors, parts presenters, and optimum material flow. Prerequisite: MET 451 or instructor approval.

MET 455 Automation Systems Integration. (3)

fall

Applies sensors and devices and their integration with PLCs and computers into automated devices and systems. Lecture, lab. Prerequisites: EET 403; MET 451.

MET 460 Manufacturing Capstone Project I. (3)

fall

Group project designing, evaluating, and analyzing components, assemblies, and systems. Develop products/manufacturing techniques demonstrating state-of-the-art technology. Lecture, lab. Prerequisites: MET 331, 341; senior standing.

MET 461 Manufacturing Capstone Project II. (3)

spring

Small-group projects applying manufacturing techniques, with emphasis on demonstrating state-of-the-art technology. Lecture, lab. Prerequisite: MET 460 or instructor approval.

MET 484 Internship. (1–2)

selected semesters

MET 492 Honors Directed Study. (1–6)

selected semesters

MET 493 Honors Thesis. (1–6)

selected semesters

MET 494 Special Topics. (1–4)

fall and spring

Topics may include the following:

- Composite Materials Manufacturing. (3)
- Consumer Manufacturing. (1–3)
- Manufacturing Resource Management. (3)
- Packaging Design. (1–3)

MET 498 Pro-Seminar. (1–7)

selected semesters

MET 499 Individualized Instruction. (1–3)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 56.

Graduate-Level Courses. For information about courses numbered from 500 to 799, see the *Graduate Catalog*, or access www.asu.edu/aad/catalogs on the Web. In some situations, undergraduate students may be eligible to take these courses; for more information, see "Graduate-Level Courses," page 56.