MERCER UNIVERSITY
Catalog 2007-2008

College of Liberal Arts

Eugene W. Stetson School of Business and Economics

School of Engineering

Tift College of Education

Townsend School of Music

School of Medicine

Macon, Georgia 31207

The School of Engineering

M. Dayne Aldridge, Sc.D., P.E., *Dean/Professor*
Michael S. Leonard, Ph.D., P.E., *Senior Associate Dean/Professor*
Aaron S. Collins, Marjorie T. Davis, Behnam Kamali, Richard O. Mines, Jr., Philip D. Olivier, Clayton R. Paul and Ramachandran Radharamanan, *Professors*
Kevin D. Barnett, Andre J. Butler, Joan M. Burtner, Helen M. Grady, Jeng-Nan Juang, Richard K. Kunz, Laura W. Lackey, Paul E. MacNeil, Jack M. Mahaney, David M. McClellan, Philip T. McCreanor, Laura E. Moody, William M. Moses, Edward M. O'Brien, and Loren B. Sumner, *Associate Professors*
T. Anthony Choi, Susan Codone, Donald U. Ekong, Sinjae Hyun, Hodge Jenkins, Scott Schultz, and Ha Van Vo, *Assistant Professors*

An engineer takes the discoveries of the scientist, the tools of the mathematician, and the imagination of the inventor and transforms them into goods, services, and information to satisfy human needs. The purpose of Mercer University's School of Engineering is to educate a student who is prepared to be a practicing engineer, one who can responsibly contribute to a global society that is becoming ever more dependent on technology.

The engineering program of study includes a solid foundation in mathematics and sciences along with a broad range of courses in engineering topics. The program culminates in engineering design courses in which a student explores solutions to recognized needs as a member of a team, since so much of modern engineering is a team effort. Engineering courses place emphasis on the written and spoken word; enabling graduates to effectively communicate their ideas to both technical and non-technical audiences. Because the computer is such an essential tool for analysis, the courses integrate computer methods of problem-solving. Within the engineering curriculum are the general education requirements which promote social, cultural, and global awareness, and draw on Mercer University's distinguished Judaeo-Christian ethical value structure. All of this contributes to the development of a practicing engineer who is a responsible contributor to the global society.

While the focus of the engineering school is to educate engineers, its graduates may enter many fields of graduate study, especially those requiring the disciplined problem solving methods developed in the undergraduate engineering curriculum. Mercer School of Engineering graduates have entered professional graduate programs in medicine, law, and business, as well as graduate engineering programs. The Mercer Bachelor of Science in Engineering (BSE) program is accredited by the Engineering Accreditation Commission of ABET, Inc.

In addition to the specializations that lead to a Bachelor of Science in Engineering, the School of Engineering offers two Bachelor of Science (BS) degree programs. The Bachelor of Science in Industrial Management focuses on applying selected engineering tools to management decisions. The Bachelor of Science in Technical Communication provides a foundation in sciences, mathematics and technology with a strong emphasis on communication skills. Both of the BS programs are intended to provide a technical, scientific, and analytical foundation so the graduate can pursue engineering-related careers that require some engineering-like expertise. The programs are a mutual effort between the School of Engineering, the College of Liberal Arts, and the Stetson School of Business.

The faculty within the engineering school is dedicated to staying abreast of the latest developments and conveying that current practice to the students in a supportive environment. Each student is encouraged and expected to draw on faculty assistance for knowledge, motivation, value clarification, and transition to the world of engineering.

Mercer University General Education

The six undergraduate schools and colleges of Mercer University are clearly distinct. The autonomy and traditions of each is respected. Although each school is unique, all have identified goals, objectives, and outcomes that they share and that are reflective of a Mercer education. The objectives and specific outcomes, related to each major goal, do not constitute an exhaustive list but rather a summary of the central, intersecting objectives and outcomes.

Mercer University is dedicated to the ideal of educating the whole person and providing a foundation that can be described by the Greek term "Paideia". Paideia is consistent with the founding vision of Jesse Mercer as he sought to encourage learning and culture for both clergy and laity. Teaching, character development, service and leadership, classical education, and the nurturing of a prevailing culture are all instrumental. Mercer's aim is to prepare all students to contribute to society through a sharing of their knowledge, skills, and character.

Through the general education curriculum Mercer University graduates will be able to:

A. Reason effectively
B. Demonstrate broad and deep knowledge
C. Demonstrate habits of free inquiry
D. Demonstrate an understanding of themselves in light of the values and traditions upon which the University was founded.

From these four goals flow the intended educational outcomes for general education at Mercer University:

A.

1. Communicate clearly, responsibly, and with integrity in written and oral forms
2. Master at least the basic principles of mathematical and scientific reasoning
3. Identify, access, and evaluate information and materials as needed for personal, academic, and professional purposes

B.

4. Acquire foundational knowledge important to becoming an informed person and/or for the major
5. Relate theory, principles, and content from one discipline to another
6. Demonstrate familiarity with cultures and traditions other than one's own

C.

7. Work as part of a team/group, to learn and teach cooperatively, to develop an appreciation of individual differences, and to assess one's own and other's roles in a working group
8. Consider viewpoints other than one's own, including viewpoints associated with other cultures and traditions
9. Commit to live as an engaged and informed citizen

D.

10. Reflect on one's life and learning experience
11. Develop a respect for intellectual and religious freedom

National Engineering Advisory Board

The National Engineering Advisory Board, established in 1986, supports the School of Engineering in the offering of high-quality engineering education at the undergraduate and graduate levels; the offering of research opportunities appropriate to the needs of the School, the University, industry and society in general; promoting faculty development as a means to achieve national prominence as a quality educational institution; obtaining financial support from corporate and other sources throughout the nation; and serving the educational, technical, and consulting needs of local industry.

Members of the Board include: Chairman: Dr. Dan E. Nale, Gulfstream Aerospace Corporation; Members: Mr. James L. Bond, Public Service Telephone Co.; Mr. Peter Bryant, Mercer Engineering Research Center; Mr. Malcolm S. Burgess, Jr., Burgess Pigment Company; The Honorable Saxby Chambliss, United States Senate; Mr. Robert V. Dumke, Siemens Medical Systems Company (retired); Mr. Eugene Dunwody, Dunwody, Beeland Architects, Incorporated; Mr. A. V. Elliott, Jr., The Elliott Machine Shop, Incorporated; Mr. Ernest Gay, Imerys Pigments and Additives Group; Mr. Stephen E. Giles, Milliken & Company, Mr. Arthur L. Grady, Northrop Grumman Corporation (retired); The Honorable George Hooks, Georgia Senate, District 14; Mr. Obie B. Jones, The Boeing Company; Dr. Carmen M. Kavali, Kavali Plastic Surgery; Mr. John Krawczuk, BAE Systems Platform Solutions Inertial Products; Mr. Melvin Kruger, L. E. Schwartz & Son, Incorporated; Mr. L. Donald LaTorre, L & G Management Consultants; Mr. Jim Rogers, R.J. Reynolds Tobacco Company; Mr. John Rowe, Panasonic Battery; Mr. Chris R. Sheridan, Jr.; Chris R. Sheridan and Company; Scott E. Waters, American Ironhorse Motorcycle Company; Mr. Tom Wilkason, Raytheon; Ms. Karen A. Albrecht, Lockheed Martin Aeronautics Company; Mr. G. Holmes Bell, IV, Hussey, Gay, Bell & DeYoung, Inc; Mr. W. Michael Hatcher, Headquarters Warner Robins Air Logistics Center; Mr. Brian C. Highley, Avail Medical Products.

Mercer Engineering Research Center

The Mercer Engineering Research Center, established by Mercer University in 1987, is closely affiliated with the School of Engineering with the mutual benefit of the two units through the conduct of research and development activities. The Mercer Engineering Research Center maintains a staff of research scientists, engineers, analysts and support personnel to conduct fundamental and applied research and development in engineering. The center provides advanced engineering and computational services, and disseminates the results through products and services delivered to the customer, publications, training courses and conferences. These activities are conducted with support and sponsorship of the federal government (civilian and military agencies), state and local governments and private, commercial, or philanthropic organizations and institutions. They include design, analysis, testing and other services relating to the support of the research and development activities.

MERC operates out of its research facility located in Warner Robins, Georgia and employs a core group of approximately 100 research engineers and scientists.

Degree Programs

Undergraduate

BACHELOR OF SCIENCE IN ENGINEERING
- Specializations:
  - Biomedical
  - Computer
  - Electrical
  - Environmental
  - Industrial
  - Mechanical

BACHELOR OF SCIENCE
- Majors:
  - Industrial Management
  - Technical Communication

Minor

Technical Communication

Graduate

MASTER OF SCIENCE IN ENGINEERING
- Majors:
  - Biomedical Engineering
  - Computer Engineering
  - Electrical Engineering
  - Engineering Management
  - Mechanical Engineering
  - Software Engineering

MASTER OF SCIENCE
- Majors:
  - Software Systems
  - Technical Communication Management
  - Technical Management

Advanced Placement

Advanced placement and CLEP credits for appropriate courses which satisfy University criteria may be included in the BSE degree.

Transfer Credit

Students who transfer into the School of Engineering must have a minimum of 2.5 GPA in all college enrollments. In addition, students must also have a 2.5 GPA or higher in all college mathematics, science, and engineering courses (excluding developmental mathematics courses). They must also be in good standing—that is, not on warning, probation, suspension, or equivalent. The School of Engineering will consider transfer students at any stage in their education; however, it is recommended that prospective transfer students follow a pre-engineering course of study if available at their institution. The core of any pre-engineering course of study includes: mathematics (i.e., calculus through differential equations); laboratory based chemistry; and calculus based physics with laboratory.

While all legitimate transfer credits are accepted, students must meet the degree requirements established by the School of Engineering. Any additional hours will be reflected on a student's transcript as general electives.

Full Admission for Transfer Students to the BSE Degree Program

Transfer students who seek full admission to the School of Engineering BSE degree program must satisfy the following conditions:

1) Have a minimum of a 2.5 GPA in all college enrollments;
2) Have a 2.5 GPA or higher in all degree relevant college math, science and engineering courses attempted. Courses are considered degree relevant only if they could be used (were an appropriate grade earned) to satisfy degree requirements in the specialization or program to which the student is seeking transfer admission. For the purpose of this computation, all attempts or individual courses are included.
3) Have completed courses, which transfer as CHM 111, PHY 161/PHY 121L, MAT 191, and MAT 192.
4) Be in good standing at their previous school—that is, not on warning, probation, suspension, or the equivalent.

Conditional Admission for Transfer Students to the BSE Degree Program

Students who have completed a course which transfers as MAT 133 and have not yet completed CHM 111, PHY 161/PHY 121L, MAT 191, and /or MAT 192, but who are otherwise eligible, may be granted conditional admission to the School of Engineering BSE degree program. Full admission will not be granted until these courses have been completed satisfactorily. Students who are granted conditional admission to the School of Engineering will have their academic performance evaluated at the end of each semester by the Scholarship and Academic Standards Committee of the School of Engineering. Students who have not earned a term average of at least 2.0 in any given semester during this period will be suspended from the School of Engineering. Students conditionally admitted will remain in this status until the four indicated courses are completed with a composite GPA of 2.5 or better (including repeated courses). Students have one calendar year from first admission to the School to satisfy these requirements. In addition:

1) Students must also have an overall GPA of 2.5 or better in all degree relevant courses attempted during the period of the conditional admission.
2) Students must satisfy the general academic standards of the University and/or the School of Engineering.

Students unable to satisfy the requirements of the conditional admission will be suspended from the School of Engineering.

Credit by Examination

Students who have completed course work or other training that cannot be accepted as transfer credit for a School of Engineering course may elect to receive credit by examination. This can be done by passing a comprehensive test

prepared and administered by a School of Engineering faculty member who has recently taught the course. A fee is charged for taking the examination, and there must be sufficient evidence that a passing grade will be achieved before the examination will be given.

English Requirement

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor of that course to the Dean of the School of Engineering. The Dean may choose to assign supplementary work, including additional course work, consistent with the needs of the student. The granting of a degree may be delayed until the work assigned is satisfactorily completed.

Credit Hours

The number of credit hours awarded for a course is based on the number of lecture and laboratory hours per week. The School of Engineering has defined a unit of credit for programs under its jurisdiction. An hour of work is the equivalent of 50 minutes of class time (often called a "contact hour") or its equivalent in other forms of instruction. The normal semester is 15 weeks in length.

Satisfactory - Unsatisfactory Grading Option

Students seeking degrees from the School of Engineering are not permitted to take courses on a Satisfactory - Unsatisfactory basis for credit toward graduation unless the course is only offered on an S-U basis.

Academic Requirements

A baccalaureate degree will be awarded to those students in good academic standing who successfully satisfy the academic requirements of the University and the School of Engineering, and who have adhered to the standards of conduct generally applicable to the engineering or related profession.

Dean's List

Criteria for achieving dean's list status are listed in the Academic Information section of this catalog.

Engineering Honors Program

The Engineering Honors Program provides exceptional students a program of study that presents challenges beyond the normal requirements for an undergraduate degree in the School of Engineering. The goals of the Engineering honors Program are to: (1) provide a common freshman experience that challenges the students and faculty members both technically and non-technically, and (2) provide a project experience that demonstrates knowledge and skills that exceed normal undergraduate requirements. Students are admitted to the Program by invitation only.

The Engineering Honor's Program is a part of Mercer University's Honors Program which seeks to enrich the learning environment for both students and faculty members. By doing so, it invites new and higher levels of excellence in student research and creative accomplishments. It particularly works to foster a sense of academic community among faculty members and students of outstand-

ing ability through its cultural events, its sponsored activities, and its four-year, interdisciplinary course of study.

All engineering honors students must: (1) participate in a weekly one hour credit Engineering Honors Seminar, (2) complete a total of eight honors seminar credits, (3) maintain a cumulative grade point average of at least 3.3, (4) complete an approved honors project in addition to the undergraduate degree requirements, (5) provide a poster session honors project progress report for the project each year, and (6) complete an approved final project report at the conclusion of the honors project. Students who fall below 3.3 will be allowed to continue in the Engineering Honors Program for one semester.

Engineering honors students are encouraged to include one term of study or work experience preferably outside the United States that complements the required program of study and the honors project. This may be part of a study abroad experience provided to all qualifying Mercer University undergraduate students and may be fulfilled during a summer or May-term.

Academic Warning, Probation, and Suspension

To implement the University requirements for academic warning, probation, and suspension, the School of Engineering has adopted the following provisions to assure engineering students who experience difficulty will receive prompt attention.

1. **Warning**

   A student may be placed on academic warning if his or her term grade point average is below 2.0. A student who is on academic warning may be returned to academic good standing by achieving a term grade average of 2.0 or greater and an accumulative grade point average of 2.0 or greater.

2. **Probation**

   A student will be placed on academic probation if his or her term grade point average is below 1.0 or the cumulative grade point average is below the minimum University requirement. A student who is on academic warning will be placed on academic probation if his or her term grade point average is below 2.0.

   A student who is on academic probation may have conditions imposed on him or her as a requirement to return to academic good standing. A student who is on academic probation cannot be returned to good standing until a term grade point average and a cumulative grade point average of 2.0 or greater are both achieved.

3. **Suspension**

   A student who is on academic probation may be suspended if his or her term grade point average is below 2.0. Any full-time student who fails to pass a minimum of three hours in any term will be subject to academic suspension. Additionally, students who have demonstrated an inability to complete the special academic requirements of their chosen program of study may be suspended.

   Normally a student who is suspended is not readmitted. A request for readmission will be considered only after one or more terms of no enrollment in Mercer School of Engineering courses. Readmission will be granted only with specific conditions imposed by the Academic Standards Committee.

A student may appeal a warning, probation, and suspension to the Academic Standards Committee.

Second Specializations, Majors and Minors

Engineering students may pursue two specializations simultaneously. To do this, a student must officially declare each specialization, be assigned an advisor from each specialization, and complete all the requirements of each specialization. Second specializations and minors will be noted on permanent records. Second specializations will be noted on diplomas.

Students who pursue the B.S.E. degree may earn a second major or a minor in programs offered through the College of Liberal Arts. A second major in business, through the Stetson School of Business and Economics, may be earned only by completing all of the requirements for a second degree, the B.B.A. degree, including the general education requirements. Minors for non-business students are offered in accounting, business administration, and economics by the Stetson School of Business and Economics. A student must officially declare the second major, degree, or minor, and follow proper University procedures, which call for fulfilling the specific course requirements for the second major, degree, or minor, plus additional requirements that may be arranged on an individual basis.

Students wishing to earn a second major or degree must request or seek a second advisor from that department, who will serve in addition to their primary engineering advisor.

Within the School of Engineering, minors are offered to all qualified university students in technical communication.

Student Work Experiences

Students working toward degrees in engineering may qualify for work-learning experiences. Through industrial experience, students combine work in the classroom with practical experience in industry, business, or government. The School of Engineering encourages students to view the employment phases of the program, not as mere practice, but rather as a complementary part of the educational process. Through industrial opportunities, students experience practical application for at least one academic semester. While formally enrolled in a work experience, students are considered as being enrolled full-time.

In order to receive academic credit for work experience, students will submit periodic reports on their work experiences as related to their engineering studies. These reports will be evaluated by the students' employers and faculty advisors who will assign a grade at the end of each work period. Students who receive a satisfactory grade for three semesters (or three periods of work experience which include at least 400 hours on the job in each work period) will receive the Industrial Experience Certificate upon graduation.

Work assignments exist, or can be developed, in every area of study within the School of Engineering. Assignments are available nationwide. Through diversified types of employment, students acquire a wide range of experience in fields related to their specializations. The level of responsibility and expertise required for the job increases to match the student's progress through the academic curriculum, thus assuring a stimulating, challenging employment situation. Salaries are established by individual employers, and increase as the student progresses academically.

Qualifying for Industrial Experience Program

Students applying to the industrial experience program should be full-time students in good academic standing with at least a 2.5 GPA. Freshman applicants qualify for an initial industrial experience after successfully completing at least 30 credit hours. Transfer students must complete a minimum of 12 hours as students in the School of Engineering. All students must have the equivalent of three full-time industrial experience semester credit hours to earn the certificate of completion. Policy information and specifics relating to the industrial experience program are available in the Office of Career Services. Students interested in applying for participation in the industrial experience program should contact the Office of Career Services, Mercer University, Macon, GA 31207.

Undergraduate Curricula

Bachelor of Science in Engineering Degree Program

The strength of Mercer's BSE program lies in its combination of breadth and depth. Breadth is achieved by every student completing a set of courses that build a strong foundation in writing, speaking, mathematics, lab sciences, and engineering fundamentals. In addition, special emphasis is placed on cross-disciplinary work, with all BSE students required to complete courses grounding them in the basic tools and techniques of electrical, mechanical, and industrial engineering. These "breadth" courses constitute the "core" of the BSE degree and are covered in greater detail in subsequent sections of this catalog. Depth is achieved by adding to the core foundation a set of courses in one area of specialization. The areas of specialization available are:

Biomedical
Computer
Electrical
Environmental
Industrial
Mechanical

The program educational objectives that have been established for the BSE program are as follows. Graduates are prepared to be practicing engineers with the knowledge and skills needed to: (1) identify, formulate, and solve engineering problems through analysis and design, using the principles of science and mathematics and the modern tools of engineering; (2) work effectively in a variety of contexts, using superior communication skills, knowledge of contemporary issues with a commitment to professional ethics, and life-long learning; (3) pursue additional graduate or professional education; and (4) participate in their local and global communities through sustaining service and leadership.

The program outcomes that have been established for the BSE program are as follows. Students at the time of graduation will know and be able to: (1) apply mathematics and science principles to the solution of engineering problems, (2) apply appropriate breadth and depth of skills in identification of engineering problems designed with realistic constraints, (3) apply appropriate breadth and depth of skills in engineering design and analysis of engineering problems designed with realistic constraints, (4) design and conduct experiments and analyze data, (5) function on interdisciplinary teams, (6) communicate to both specialized and public audiences in a variety of modes, i.e., writing, presentation, etc., (7) relate the practice of engineering to global contemporary issues, to professional ethics,

and to the need for lifelong learning, and (8) contribute to sustaining and improving community.

Mercer engineering seniors are required to exhibit their ability to conduct appropriate analysis and design a system, component, or process under a variety of realistic constraints. This engineering design project is a capstone requirement for all BSE seniors.

All senior engineering students are strongly encouraged to take the Fundamentals of Engineering (FE) exam during their senior year and demonstrate proficiency in both general and specialization areas of engineering. The FE exam is a nationally normed exam administered by the National Council of Engineering Examiners. Successful completion of this exam is the first step in attaining a license as a professional engineer. It is offered once during the fall and spring terms.

General Education Requirements

Engineers in the 21st century work in a complex world shaped significantly by culture and globalization. The general education requirements broaden the student experience beyond science, technology, engineering and mathematics. Students are encouraged to investigate their diverse talents and interests as part of an ongoing process of life-long learning. Four general education options, each requiring a minimum of 15 hours, allow latitude for students to explore among a rich array of topics at Mercer University or to pursue an in-depth expertise. Note that courses completed to satisfy the general education requirements cannot be used to satisfy other degree requirements. In keeping with the university's Baptist heritage, the School of Engineering requires its students, through each general education option below, to complete at least one religion course.

Engineering graduates from Mercer are increasingly employed in an international environment. Some graduates work for foreign companies. Others are placed in companies that compete in international markets. Many engineers and corporate executives have emphasized the need for schools of engineering to prepare graduates to practice in a global environment. Engineering students are encouraged to take courses that promote social, cultural, and global awareness.

Also, Mercer sponsors a number of international study alternatives for students, some of which have an engineering emphasis. Students are encouraged to take advantage of these travel and study opportunities to fulfill part of the general education requirements.

General education requirements may be satisfied by one of the following four options: Note that courses taken in any of these options may have prerequisites which must be satisfied.

Option 1, Minor. (minimum of 15 credit hours)

Students must complete the requirements for any one of the following minors, which do not include science, technology, engineering and mathematics courses. If not fulfilled by minor requirements, students must also complete one 3-hour religion course selected from AFR 230, CHR (any course), GBK 203, PHI 331, SOC 340, or WGS 363.

Minors typically require 15-18 hours; see appropriate departmental sections in this catalog for details. Request a Minor Advisor from that department.

Accounting
African American Studies
Anthropology
Journalism
Latin
Media Studies

Art
Business Administration
Christianity
Communications and Theatre Arts
Criminal Justice
Economics
English
French
German
History
Music
Philosophy
Photography
Political Science
Psychology
Sociology
Spanish
Teacher Education
Theater
Women's and Gender Studies

Option 2, Distributional Education Program. (15 credit hours)

Students must choose 3 hours from Group 1 and 3 hours from Group 2 for a total of 6 hours. The remaining 9 hours may be chosen from any of Groups 1-4. At least 3 hours must be 300-level or higher and build on a lower level experience.

Group 1, Religion (minimum of 3 hours)
AFR 230, CHR 101 or 150, GBK 203, PHI 331, SOC 340, or WGS 363

Group 2, Global, Social, & Cultural Studies (minimum of 3 hours)
Courses of the following disciplines: AFR, ANT, CRJ, CTA, ECN, EDUC, Foreign Languages, IAF, PSY, POL, PLS, SCP, SOC, WGS, or courses taken during an approved Study Abroad program

Group 3, Humanities & Fine Arts
Courses of the following disciplines: ART, CHR, CLA, CON, CTA, ENG, Foreign Languages above 111-112 (excluding FLL 467, 470), FYS, GBK, HIS, JRN, MUS, Applied Music, PHI, PHO, SST

Group 4, Business
Courses of the following disciplines: ACC, BUS, ECN, FIN, MGT, or MKT

Option 3, Thematic Program. (15 credit hours)

Working with their faculty advisor, students may propose an individualized, focused general education program. At least three hours must be taken in religion (Group 1 of Option 2). At least 3 hours must be 300-level or higher and build on a lower level experience.

Students may choose from a rich assortment of study abroad, interdisciplinary, and specialized studies. Freshmen may present a proposal to their advisor no sooner than the end of their first semester of collegiate study. The courses to be taken will be recorded on a form signed by the student, the advisor, and the Dean's Office.

Option 4, Great Books Program. (15 credit hours)

Complete 15 hours from the Great Books Program to include GBK 203 to fulfill the religion course requirement.

Integrated Bachelor of Science in Engineering (BSE) / Master of Science in Engineering (MSE)

An integrated bachelor of science in engineering/master of science in engineering program which involves a minimum of 30 semester hours (a full fifth year) beyond the 129 semester hours required for the BSE degree is available as an option for students who qualify for admission to the graduate program. Please see the graduate section near the back of this catalog for more information about this program.

Engineering Core

The engineering core is a set of required courses taken by all BSE students. Most of the freshman and sophomore courses are dedicated to basic subject matter in writing, speaking, mathematics, lab sciences, and engineering fundamentals. Special emphasis is placed on cross-disciplinary work, with all BSE students required to complete courses grounding them in the basic tools and techniques of electrical, mechanical, and industrial engineering. Following this preparation, students dedicate their junior and senior years to development of specialized proficiency. Prior to graduation each student must exhibit an ability to accomplish engineering design by completing a project in which small groups design, build and test a realistic engineering system.

Bachelor of Science in Engineering (BSE) Degree Requirements: Core Courses

1. Mathematics and Basic Sciences Courses……..…….23 hours
   - CHM 111. General Chemistry I
   - MAT 191. Calculus I
   - MAT 192. Calculus II
   - MAT 330. Intro to Differential Equations
   - PHY 121L. General Physics I Lab
   - PHY 161. General Physics I
   - PHY 162. General Physics II*
   - PHY 162L. General Physics II Lab*
   - *Environmental students take Biological/Earth Sciences, or additional chemistry course work in place of PHY 162 and PHY 162L
2. Engineering Courses……...……35 hours
   - EGR 107. Intro to Engineering Design
   - EGR 108. Professional Practice
   - EGR 126. Programming for Engineers
   - EGR 232. Statics/Solid Mechanics
   - EGR 235. Thermodynamics
   - EGR 236. Dynamics
   - EGR 244. Electrical Fundamentals I
   - EGR 245. Electrical Fundamentals II
   - EGR 246L. Electrical Fundamentals II Lab
   - EGR 252. Prob. and Statistics for Engr.
   - EGR 312. Engineering Economy
   - EGR 386. Feedback Control
3. Technical Communication Courses……..……3 hours
   - TCO 341. Technical Communication

Total Core Course Semester Hours Required……...……61 hours**
**Environmental Specialization …….....……..57 hours

A typical array of courses taken by students enrolled in the BSE programs is shown below. More detailed information appears in the specialization presentations shown elsewhere in this catalog.

Bachelor of Science in Engineering
Basic Level Curriculum

Freshman Year

First Semester			Second Semester		
UNV 101	Freshman Experience	1	EGR 107	Intro to Engr Design	3
EGR 108	Professional Practice[1]	3	EGR 126	Programming for Engineers[1]	3
MAT 191	Calculus I	4	MAT 192	Calculus II	4
CHM 111	General Chemistry	4	PHY 161	General Physics I[3]	3
XXX	Gen Ed I[2]	3	PHY 121L	General Physics I Lab[3]	1
			XXX	Gen Ed II	3
		15			17

[1] Approximately half of all engineering freshmen take EGR 108 in the fall semester, followed by EGR 126 in the spring. The other half of the freshman class takes EGR 126 in the fall semester followed by EGR 108 in the spring.
[2] XXX Gen Ed = General Education Requirement
[3] Biomedical and environmental students take CHM 112 this semester, and they begin their physics sequence in the fall semester of the sophomore year. For more detail see the course sequence for specific specializations.

Sophomore Year

First Semester			Second Semester		
XXE 28Z	Intro to (Specialty) Engr [4]	1	EGR 236	Dynamics	3
EGR 232	Statics/Solid Mechanics	3	EGR 235	Thermodynamics[6]	3
EGR 244	Electrical Fundamentals	4	EGR 245	Electrical Fund. II	3
MAT 330	Intro to Differential Eqns	3	EGR 246L	Electrical Fund II Lab	1
PHY 162	General Physics II[5]	3	EGR 252	Prob. and Stats. for Engr.	3
PHY 162L	General Physics II Lab[5]	1	Technical course required by specialty		4
		15			17

[4] XXX 28Z includes BME 288 and ISE 288, both one-credit courses taken by students in the specializations of biomedical and industrial engineering. The environmental specialization includes this introduction as a three-credit course, while the computer, electrical and mechanical specialization includes a three-credit general education course. For more detail see the course sequence for specific specializations.
[5] Environmental students take Biological/Earth Science or additional Chemistry course work in place of PHY 162 and PHY 162L. For more details, see the course sequence for specific specializations.
[6] Biomedical and computer engineering students take EGR 235 in the junior year. For more detail see the course sequence for specific specializations

Junior Year

First Semester			Second Semester		
EGR 312	Engineering Economy	3	EGR 386	Feedback Control	3
MAT 293	Multivariable Calculus [7]	3	TCO 341	Technical Communication	3
Technical courses required by specialization		11	XXX	Gen Ed III	3
			Technical courses required by specialization		7
		17			16

[7]Multivariable calculus is taken by students enrolled in the biomedical traditional path, electrical and mechanical specializations

Senior Year

First Semester			Second Semester		
XXX	Gen Ed IV	3	XXX	Gen Ed V	3
Technical courses required by specialization		13	Technical courses required by specialization		13
		16			16

EGR Courses

EGR 101. Freshman Engineering Honors (1-0-1)

Prerequisites: Outstanding high school GPA and SAT score. Permission of the dean.

Co-requisites: EGR 126 and MAT 191.

To familiarize the students with robots and robotic programming as a foundation to discuss the general topic of autonomy. EGR 101 is the first of two courses sequence that introduces freshmen engineering honors students to advanced topics normally not covered in freshman courses. This course is graded S/U.

EGR 102. Freshman Engineering Honors II (1-0-1)

Prerequisites: EGR 101.

Students explore fundamental issues involved in the design of autonomous entities including the possibility mimicking human behavior. EGR 102 is the second of a two-course sequence that introduces freshmen engineering honors students to advanced topics normally not covered in freshman courses. This course is graded S/U.

EGR 107. Introduction to Engineering Design (2-3-3)

Prerequisite: Be a fully admitted student in the School of Engineering or have the written permission of the dean.

Systematic procedures for engineering design. Student teams pursue design projects that incorporates problem identification, information gathering, development of alternative solutions, merit analysis, decision presentation, implementation, testing, and redesign. Students practice skills in preparing and presenting a variety of engineering-related written and oral reports.

EGR 108. Professional Practices (3-0-3)

Prerequisite: Be a fully admitted student in the School of Engineering or have the written permission of the dean.

In a seminar format, small groups explore the history of engineering, engineering ethics, and the impact of engineering practice in the context of society. Critical

reading and thinking skills are developed through extensive readings and discussions of relevant engineering, social science, and humanities topics. Students gain fluency in preparing and presenting the results of these discussions, both in written and oral format.

EGR 126. Programming for Engineers (3-0-3)
Prerequisite: Be a fully admitted student in the School of Engineering or have the written permission of the Dean.
Computer programming and the use of computers to solve engineering problems. Special attention is given to development of an organized thought process in which analysis, modeling, and construction of algorithms lead to structured procedures for solving non-trivial problems.

EGR 190-290-390-490. Cooperative Education Work Experience (0-1-1)
Prerequisites: Minimum GPA of 2.50; approval of Director of Cooperative Education and faculty advisor. Satisfy resident credit requirements. Four month work periods alternated with academic semesters.

EGR 201. Sophomore Engineering Honors I (1-0-1)
Prerequisite: EGR 102.
Each student develops a personal project plan for the remainder of the engineering honors experience. This course is graded S/U.

EGR 202. Sophomore Engineering Honors II (1-0-1)
Prerequisite: EGR 201.
Each student works with a faculty advisor in accordance with a personal project plan that was approved for the remainder of the engineering honors experience. This course is grade S/U.

EGR 232. Statics/Solid Mechanics (3-0-3)
Corequisites: MAT 192, PHY 161.
Equilibrium of concurrent force systems. Stress, strain, and axial deformation. Hooke's Law. Rigid-body equilibrium. Stresses and deformation in shafts and beams. Shear and bending moment diagrams. Column buckling.

EGR 235. Thermodynamics (3-0-3)
Prerequisites: PHY 161, MAT 192.
A first course in the fundamentals of thermodynamics. Properties of substances, open and closed systems, conservation of mass, conservation of energy and the second law of thermodynamics. Second law analysis of systems. Introduction to cycle analysis. Use of these principles in the analysis and solution of engineering problems.

EGR 236. Dynamics (3-0-3)
Prerequisites: EGR 232, MAT 192, PHY 161.
Planar kinematics of particles and rigid bodies. Planar kinetics of particles and rigid bodies: force and acceleration, work and energy, and impulse and momentum.

EGR 244. Electrical Engineering Fundamentals I (3-2-4)
Corequisite: MAT 330.
Basic electrical circuit analysis; DC and sinusoidal steady-state circuits, manual and computer analysis methods, capacitance and inductance.

EGR 245. Electrical Engineering Fundamentals II (3-0-3)
Prerequisite: EGR 244.
Corequisite: EGR 246L.
An introduction to electronic components: diodes, junction transistors, field effect transistors, operational amplifiers, and small signal amplifiers. Magnetic fields and circuits. Rotational and moving iron transducers, AC and DC motors and generators, transformers, single phase power and stepper motors.

EGR 246L. Electrical Fundamentals Lab (0-3-1)
Corequisite: EGR 245.
Basic methods and instrumentation for measurements of electrical circuits and operational amplifier and diode circuits. Planning of experimental processes and procedures; manual and direct computer collection of experimental data, and off-line and on-line data analysis. Reports of experimental investigation, including descriptions of study objectives, procedures and methods, analysis methods, results, and conclusions.

EGR 252. Probability and Statistics for Engineers (3-0-3)
Prerequisite: C or better in MAT 191.
Techniques and applications of probability and statistics. Variability and representation of data. Laws of probability, random variables and distributions. Confidence intervals and statistical hypothesis testing. Quality control and statistical inference. Design of experiments. Regression analysis. Use of spreadsheets and statistical software packages.

EGR 301. Junior Engineering Honors I (1-0-1)
Prerequisite: EGR 202.
Each student works with a faculty advisor in accordance with a personal project plan that was approved for the remainder of the engineering honors experience. This course is graded S/U.

EGR 302. Junior Engineering Honors II (1-0-1)
Prerequisite: EGR 301.
Each student works with a faculty advisor in accordance with a personal project that was approved for the remainder of the engineering honors experience. This course is graded S/U.

EGR 312. Engineering Economy (3-0-3)
Prerequisite: MAT 192.
Economics in engineering decision making, interest and present worth, depreciation, economic analysis of engineering alternatives. Project management, budgeting and cost estimation, and economic analysis. The use of software tools in economic analysis and project management.

EGR 386. Feedback Control and Modeling for Engineers (3-0-3)
Prerequisite: MAT 330.
Corequisites: EGR 236, EGR 245.
Solving linear time-invariant differential equations using Laplace transforms. Transient response for first and second order systems, including time constants, damping ratio, natural frequencies, overshoot and settling time. Relative and absolute stability. Analytical and empirical modeling of engineering systems. Control engineering topics including block diagrams, Routh Hurwitz, root locus and bode plots. Introduction to PID and lead/lag compensators and to design of feedback control systems with root locus, bode and or simulation.

EGR 401. Senior Engineering Honors I **(1-0-1)**
Prerequisite: EGR 302.
Each student submits a draft version of his or her Engineering Honors Report. This course is graded S/U.

EGR 402. Senior Engineering Honors II **(1-0-1)**
Prerequisite: EGR 401.
Each student revises the draft version of his or her engineering Honors Report in response to faculty reviews and submits the final version in completion of the requirements for the Engineering Honors Program. This course is graded S/U.

SPECIAL COURSES: EGR 191, 192, 193, 491, 492, 493, 498, 499 for variable credit. May be repeated for credit with approval of academic advisor and department chair.

EGR 191-192-193. Special Topics **(1-6 hours)**

EGR 291-292-293. Special Topics **(1-6 hours)**

EGR 491-492-493. Special Topics **(1-6 hours)**

EGR 498. Professional Seminar **(1-6 hours)**

EGR 499. Independent Study **(1-6 hours)**

Technical Communication

Technical communication is a relatively new professional field of study that is gaining prominence as society becomes more and more immersed in technology. Technical communicators serve as information architects; as translators of technical information for nonspecialist users; as bridges between people in different businesses, cultures, or disciplines; and as user advocates on design teams. They are skilled in writing, speaking, designing documents, using advanced information technologies, working with people, and solving complex problems of communicating information using technology.

The Bachelor of Science (BS) in Technical Communication degree program draws upon the resources of several disciplines to provide a foundation in sciences, mathematics and technology, together with strong emphasis on communication skills. This program enables students to enter a wide variety of career fields. The technical communication degree program emphasizes mastery of the theoretical, rhetorical background of communication, while providing practical, hands-on experience. In the same way that engineering applies the principles of mathematics and science to real-world problems, so technical communication applies the principles of communication to real-world problems in technical settings.

Graduates are well prepared for entry-level positions in technical writing and editing, documentation, publications design management, advertising and marketing for technical fields, training, web design, instructional design, and many others. Majors are encouraged to join professional organizations, such as Mercer's Student Chapter of the Society for Technical Communication. A number of graduate programs in technical communication are available for advanced study, including Mercer's Master of Science in Technical Communication Management, offered via distance learning.

Students are encouraged to enter internships for practical experience, and they are expected to work as members of design teams at several levels. Students may, by careful planning, earn a major both in technical communication and in another discipline.

The minor in technical communication provides an attractive component for many degree programs (see description below).

Technical communication courses are open to any students, regardless of their college or major, who have the prerequisites and/or appropriate experience.

Academic Requirements for BS, Technical Communication Major

In addition to the general academic requirements of the University and the School of Engineering, technical communication students must maintain a grade point average of at least 2.0 in all courses carrying a TCO prefix or counted as part of the TCO major.

Departmental Honors for BS, Technical Communication Major

Each year, the technical communication faculty determines the graduating

technical communication student who has best distinguished himself or herself academically and whose undergraduate career best exemplifies the standards of the profession and recognizes this student as the Outstanding Graduate in Technical Communication.

TCO Scholarships

The Jeffrey Mavro TCO Scholarship provides financial awards for selected Undergraduates majoring in Technical Communication. Consult University Admissions or the Chair of the Technical Communication Department for more information.

The David C. Leonard Scholarship provides funds for selected graduate students in the Master of Science Program. Consult the department chair for information, or see www.mercer.edu/mstco.

The Technical Communication BS Curriculum

The program educational objectives that have been established for the Bachelor of Science in Technical Communication are as follows. Graduates are prepared to be professionals with the knowledge and skills needed to: (1) analyze the audience for any communication, define its purpose, and design an appropriate communication product to meet the needs, (2) write and speak clearly for various audiences, present information accurately and persuasively, use a variety of media appropriately, and work successfully in a team environment, and (3) serve as the user advocate on design teams, focusing attention on design alternatives that respect the needs of the users and add value to technical products.

The program outcomes that have been established for the Bachelor of Science in Technical Communication are as follows. Students at the time of graduation will know and be able to do the following: (1) apply basic principles of mathematics, science, communication, information design, and technology to the solution of technical problems, (2) apply appropriate breadth and depth of skills in audience analysis, document design, and rhetorical purpose to solving technical communication problems, (3) design and conduct user/task analyses, expert interviews, and usability tests; gather, analyze, and use data to design effective informational products, (4) communicate effectively to both specialized and public audiences in a variety of modes, using a variety of media appropriate to the projects assigned, (5) relate the practice of technical communication to global contemporary issues, to professional ethics, and to the need for lifelong learning, (6) demonstrate the ability to lead and manage projects and participate in interdisciplinary teams, and (7) contribute to sustaining and improving community.

Bachelor of Science (BS) Degree Requirements
Technical Communication Major

1. UNV 101 . . . . . .1 hour
2. Engineering, Mathematics, and Science Core . . . . . .Approx. 31 hours
   (Depending upon placement; may substitute higher-level courses)
   EGR 107. Introduction to Engineering Design
   EGR 108. Professional Practices
   EGR 126. Programming for Engineers [or CSC 204]
   MAT 126. Elementary Statistical Methods
   MAT 133. Precalculus
   MAT 141. Calculus for the Social Sciences

Three courses (at least 1 Physics and Lab) from these:
PHY 115. Descriptive Astronomy
PHY 141. Intro. Physics I
PHY 121L. Intro. Physics I Lab
PHY 142. Intro. Physics II
PHY 142L. Intro. Physics II Lab
EES 150. Introduction to Environmental Science
EES 210. Environmental Geology
EES 105. Geology
EES 110. Meteorology
CHM 108. Concepts of Chemistry
CHM 111. General Chemistry I
CHM 112. General Chemistry II
BIO 205. Intro. To Biology for Biomedical Engineers
BIO 211. Introduction to Biology I

3. Required TCO Courses . . . . . .19 hours
TCO 285. Document and Web Design
TCO 341. Technical Communication
TCO 361. Usability
TCO 363. Instructional Design
TCO 421. Technical Editing
TCO 480. Introduction to Senior Design or Internship
TCO 487. Senior Design Project I, and
TCO 488. Senior Design Project II
Or
TCO 496. Technical Communication Internship, plus
TCO 498. Graduation Exhibit

4. TCO Electives . . . . . .24 hours
(Minimum, with at least 4 courses numbered 300 or above)
TCO 325. Multimedia
TCO 345. Communication in Management
TCO 351. Reports & Proposals
TCO 376. Visual Communication
TCO 425. Advanced Multimedia
TCO 476. Communication in High-Tech Environments
TCO 491. Special Topics: (subtitle)
TCO 492. Special Topics: (subtitle)
ART 354. Digital Imaging
CTA 276. Video Production
CTA 370. Public Relations: Theory and Methods
CTA 400. Senior Seminar in CTA: Ethics
CSC 206. Visual Programming
IDM 470/BUS 349. Management Information Systems
IST 220. Introduction to Databases
IST 221. Introduction to Networks
IST 276. Introduction to Internet Programming
PHO 221. Art of Photography

5. General Education Requirements . . . . . .15 hours
BS students in Technical Communication select from the same General

Education Requirements as BSE students. Please refer to the BSE General Education section of this catalog.

6. Professional Area Electives . . . . . .15 hours
   Students must select one of the Professional Areas outlined below. These courses are designed to develop strength in a corollary discipline compatible with the student's career plans. In some departments, this professional elective may be called a minor and be so listed on the transcript.

   At least three courses should be selected from courses numbered 300 or above. Consult the faculty advisor for best fit with career plans.

   (1) Computer Science or Information Science Technology
   A large percentage of technical communication careers involve the computer industry; having a grasp of computer science and information technology is an asset for technical communicators. See the College of Liberal Arts section of the catalog for descriptions of minors in CSC and IST.

   (2) Business Minors
   Understanding the business environment is a great help in working in corporate settings. The Stetson School of Business & Economics offers minors to non-BBA students in Accounting, Business Administration, and Economics. See the SSBE section of this catalog for requirements.

   (3) Foreign Language
   Many companies are international, and having skills in a language will be an asset. Courses leading to a minor in French, Spanish, or German will involve at least two courses numbered 300 or above. The total number of courses will depend upon the student's earlier preparation and fluency. Please see the Foreign Languages and Literatures Department in the College of Liberal Arts and consult the catalog.

   (4) Engineering Emphasis
   Preparation for working in engineering environments helps open doors within highly technical companies. Working with the chair of the chosen specialization area, the student selects at least 15 hours from the specialization. Students must meet the prerequisites of the courses selected and approved for the Professional Area.

   (5) Communication and Theatre Arts or Media Studies
   Concepts in communication, mass media, journalism, speaking, and video are relevant courses for technical communicators. See the description of the minors in CTA in the College of Liberal Arts section of this catalog.

   (6) Individualized
   Students may individualize their choices, providing they select at least 15 hours making a coherent, logical set of courses, with at least 3 courses numbered 300 or above. Consult with your advisor and get approval from the chair of Technical Communication.

7. Free Electives . . . . . .Variable
   Students will take free electives as needed to gain the 129 hours required for graduation. These electives are entirely open for student choice.

Total Semester Hours Required . . . . . .129 hours

Double and/or Second Majors

Students are encouraged to investigate the possibility of combining another major with the technical communication major, especially when preferred career directions are clear early in their academic programs. This option may provide opportunities to combine fields of interest, even widely dissimilar ones.

Minor in Technical Communication

Students wishing to earn a minor in technical communication should select at least 15 hours of course work in technical communication courses, including TCO 285, TCO 341 and at least two other courses above 300. The student should consult with the chair of his/her major academic unit to get approval for selected courses and then formally declare the TCO minor.

Sample 4-Year Curriculum

The Bachelor of Science in Technical Communication degree may be completed in four years. This sample curriculum shows one possible configuration of courses, but will vary according to each student's circumstances (for example, students who exempt MAT 133 will have 4 more hours of free electives).

Technical Communication

Freshman Year

Fall Semester					Spring Semester				
UNV 101	Freshman Experience	1	0	1	EGR 107	Intro to Engr Design	2	3	3
EGR 108	Professional Practices	3	0	3	EGR 126	Programming for Engr	3	0	3
MAT 133	Pre-Calculus	4	0	4	MAT 141	Calc for Soc Science	3	0	3
XXX	Science course w/Lab	3	3	4	PHY 1XX	Science course w/Lab	3	3	4
XXX	Gen Ed I	3	0	3	XXX	Gen Ed II	3	0	3
		14	3	15			14	6	16

Sophomore Year

Fall Semester					Spring Semester				
TCO 285	Document & Web Design	3	0	3	TCO 325	Multimedia	3	0	3
MAT 126	Elem. Statis. Methods	3	0	3	TCO 341	Tech. Comm.	3	0	3
XXX	Science course w/Lab	3	3	4	TCO XXX	(TCO Elective)	3	0	3
XXX	Gen Ed III	3	0	3	XXX	Prof. Area Elective	3	0	3
TCO XXX	(TCO Elective)	3	0	3	XXX	Gen Ed IV	3	0	3
XXX	Elective	3	0	3	XXX	Elective	3	0	3
		18	3	19			18	0	18

Junior Year

Fall Semester					Spring Semester				
TCO XXX	(TCO Elective)	3	0	3	TCO 361	Usability	3	0	3
TCO XXX	(TCO Elective)	3	0	3	TCO XXX	(TCO Elective)	3	0	3
XXX	Elective	3	0	3	XXX	Prof. Area Elective III	3	0	3
XXX	Prof. Area Elective II	3	0	3	XXX	Elective	3	0	3
XXX	Gen Ed V	3	0	3	XXX	Elective	3	0	3
					TCO 480	Intro to Senior Design or Internship	0	1	0
		15	0	15			15	1	15

Senior Year

Fall Semester					Spring Semester				
TCO 363	Instructional Design	3	0	3	TCO 496	Internship*	1	0	3
TCO XXX	(TCO Elective)	3	0	3	TCO 498	Graduation Exhibit*	1	0	1
XXX	Prof. Area Elective IV	3	0	3	TCO 421	Tech Editing	3	0	3
XXX	Elective	3	0	3	TCO XXX	(TCO Elective)	3	0	3
XXX	Elective	3	0	3	XXX	Prof. Area Elective V	3	0	3
					XXX	Elective**	3	0	3
		15	0	15			14	0	16

*Or Senior Design 487-488
**Number of Free Electives will vary; must reach total hours of 129

TCO Courses

TCO 285. Document and Web Design (3-0-3)

Designing effective print and web documents for varying audiences and purposes. Includes basic design principles, integration of visuals, analysis of multiple documents, production issues, and introduction to computer software for desktop publishing and web design. Requires additional lab time outside of class.

TCO 325. Multimedia (3-0-3)

Prerequisite: TCO 285.
An introduction to the technical aspects of computer-based multimedia. Technical and hardware issues as well as theory and design concepts will be covered. Students will analyze the audience and purpose for multimedia, consider advantages and disadvantages of different technologies, and design, build and test multimedia products. Recommended for TCO majors and minors. Includes laboratory exercises and design projects.

TCO 341. Technical Communication (3-0-3)

Prerequisites: EGR 108 or equivalent; completed minimum 45 credit hours.
Introduction to forms and processes of technical communication, including letters and memos, reports, instructions, and proposals. Includes oral presentations, peer reviews, collaborative efforts. Emphasis is on determining audience and purpose, especially within organizational contexts, and on designing effective documents. Introduction to resume and data gathering.

TCO 345. Communication in Management (3-0-3)

Prerequisite: TCO 341, or permission of instructor.
Study of the role of communication in management of publications, projects, and people. Includes information specification and planning, quality standards, tracking systems, production, and evaluation. Emphasis on understanding organizational structures, building teams, and adapting to rapidly changing technologies and expectations.

TCO 351. Reports and Proposals (3-0-3)

Prerequisite: TCO 341.
Covers the principles involved in preparing scientific or technical reports and proposals for various audiences. Audience analysis, clarification of communication purposes, and presentational skills are included. Attention is given to research skills, individual and collaborative writing processes, review and editing procedures, layout and document design, and styles of reports and proposals.

TCO 361. Usability (3-0-3)
Prerequisites: TCO 285, TCO 341.
Theory and practice of designing usable information for different audiences and purposes (document usability, interface design, web usability, etc.). Students participate in a major course project introducing planning and project management, user and task analysis, document and interface design, usability testing. Includes laboratory exercises and design projects.

TCO 363. Instructional Design (3-0-3)
Prerequisites: TCO 285, TCO 341.
Theory and practice of designing information products for teaching or training; includes concepts of adult learning theory, delivery in various models (face to face, online, on CD, etc.), and evaluation of learning. Students participate in a major course project including planning and project management, instructional design, and training.

TCO 376. Visual Communication (3-0-3)
Prerequisite: TCO 285 or permission of instructor.
Introduction to theoretical and applied principles of visual communication. The course explores theories of visual communication which help us understand the structure and organization of the visual world, and explores practical applications of these principles in planning and designing visual systems for new, emerging media. Includes laboratory exercises and design projects.

TCO 421. Technical Editing (3-0-3)
Prerequisite: TCO 341.
A workshop course covering the essential tasks performed by technical editors, including editing for grammar, style, form, and content; organizational principles for reader-centered texts; integrated use of art, figures, and numbers in layout; indexing; and managing people and processes in all phases of document preparation. Attention is given to the editor's role in dealing with authors, audiences and purpose, and to the complex analytical skills required for technical editors.

TCO 425. Advanced Multimedia (3-0-3)
Prerequisites: TCO 285, TCO 325, and TCO 341.
This course is an advanced study of the technical aspects of multimedia, including animation, video, audio, wiki design, podcasting, and multimedia portfolios. Students will build web content in a collaborative wiki environment, author custom animation, and shoot and edit digital video for incorporation into an online project. The end deliverable is an authored DVD with a professional portfolio.

TCO 476. Communication in High-Tech Environments (3-0-3)
Prerequisite: TCO 341.
This senior capstone course focuses on a topic of significance in the future of technical communication. Through research and presentations, students generate a body of knowledge and identify critical issues related to the future of technical communication.

TCO 480. Introduction to Senior Design or Internship (0-1-0)
Prerequisites: TCO 341 and at least two additional required TCO Core Courses.
Course provides guidance for selecting either Senior Design or Internship options. To successfully complete the course, students will either (a) establish a team and select a design project, or (b) find an appropriate full-time internship. Seminars will

be conducted to assist students in creating portfolios, defining projects, creating an action plan, and interviewing with potential clients or employers. Seminar attendance is required to obtain a satisfactory course grade. Graded S/U.

TCO 487, 488. Senior Design Exhibit I, II (1-3-2, 1-3-2)

Prerequisites: TCO 341, senior standing, permission of chair of TCO department. Technical communication design project in small groups; plan, design, produce, test, and revise a technical document or product under faculty supervision. Prepare presentations at both proposal and final phases. Students must design document(s) or products appropriately for audience and purpose; master technical content, organization, and layout; use appropriate technology; and write with clarity and precision. Professional presentational skills are expected. TCO 488 includes Graduation Exhibit.

TCO 496. Technical Communication Internship (1-0-3)

Prerequisite: permission of chair of TCO department.
Corequisite: TCO 498.
This full-time, semester-long internship is the preferred option for TCO majors. Provides the student with practical experience in a technical communication setting, under the supervision of a faculty member. A journal and written report will be submitted, along with documents produced in the internship, if applicable. Interns will deliver a seminar for faculty and students on their internship experience (see TCO 498). Graded S/U

TCO 498. Graduation Exhibit (1-0-1)

Prerequisite: senior status.
Corequisite: TCO 496.
Public presentation of portfolio, seminar, or other senior capstone exhibits. Required for students selecting TCO 496, Internship, rather than TCO 487-488, Senior Design Project.
SPECIAL COURSES: TCO 491, 492, 493, 499 for variable credit. May be repeated for credit with approval of academic advisor and department chair.

TCO 491-492-493. Special Topics (1-6 hours)

TCO 499. Independent Study (1-6 hours)