

COLLEGE OF ENGINEERING

UNIVERSITY OF SOUTH FLORIDA - 2008/2009 UNDERGRADUATE CATALOG

MISSION STATEMENT

The mission of the USF College of Engineering is to continuously aspire to excellence in teaching, research and public service. The College values academic excellence, professionalism, ethics and cultural diversity among its students, staff and faculty. The College is committed to addressing the needs of its constituencies and gives careful consideration to the urban and suburban populations in our service area.

At the undergraduate level the College is committed to provide students with a strong, broad-based, fundamental engineering education as preparation for careers in industry in a global environment, and government, or as preparation for advanced studies in professional schools of engineering, science, law, business and medicine.

At the graduate level students work in close collaboration with faculty, pursuing advanced topics within their disciplines, which will result in advancements in their fields and society at large.

Utilizing the expertise of its individual and collective faculty, the College is dedicated to the development of new fundamental knowledge and processes or procedures, which will benefit all humanity. The College promotes multi-disciplinary approaches, commitment to life-long learning and awareness of societal issues, which are requisite for meeting technological challenges.

The College provides technical assistance and technology transfer to the region, state and nation. In all facets of teaching, research and service, the College emphasizes close liaisons with industry and government to provide students and faculty with the skills and perspectives needed to ensure effective technological leadership.

DEPARTMENTS AND PROGRAMS

The College of Engineering offers undergraduate and graduate programs to prepare students for a broad spectrum of professional careers in engineering. Laboratory experience as well as real-world participation in technological problem solving is a key aspect of a professional engineer's college education. The College of Engineering, in implementing this need, augments modern laboratory and research facilities in close collaboration with the professional societies and the many industries in the metropolitan Tampa Bay area. The College of Engineering offers undergraduate degrees in Chemical Engineering, Civil Engineering, Computer Engineering, Computer Science, Information Systems, Electrical Engineering, General Engineering, Industrial Engineering, and Mechanical Engineering. In addition, the College offers a minor in Biomedical Engineering and several certificate programs offering additional specialization expertise in a related or cross disciplinary area.

The engineering programs of the College have been developed with an emphasis on three broad aspects of engineering activity: design, research, and the operation of complex technological systems. Students who are interested in advanced design or research should pursue the 5-Year Program leading to a Master of Science degree in a designated Engineering discipline. The Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology, Inc. (ABET) has accredited the Engineering programs of the College (Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Industrial Engineering and Mechanical Engineering). The Bachelor of Science program in Computer Science is accredited by the Computing Accreditation Commission (CAC) of ABET.

The supervision of the academic programs for the College is the function of the administrative departments together with several coordinators. Each department is responsible for specific professional programs, faculty, laboratories, and student advising.

The Departments and Programs section that follows contains descriptions of the engineering degrees offered by the College. The "Four Year Programs" section includes courses students need to take, beginning with the freshman year, to earn the Bachelor of Science in Engineering degree.

Students interested in particular programs offered by the College of Engineering should direct their inquiries to the College of Engineering Office of Student Services (see Advising section below). Information is also available on the College's website: <http://www.eng.usf.edu/>.

PROFESSIONAL ENGINEERING

The College of Engineering recognizes that modern engineering solutions draw on knowledge of several branches of engineering. It also recognizes that future technological and societal developments will lead to shifting of the relative emphasis on various branches of engineering, triggered by new needs or a reassessment of national goals. For this reason the College's programs include a strong engineering foundation portion, designed to equip the prospective engineer with a broad base of fundamental technical knowledge. To this foundation is added the student's specialization of sufficient depth to prepare him/her to embark successfully on a professional career.

The Bachelor of Science degrees offered in the various engineering disciplines provide the student a broad education with sufficient technical background to contribute effectively in many phases of engineering not requiring the depth of knowledge needed for advanced design or research. The baccalaureate degree is considered the minimum educational credential for participating in the engineering profession and is the first professional degree. Students interested in design and research are strongly encouraged to pursue advanced work beyond the baccalaureate either at this or other institutions. It is evident that large segments of today's engineering professionals are involved in some form of post baccalaureate study. Engineers are earning advanced degrees to obtain the information and training necessary to meet effectively tomorrow's technological challenges. All are faced with the continuing problem of refurbishing and updating their information skills and most are obtaining advanced information by means of formal graduate study, seminars, special institutes and other such systems designed for this purpose. *Life-long learning is a fact in engineering practice and graduates must be committed to it.*

The Bachelor of Science degree program in a designated engineering discipline and the Master of Science degree in the same discipline may be pursued simultaneously in a program called the Five-Year Program.

Professional Registration

Students who have attained senior status, and are in good academic standing in an ABET accredited Engineering Program, are eligible to register for examinations leading to licensure as Professional Engineers. The first examination, called the Fundamentals of Engineering (FE) Exam, is offered by the Florida Board of Professional Engineers and is usually taken the semester prior to graduation. In addition to the knowledge acquired through the engineering curriculum, many students take advantage of review courses offered by the Engineering Student College Council or the College of Engineering's distance education program, APEX, to prepare for the Fundamentals of Engineering Examination. Registering for the FE exam during the senior year is strongly encouraged for students graduating with an engineering degree.

Preparation for Engineering

Students planning to attend USF's College of Engineering should familiarize themselves thoroughly with the College's admissions standards and requirements for their prospective program, which are more stringent than the University's minimum entrance requirements.

The high school student anticipating a career in engineering should select the strongest academic program available, including four years each of English, mathematics and science (preferably including Chemistry, Physics, and Biology), as well as full programs in the social sciences and humanities.

Prospective students considering engineering at the University of South Florida who lack certain preparation in high school must elect to follow a program to overcome their deficiencies. Alternatives for these students, classified as "Pre-Engineering majors" might include preparatory coursework at the University of South Florida or the many community colleges that offer the preliminary coursework.

Students planning to transfer to the University of South Florida's engineering program from a Florida state operated college or university should follow a pre-engineering program leading to an A.A. degree. All transfer students should complete as much of the mathematics and science coursework as is available to them. Junior/community college students intending to pursue an engineering program at USF should contact the advisor at their institution and request a course equivalency list.

In general, engineering courses taken for military training, at the lower level, or as part of an A.S. or technology degree are not transferable to the engineering programs. Transfer students should be aware that the College expects them to meet departmental admission requirements just as it expects its own students to meet these requirements.

The Office of Engineering Student Services will assist prospective transfer students in formulating a sound total program. Interested students should contact the Director of Advising (813/974-2684 or kjohnson@eng.usf.edu) furnishing sufficient details to permit meaningful response.

College Computing Facilities

The College provides access to centralized computing facilities to undergraduate and graduate students. Most engineering departments also provide students with local facilities. The University is an Internet2 site and links are available to directly connect to all major supercomputing centers in the country.

The College provides enterprise level servers for computing, mail, file, web and database services for students and faculty. The College operates several computer open-access labs for student use. These labs are equipped with a large number of modern PCs and Unix workstations. Laboratory computers have the necessary software required for coursework as well as other standard productivity software. The College also supports a state-of-the-art multimedia lab.

Laboratory computers provide the software required for coursework and research. Standard programming languages such as FORTRAN, Basic, Pascal, C, C++ and Java are provided on these machines. General-purpose software such as MS Office, MS Visual Studio and specialized engineering software including mathematical packages (Mathcad, MATLAB, Mathematica, Maple, Macsyma, TK Solver), statistical package (SAS), discipline specific application packages such as Abaqus, Ansys, ARENA, Aspen, Cadence and Labview are provided on Unix and Windows platforms on the network and in the labs. Several database management system software packages such as Oracle, MySQL, MSSQL and MS Access are available for classwork. Multi-media software packages such as MS FrontPage, Adobe Acrobat, Illustrator, Photoshop, Omni Page Pro, Paint Shop Pro, Macromedia Dreamweaver and Flash are available in the multi-media lab. The university has also entered an agreement with Microsoft Corporation for upgrade of

standard office application, development tools and desktop operating systems.

The college-wide Ethernet network is connected to the USF campus-wide Gigabit Ethernet backbone. Within the College connections are provided to laboratories via 100 Mbps Ethernet. The university's Internet2 connection links it to more than 150 major universities and research institutions in the nation.

Student Computer Recommendations

It is strongly recommended that engineering students obtain a laptop (suggested) or desktop computer prior to the semester in which specialization courses commence. The recommended computer configuration for engineering applications is indicated on the College web page www.eng.usf.edu/. For further details, contact the Associate Dean of Engineering or the Director of Engineering Computing in the College.

Cooperative Education and Internship Programs

A wide variety of industries and government agencies have established cooperative education and internship programs for engineering students to provide them the opportunity to become familiar with the practical aspects of operations, engineering research, and careers. Students in the Career Resource Center's Cooperative Education (Co-op) program may alternate periods of paid employment in their major field with like periods of study, or may elect to participate in part-time employment while attending classes every semester. Students following the Co-op program usually encounter no problems in scheduling their program, since required Social Science and Humanities, Mathematics and Science, and Engineering Common courses are offered every semester. Students normally apply for participation in this program during their sophomore year and pursue actual Co-op employment during their junior and senior years. The senior year is generally pursued on a full-time study basis, since many specialization courses are not offered every semester. The students receive a Cooperative Education Certificate upon successful completion of a minimum of two work assignments.

Engineering Students in the University Honors College

Engineering students participating in the University Honors Program are able to complete their Engineering Bachelors degree in four years. Many enter the 5 Year program in the fourth year to pursue the combined Bachelors and Masters programs in Engineering. Students who qualify for the Honors Program at USF should contact the Honors College or Engineering Student Services to learn about the benefits of this prestigious program.

Army, Air Force & Navy R.O.T.C. For Engineering Students

The academic and technological knowledge an engineering degree provides is a distinct advantage to individuals interested in a military appointment or career. This is especially true for those participating in one of the ROTC programs at USF.

Five-Year Programs Leading to the Bachelor and Master of Science Degrees in Engineering

Well qualified students who, at the beginning of their senior year, are clearly interested in graduate study are invited to pursue a Five-Year Program of study leading simultaneously to the Bachelor of Science and Master of Science in Engineering.

Undergraduate Admission to the College of Engineering

Students may apply to the College of Engineering upon initial entry to the University by declaring Engineering as their intended major on their admissions application. When a student is accepted to USF, engineering admissions officers will review the necessary credentials and notify the applicant of his or her Engineering status.

Continuing USF students may apply through the Office of Engineering Student Services. To be considered for admission to the College, an applicant must be accepted by the University as a degree-seeking student and be in good standing academically.

College of Engineering Admission Requirements

Students meeting or exceeding the below criteria are granted direct entry to the College. Others are classified "Pre-Engineering." Pre-Engineering and transfer students are fully admitted to the College after satisfactorily completing Calculus I and II and Physics I and II with labs. Additional requirements must be met prior to admission to specific degree programs.

1. Freshmen:
 - a. Test Scores:
 - SAT—combined score of 1150 minimum with a minimum quantitative of 550.
 - ACT—combined score of 25 minimum and mathematics of 25 minimum.
 - b. High School Mathematics: Should include sufficient algebra and trigonometry to enter Engineering Calculus I.
 - c. High School Grade Point Average of 3.0/4.0.
2. Transfer Students:
 - a. Engineering
 - Florida community college transfer students that have completed the courses shown below with a minimum grade of "C" are accepted directly into the College of Engineering. Additional requirements must be met prior to admission to specific degree programs.

Communications:
ENC 1101/1102 English I and II (6)

Humanities & Social Sciences:
Humanities Courses (6)
Social Science Courses (6)
Humanities or Social Sciences (3)

Mathematics:

USF	C/C
MAC 2281	MAC 2311* (4)
MAC 2282	MAC 2312* (4)
MAC 2283	MAC 2313* (4)
MAP 2302	MAP 2302 (3)

*or MAC 2281, MAC 2282, MAC 2283

Natural Sciences:

USF	C/C
CHM 2045	CHM 1045* (3)
CHM 2045L	CHM 1045L* (1)
PHY 2048	PHY 2048 (3)
PHY 2048L	PHY 2048L (1)
PHY 2049	PHY 2049 (3)
PHY 2049L	PHY 2049L (1)

*or CHS 1440 Chemistry for Engineers
- b. Computer Science
 - Transfer students into the Computer Science program from a Florida community college are not required to have MAP 2302 or the Chemistry course indicated above.
- c. Information Systems
 - Transfer students into the Information Systems program from a Florida community college are not required to have MAP 2302 or Calculus III or the Chemistry course indicated above.

All other transfer students should contact the College's Admission Office (813/974-2684).

Transfer Credit

The USF College of Engineering will accept transfer credit when appropriate if the transferred course has been passed with a grade of "C" or better. In some cases credit for a course may be granted, but the hours accepted may be less than the hours earned at another school.

While credit work from other institutions may be granted subject to the conditions of the previous paragraph, at least 30 credit hours including a *minimum* number of semester hours of engineering coursework specified by the degree-granting department must be taken at USF to receive the baccalaureate degree.

Transfer credit evaluation is conducted in the Office of Engineering Student Services. Transfer students should be prepared to submit College catalogs and course syllabi from the previous institution if requested.

In general, engineering and technology courses taken at the lower level, at technical schools, or as part of professional or military training, are not applicable to the degree programs of the College of Engineering.

Required Prerequisites for Entering Engineering programs

Once a student has been admitted to the College of Engineering, he/she must then seek admission into one of the academic departments. Departmental admissions requirements vary by program. Students considering transferring to USF should familiarize themselves with the requirements for their intended department as early as possible. Students admitted to the University of South Florida and the College of Engineering must qualify for the program of their choice by completing the courses and successfully meeting the GPA criteria detailed below. Unless otherwise stated, the minimum acceptable grade in math and science prerequisites is a C (C- is insufficient). Minimum acceptable grades for math, science and engineering courses, as they pertain to specific degree programs are defined by the academic departments. Students are *strongly encouraged to familiarize themselves with departmental guidelines*.

Prior to being admitted to a department, a student may be permitted to take no more than two departmental engineering courses. Once admitted, individual departments may have continuation requirements which specify minimum performance standards in the core courses for the discipline which must be met before further registration in the Department is granted.

The Department of Chemical & Biomedical Engineering

Bachelor of Science in Chemical Engineering:

- Completion of MAC2311 or MAC2281, MAC2312 or MAC2282, MAC2313 or MAC 2283
PHY2048, PHY2048L, PHY2049, PHY2049L
CHM2045, CHM2045L
with a minimum grade of C in each course.
- A minimum overall GPA of 2.0
- A minimum USF GPA of 2.0

The Department of Civil and Environmental Engineering

Bachelor of Science in Civil Engineering:

- Completion of MAC2311 or MAC2281, MAC2312 or MAC2282, MAC2313 or MAC 2283
PHY2048, PHY2048L, PHY2049, PHY2049L
CHM2045, CHM2045L
with a 2.3 GPA (based on best attempt) in these prerequisites
- A minimum overall GPA of 2.0
- A minimum USF GPA of 2.0

The Department of Computer Science and Engineering

Bachelor of Science in Computer Engineering and Bachelor of Science in Computer Science

Admission to the Department as a Pre-CSE student requires

- Completion of ENC1101, ENC1102, MAC2311 or MAC2281, MAC2312 or MAC2282, PHY2048, PHY2048L, PHY2049, PHY2049L with a 3.0 GPA (based on best attempt in these courses) and a minimum grade of "C" in each course (grades of "C-" are insufficient).
- A minimum overall GPA of 2.0
- A minimum USF GPA of 2.0

Admission to one of the three major degree tracks is granted by also meeting the following continuation requirements

- Completion of CDA3103 and COP3514 with a minimum grade of "C", based on best attempts in each course ("C-" is insufficient).
- A minimum overall GPA of 2.0
- A minimum USF GPA of 2.0

Bachelor of Science in Information Systems

Admission to the Department as a Pre-CSE student requires

- Completion of ENC1101, ENC1102, MAC2311, MAC2281 or MAC2241, MAC2312, MAC2282 or MAC2242, PHY2048 and PHY2048L or PHY2053 and PHY2053L, PHY2049 and PHY2049L or PHY2054 and PHY2054L with a 3.0 GPA (based on best attempt in these courses) and a minimum grade of "C" in each course ("C-" is insufficient).
- A minimum overall GPA of 2.0
- A minimum USF GPA of 2.0

Admission to one of the three major degree tracks is granted by also meeting the following continuation requirements

- Completion of CDA3103 and COP3514 with a minimum grade of "C", based on best attempts in each course (grades of "C-" are insufficient).
- A minimum overall GPA of 2.0
- A minimum USF GPA of 2.0

The Department of Electrical Engineering

Bachelor of Science in Electrical Engineering:

- Completion of MAC2311 or MAC2281, MAC2312 or MAC2282, MAC2313 or MAC 2283, PHY2048, PHY2048L, PHY2049, PHY2049L, CHM2045, CHM2045L with a minimum grade of C in each course and a 2.25 GPA based upon all attempts in these courses.
- A minimum overall GPA of 2.0
- A minimum USF GPA of 2.0

The Department of Industrial and Management Systems Engineering

Bachelor of Science in Industrial Engineering:

- Completion of MAC2311 or MAC2281, MAC2312 or MAC2282, MAC2313 or MAC 2283, PHY2048, PHY2048L, PHY2049, PHY2049L, CHM2045, CHM2045L with a minimum grade of C in each course.
- A minimum overall GPA of 2.0
- A minimum USF GPA of 2.0

The Department of Mechanical Engineering

Bachelor of Science in Mechanical Engineering:

- Completion of MAC2311 or MAC2281, MAC2312 or MAC2282, MAC2313 or MAC 2283, PHY2048, PHY2048L, PHY2049, PHY2049L, CHM2045, CHM2045L

with a 2.5 GPA (based on better of first two attempts) and a minimum grade of C (not C-) in these courses.

- A minimum overall GPA of 2.0
- A minimum USF GPA of 2.0

FIVE-YEAR PROGRAMS LEADING TO BACHELORS AND MASTERS DEGREES IN ENGINEERING

Well qualified students who, at the beginning of their senior year, are clearly interested in graduate study are invited to apply to the Five-Year Program leading simultaneously to the Bachelor of Science in Engineering or Engineering Science and Master of Science in Engineering or Engineering Science degrees. The general basis of the five-year program includes:

1. The opportunity of taking some graduate courses during the fourth year and deferring the taking of some senior courses to the fifth year.
2. Up to six credit hours, to be determined by program, may be counted toward both degrees in some degree programs.

Students apply for admission to this program through their departmental advisor. Admissions requirements vary by department.

Applicants must have senior standing (90 credits) with at least 16 upper level engineering credits and must meet or exceed the graduate program entrance requirements of the department.

Engineering Advising

Effective pursuit of engineering and engineering related studies requires careful attention to both the sequence and the type of courses taken. The engineering curriculum differs in key respects from the study plans of other majors—even in the freshman year.

New students must attend the University's Orientation program. They will be introduced to the engineering advisors during this program and receive advisement for their first semester.

The student and advisors jointly work out a plan of study that meets both the student's career objectives and the College of Engineering's degree requirements. The advisors maintain College of Engineering student records.

Students not yet meeting departmental admissions requirements are advised in the office of Engineering Student Services.

While the College provides advising services to assist students with academic planning, *the responsibility for seeing that all graduation requirements are met rests with the student.*

The College of Engineering requires all undergraduates to apply for graduation the semester prior to the anticipated graduation term. Necessary forms and instructions can be obtained in the Engineering Student Services Office or from departmental advisors.

Advising Offices

Tampa Campus: TECO Energy Hall, Room 1302, (813) 974-2684.

Sarasota Campus: Room C111, (941) 359-4521.

Lakeland Campus: Student Services Office (LLC), Room 2100, (863) 667-7071

Preliminary Coursework for Engineering Students

The College of Engineering Bachelor of Science programs are founded on a set of coursework that is designed to give each student a thorough foundation of knowledge on which specialization studies and a professional career can be based. Emphasis is placed on three key elements; development of communication skills, familiarity with the social sciences and humanities and a solid base in science and mathematics.

Each degree-granting department has developed a list of courses to provide key elements for the degree offered. While

the specific courses will vary slightly from one department to another, the categories are as follows:

- General Education Courses
- Mathematics, Chemistry and Physics
- Engineering Courses
- Department Specialization

Students selecting an engineering major should be aware of specific requirements. Students may consult the College's Advising Office for detailed information.

The Engineering undergraduate student must not only be a technically competent individual but a person who can understand, adjust and contribute to the social environment.

Students who transfer from a State of Florida community college with an Associate of Arts will find their General Education coursework satisfies the USF General Education Requirements.

All Engineering students must complete the USF Exit Requirements. The Literature and Writing portion can be met by completing ENC 3246 Communication for Engineers. The three-hour Major Works/Major Issues requirement is integrated into the senior year curriculum. Students who have completed a previous bachelors degree with transfer work equivalent to required exit courses may be exempt from one or both of these requirements.

1. University Liberal Arts Requirements

All students are required to take 42 semester hours to complete the University liberal arts requirements. Thirty-six (36) semester hours will satisfy the general education course requirements and 6 semester hours will satisfy the exit requirements. These requirements are distributed as follows:

General Education Requirements*	Semester Hours
English Composition	6
Quantitative Methods	6
Natural Sciences	6
Social Sciences	6
Historical Perspectives	6
Fine Arts	3
African, Latin American, Middle Eastern or Asian Perspectives	3
	36
Exit Requirements* (Must be taken at USF)	
Major Works and Major Issues	3
Literature and Writing	3

*Courses may be certified in more than one area, but students may use each course in **only** one (1) area.

In addition, 12 hours considered Gordon Rule Communication (6A) courses must be completed. For Engineering students, these are ENC 1101, ENC 1102, ENC 3246, and one more. The fourth course is selected from any general education or departmental courses that have been certified Gordon Rule Communication (6A) by the USF Undergraduate Council.

Courses in the liberal arts requirements should incorporate the following components whenever they are relevant to the specific discipline: the learning skills of conceptual thinking, analytical thinking, creative thinking, written expression, oral expression, and the dimensions of values and ethics, international perspectives, environmental perspectives, race and ethnicity, and gender. When warranted by the subject matter, each course must incorporate consideration of at least one of the dimensions and one of the thinking skills to meet the liberal arts requirements.

Departments should ensure that courses proposed for the liberal arts have sufficient depth and breadth. These courses will share the substantive rigor and intellectual challenge of courses offered for major credit, with the specific feature of offering an integrative perspective of the discipline and its relationship to academia as a whole. Additionally, such courses

will encourage majors to interact with students from other disciplinary backgrounds.

2. Mathematics and Science Core Requirements

For students in the engineering programs, the mathematics coursework consists of a Calculus for Engineers sequence (or a calculus sequence of equivalent level), Differential Equations, and additional hours of designated courses supportive of the student's selected field of specialization, as specified by the department. Science coursework includes the Physics with Calculus sequence and General Chemistry course(s) depending on the degree-granting program.

Students whose high school preparation is insufficient to enter the Calculus for Engineers are required to take supplementary algebra and trigonometry prior to being considered for acceptance into the College.

Grading Policies

1. S/U GRADING POLICY

Students pursuing College of Engineering degree programs are expected to take their courses on a graded basis. Please refer to the grading system in the Academic Policies and Procedures section of this catalog. S/U grading option must be requested during the first week of classes. Courses taken on an S/U basis are not applicable to the College's degree programs. Exceptions require written approval of the department advisor prior to registration.

2. I GRADE POLICY

The criteria for requesting and time limit for completing a grade of "I" (incomplete) are detailed in the University's Academic Policies and Procedures portion of this Catalog. A written agreement detailing the specific requirements and time limit for completion is required in some departments and recommended in all others.

Full tuition must be paid and an audit form must be submitted to the Registrar's Office by the end of the first week of classes if a student wishes to attend the course again to review the material. If a student registers for the course but does not request to audit the course, a grade will be submitted for the subsequent registration and the I grade will be converted to an IF. In this case, the student may choose to apply grade forgiveness.

3. Minimum Acceptable Grade in Required Courses

Unless otherwise stated, the minimum acceptable grade in math and science prerequisites is a C (C- is insufficient). Minimum acceptable grades for engineering, math and science courses, as they pertain to specific degree programs, are determined by the academic departments. Students are *strongly encouraged to familiarize themselves with departmental guidelines.*

Continuation and Graduation Requirements

1. Minimum GPA Requirements

To meet graduation and continuation requirements all undergraduate Engineering students must maintain a minimum cumulative GPA of 2.0 in the following categories:

- 1) Overall Undergraduate GPA
- 2) USF GPA
- 3) GPA* in Math and Science courses required for the curriculum
- 4) Engineering Courses
- 5) Specialization Courses

*Note: The Math Science GPA is based upon the best attempt. Other categories include all attempts, unless grade forgiveness has been applied. In no case will the minimum GPA for a category be less than 2.0.

Students who do not maintain the required minimums of the program pursued in each category are ineligible for further registration in the College unless individually designed continuation programs are recommended by the student's academic advisor and approved by the department undergraduate coordinator or the Director of Admissions & Advising.

Under University of South Florida policy, students who have been academically dismissed may petition the Academic Regulations Committee for readmission. The College may lend support to such a petition after the first dismissal from the University if extenuating circumstances existed and if the deficiency can be corrected within two semesters. However, should a second dismissal occur, the College will not support readmission to the College of Engineering.

Students who are academically dismissed from the University of South Florida may choose to attend another institution of higher learning and reapply to USF after thus improving their overall GPA. These returning students will be considered for readmission to the College if they meet the program entrance requirements for their intended major as published in the University of South Florida Undergraduate Catalog in effect during the term of return.

2. English Requirement

Students evidencing an English deficiency will be required to initiate the necessary corrective programs, with the assistance of their advisors. It is recognized that such deficiencies can exist even though a student has met the University's minimum English requirements. Correction of any deficiency must commence the term after a student has been notified and must be completed prior to recommendation of the student for graduation by the faculty of the College.

3. Mathematics Requirement

Students evidencing a lack of the ability to apply mathematics will be required to take remedial coursework beyond their regular degree requirements. Faculty of the College who encounter students deficient in mathematical ability will refer such cases to the Advising Office even if passing grades have been obtained in the math prerequisites for engineering.

4. Residency Requirement

Transfer students must complete a minimum number of specialization courses in the USF degree granting department. The minimum number of USF specialization credit hours required is established by the respective academic department. In no case will this be less than 18 hours. The University residency requirement of 30 USF hours must also be met. General engineering courses are not considered specialization courses.

5. Satisfactory Progress and Years to Degree

Students who register for a course three times without receiving the required grade (i.e., receive a grade below that required for the intended major or W (withdrawn)) will be denied further enrollment in the College of Engineering unless written permission is obtained from the Department Chairperson and the College Associate Dean for Academic Affairs or his designee.

The College of Engineering requires that a student complete the baccalaureate degree within five years after beginning engineering specialization courses. Specialization courses taken more than five years prior to graduation will not be counted toward the degree. Exceptions may be granted by the Academic Department.

6. Disruption of Academic Process and Academic Dishonesty

The College of Engineering will maintain an environment that encourages all to study and conduct engineering research free from undue disruption. Disruption of the Academic Process is a matter the College is obliged to report to Student

Judicial Services. Academic dishonesty, in any form, is taken very seriously by the College of Engineering and will result in sanctions. The most serious penalty is dismissal from the University. (See University policies regarding academic dishonesty.)

7. Grievance Procedure

Students should make themselves fully aware of the University's grievance procedures. (See University policies regarding grievance procedures.)

8. University, College and Program Requirements

The College requirements described in the section above are in addition to requirements set forth in the University policy and procedures section and the departmental sections of this catalog. It is the student's responsibility to complete all university, college, program and curricular requirements prior to graduation.

9. Graduation Application Procedures and Deadlines

Each engineering student is required to complete an application for graduation and check list. Students should schedule an appointment with the Department Undergraduate Coordinator to review graduation qualifications and obtain departmental signatures well in advance of the College graduation application deadline. Approved applications must be submitted to the College of Engineering Advising Office the term prior to the semester in which graduation is sought. Graduation applications are due on the dates indicated below.

August 1st for Fall Graduation
November 1st for Spring Graduation
April 1st for Summer Graduation

10. Fundamentals of Engineering Examination

Taking the Fundamentals of Engineering Exam prior to graduation is required in some departments and strongly encouraged in others. (See the Office of Engineering Student Services for applications and information.)

Certificate Programs

Several formalized engineering certificate programs, at the undergraduate and graduate levels, have been developed to provide qualified individuals an opportunity to enhance their degrees prior to graduation or to engage in discipline related continuing education.

Certificate in Biomedical Engineering

Biomedical Engineering is a highly interdisciplinary field where basic engineering principles are applied to problems in the biomedical sciences. Typical specific areas of interest include: understanding basic biochemical and physiological processes, designing and analyzing medical diagnostics and procedures, evaluation and design of health care systems and facilities, design and valuation of prosthetic devices, and general biomedical product development. The College of Engineering offers an undergraduate Enhancement Certificate in Biomedical Engineering. There are two main purposes for the certificate program 1) to accommodate students interested in entering medical school following graduation (this program satisfies most of the typical minimal admission standards for medical school); and 2) to prepare students for graduate education program, drawing from all engineering disciplines, biology, physical sciences, biomedical and clinical sciences. Undergraduate students anticipating graduate studies in the bioengineering area (or related fields such as medicine) are strongly encouraged to gain research experience as part of their program. Research possibilities exist in Engineering, the Health Sciences Center, Public Health, and Arts and Sciences.

The Certificate in Biomedical Engineering provides students an opportunity to get an introduction to a rapidly developing field of study and to receive recognition for their endeavors. Students in the program must fulfill all the requirements for an Engineering undergraduate degree, such as Bachelor of Science in Chemical Engineering and also meet the additional requirements of the Certificate program. Enrollment is through the Department of Chemical & Biomedical Engineering.

Certificate in Technology Management

A post baccalaureate student may enhance professional achievement by completing a Certificate in Technology Management. The required fifteen (15) semester hours in five (5) courses will enhance students' ability to succeed in a highly competitive global environment. This certificate is designed for individuals with technical backgrounds. Qualitative approaches with quantitative methods are emphasized to strengthen technical credentials and while developing managerial competencies. This program is offered by the Department of Industrial and Management Systems Engineering on the Tampa Campus or online via APEX.

Certificate in Total Quality Management

An undergraduate student, or graduate engineer, may enhance professional achievement by receiving a Certificate in Total Quality Management. The student must satisfactorily complete five courses (15 credit-hours beyond the BS degree) of the eight courses in Total Quality Management. Courses include Statistical Quality Control, Design of Experiments, Reliability, Total Quality Management, and Benchmarking. Enrollment is through the Department of Industrial and Management Systems Engineering.

Certificate in Materials Science and Engineering

The Materials Science and Engineering certificate requires 15 credit hours of theoretical and applied materials courses. The Materials Science and Engineering Certificate is designed to provide students with an opportunity to gain a focused introduction into a dynamic and explosively growing technological field. The certificate has been designed to be as flexible as possible thus allowing students from different disciplines to take advantage of the program. Enrollment is through the Department of Chemical & Biomedical Engineering.

Certificate of Wireless Engineering

This Certificate provides post-baccalaureate students with studies in engineering techniques of modern wireless circuits, antennas, and communication systems. Students must have successfully completed an undergraduate course in Electromagnetics. The candidate should also have an earned B.S. in Electrical Engineering or Computer Engineering. Any other degree tract must meet the Electrical Engineering department's approval.

Certificate of Enhancement

The Certificate of Enhancement in (a designated engineering discipline) provides students an opportunity to gain an enhanced experience in their chosen field while pursuing an engineering degree. Each department may offer a certificate of enhancement in the designated discipline. These include the Certificates of Enhancement in Chemical Engineering, Civil & Environmental Engineering, Computer Science, Computer Engineering, Electrical Engineering, Industrial and Management Systems Engineering, Information Systems and Mechanical Engineering. In addition, there are two specialized Certificates of Enhancement in Transportation Engineering and Wireless Engineering.

Requirements:

1. Enrolled in a Bachelor of Science degree program in a specified engineering discipline.
2. A minimum of 15 hours of additional specialization related courses, which have been approved by the department beyond

those included as a part of the B. S. degree, from an approved list. Courses must be taken on a letter-grade basis, and a minimum of 9 hours must be College of Engineering courses.

3. A G.P.A. of 2.0 or greater for the additional hours.
4. The student must receive the B.S. degree to receive the Certificate of Enhancement.

Please contact the appropriate department undergraduate coordinator to be accepted in the program.

FOUR-YEAR PROGRAMS LEADING TO A BACHELOR OF SCIENCE DEGREE IN A DESIGNATED ENGINEERING FIELD

These engineering degrees are awarded upon successful completion of a program consisting of the required areas of coursework. Programs are offered in the following disciplines of Engineering:

• CHEMICAL & BIOMEDICAL ENGINEERING

Undergraduate Degree Offered:

Bachelor of Science in Chemical Engineering (B.S.C.H.)

Graduate Degrees Offered:

Master of Science in Chemical Engineering (M.S.C.H.)

Master in Chemical Engineering (M.C.H.E.)

Master of Engineering (M.E.)

Master of Science in Engineering (M.S.E.)

Master of Science in Biomedical Engineering (M.S.B.E.)

Doctor of Philosophy in Chemical Engineering (Ph.D.)

Doctor of Philosophy in Engineering Science (Ph.D.)

Doctor of Philosophy in Biomedical Engineering (Ph.D.)

This department offers coursework and study in all areas fundamental to Chemical & Biomedical Engineering. Engineering specialization courses, together with mathematics, physics, chemistry, other interdisciplinary engineering fundamentals, and liberal arts courses, provide the basis for long-range professional progress. Because of the many professional areas available for employment to the chemical engineer, the students are also required to take a number of electives from areas such as biotechnology, materials, and environmental engineering. These electives are designed to broaden the experience and, therefore, the employment possibilities of our graduates. The Chemical & Biomedical Engineering Department also offers a sequence of courses in chemical engineering science, biotechnology and biomedical engineering.

A sequence of courses in the engineering aspects of biotechnology is currently available within the Chemical Engineering program. Topics include applied microbiology, fermentation, enzyme technology, cell separation technology, biomedical engineering, biomaterials, biotechnology, and biomechanics.

Students pursuing the Bachelor of Science in Chemical Engineering take coursework in advanced chemistry, thermodynamics, fluids, heat, and mass transfer, numerical methods, separation processes, reacting systems, instrumentation, control, and plant design. Students must also satisfactorily complete a design project as part of their program. Students seeking the Biotechnology/Biomedical Certificate are also required to take additional courses in general biology, microbiology, and biochemistry. Chemical and Biomedical engineering students must maintain a GPA of 2.0 in required departmental courses. Therefore, it is imperative that the students retain close contact with their advisor.

Students completing this program normally initiate their careers in manufacturing, environmental, and biological enterprises. Chemical engineers are found in administrative, technical, and research positions in these industries. Main products of these industries are petrochemicals, polymers, fibers,

natural and synthetic fuels, electronic materials, fertilizers, pharmaceuticals, bio-materials, etc.

Solutions of modern societal and scientific problems often require the use of chemical engineering skills. Chemical and biomedical engineering students must have access to a personal computer during their last two years of study. Those who do not own one will be severely disadvantaged.

Mission Statement

The mission of the Department of Chemical & Biomedical Engineering is to prepare graduates with fundamental knowledge and contemporary skills for the development, economic design, and safe operation of chemical and biological systems, processes, products, and methods in a manner compatible with societal values.

Program Education Objectives

1. Demonstrate professional engineering competence by holding positions of increasing responsibility in industry, business, government and/or educational institutions.
2. Publish papers, reports, patents and/or technical presentations at local, national, international meetings or within the professional organization/company that they are affiliated with.
3. Continue to improve their technical skills, knowledge and understanding through continuing education, pursuit of advanced degrees, and/or pursuit of professional license in their chosen profession.

Departmental Policies

In addition to the College's graduation requirements, the department has the following policies:

1. Mandatory academic advising of students for each term.
2. Exit interviews as a graduation requirement.

Four-Year Curriculum - Chemical Engineering

Prerequisites (State Mandated Common Prerequisites) for Students Transferring from a Florida Community College: If a student wishes to transfer without an A.A. degree and has fewer than 60 semester hours of acceptable credit, the student must meet the University's entering freshman requirements including ACT or SAT test scores, GPA, and course requirements.

Students should complete the following **prerequisite courses** listed below at the lower level prior to entering the University. If these courses are not taken at the community college, they must be completed before the degree is granted. Unless stated otherwise, a grade of "C" is the minimum acceptable grade.

Students qualify for direct entry to their intended department if they have completed the following courses at a Community College or University in the Florida State University System (SUS) and meet all other admissions requirements of the University and College.

Some courses required for the major may also meet General Education Requirements thereby transferring maximum hours to the university. The following are transferable courses from the Community College that will be accepted in the Math/Science/Engineering areas:

Communications:

ENC 1101/1102 English I and II (6)

Humanities & Social Sciences:

Humanities Courses (6)

Social Science Courses (6)

Humanities or Social Sciences (3)

Mathematics:

USF

MAC 2281

MAC 2282

MAC 2283

MAP 2302

C/C

MAC 2311* (4)

MAC 2312* (4)

MAC 2313* (4)

MAP 2302 (3)

*or MAC 2281, MAC 2282, MAC 2283

Natural Sciences:

USF

CHM 2045

CHM 2045L

PHY 2048

PHY 2048L

PHY 2049

PHY 2049L

C/C

CHM 1045* (3)

CHM 1045L* (1)

PHY 2048 (3)

PHY 2048L (1)

PHY 2049 (3)

PHY 2049L (1)

*or CHS 1440 Chemistry for Engineers

Chemical & Biomedical Engineering Admissions Requirements

Students must have completed the equivalent USF Engineering Calculus General Physics and Chemistry courses with a C or better in each course; must have a USF and an overall GPA of 2.0 or better.

BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

The schedule that follows indicates how a diligent student who can devote full time to coursework can satisfy requirements in four academic years. Students without a solid foundation or those who cannot devote full time to academics should plan a slower pace. The following sequence is intended to facilitate registration planning and is subject to change based upon course availability. The sequence may also vary based upon individual considerations. Registration assistance will be provided by academic advisors.

Semester I

ENC 1101	Composition I	3
MAC 2281	Engineering Calculus I	4
CHM 2045	General Chemistry I	3
CHM 2045L	General Chemistry I Lab	1
EGN 3000	Foundations of Engineering	1
ALAMEA Perspectives Elective		3
Fine Arts Elective		3
Total		18

Semester II

ENC 1102	Composition II	3
MAC 2282	Engineering Calculus II	4
CHM 2046	General Chemistry II	3
CHM 2046L	General Chemistry II Lab	1
PHY 2048	General Physics I	3
PHY 2048L	General Physics I Lab	1
Total		15

Semester III

MAC 2283	Engineering Calculus III	4
PHY 2049	General Physics II	3
PHY 2049L	General Physics II Lab	1
EGN 3443	Engineering Statistics	3
Historical Perspectives Elective		3
Social Science Elective		3
Total		17

Semester IV

EGN 3433	Modeling & Analysis of Engineering Systems	3
or		
MAP 2302	Differential Equations	3
EGN 3343	Thermodynamics	3
ENC 3246	Communication for Engineers (6A L&W)	3
ECH 3023C	Material and Energy Balances	4
ECH 4936	Undergraduate Seminar	1
Total		14

Summer

CHM 2210	Organic Chemistry I	3
CHM 2210L	Organic Chemistry I Laboratory	2

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Social Science Elective	3
Historical Perspectives Elective	3
Total	11

Semester V

ECH 4123 Chemical Engineering Thermodynamics	3
ECH 4264 Transport Phenomena	4
ECH 4845 Numerical Methods in Chem Eng	4
Chemical Engineering Elective	3
Total	14

Semester VI

ECH 3702 Instrument Systems	3
ECH 3242L Chemical Engineering Lab I	1
ECH 4265C Mass Transfer Operations	4
CHM 2211 Organic Chemistry II	3
CHM 2211L Organic Chemistry II Lab	2
Chemical Engineering Electives	3
Total	16

Semester VII

ECH 4415C Reaction Engineering	4
ECH 4243L Chemical Engineering Lab II	1
EMA 4003 Introduction to Materials Science	3
Chemical Engineering Elective	3
ECH 4605 Product & Process Systems Engineering	3
Total	14

Semester VIII

ECH 4323C Process Dynamics and Control	3
ECH 4615 Product and Process Design (MW/MI)	3
BME 4406 Engineering of Biological Systems	3
ECH 4244L Chemical Engineering Lab III	1
Chemical Engineering Elective	2
Total	12

Gordon Rule (6A) is fully met through the mathematics courses above, ENC1101, ENC1102, ENC 3246 and by selecting one technical or general education elective that is an approved 6A communication course or by completing an AA degree at a Florida Community College.

Exit Requirements in Major Works/Major Issues (MW/MI) and Literature and Writing (L&W) are fully met through ENC3246 and ECH4615.

Biomedical Engineering Minor

This biomedical engineering minor is a 15 credit hour program that is open to all engineering majors and other students that meet the prerequisites listed below. For engineering majors, at least 9 hours beyond the B.S. in any Engineering discipline must be completed for the biomedical engineering minor. Student must register with the Department of Chemical & Biomedical Engineering undergraduate advisor prior to starting this minor program. Departments within the College of Engineering are currently developing additional courses that will be added to the list of courses that can be applied to this minor, so consultation with the advisor will insure that students are informed of all offered courses.

Prerequisite courses:

1. Biology I: BSC 2010
2. Calculus II: MAC 2282, MAC 2242, MAC 2233 or MAC 2312
3. Physics II: PHY 2049 or PHY 2054
4. General Chemistry II: CHM 2046

Required Courses (6 hours)

ECH 4931 Special Topics in Chemical Engineering*	3
BME 4406 Engineering of Biological Systems	3

The remaining 9 credit hours can be taken from the following list:

ECH 6417 Bioseparations	3
ECH 4931 Special Topics in Chemical Engineering**	3
PHZ 4702 Applications of Physics to Biology & Medicine I	4
PHZ 4703 Applications of Physics to Biology & Medicine II	4
BCH 3023 Introductory Biochemistry	3
EIN 4313C Human Factors	3
BME 5006 Theory and Design of Bioprocesses	3
EIN 5245 Work Physiology/Biomechanics	3
BME 5040 Pharmaceutical Engineering	2
ECH 5748 Selected Topics in Biomedical Engineering**	1-10
BME 5748 Selected Topics in Biomedical Engineering **	3

*Please see academic advisor for required special topics courses.

**Please see academic advisor for selected special topics courses.

• CIVIL AND ENVIRONMENTAL ENGINEERING

Undergraduate Degree Offered:

Bachelor of Science in Civil Engineering (B.S.C.E.)

Graduate Degrees Offered:

Master of Science in Civil Engineering (M.S.C.E.)

Master of Science in Engineering (M.S.E.)

Master of Science in Environmental Engineering (M.S.E.V.)

Master of Civil Engineering (M.C.E.)

Master of Engineering (M.E.)

Master of Environmental Engineering (M.E.V.E.)

Doctor of Philosophy in Civil Engineering (Ph.D.)

Doctor of Philosophy in Engineering Science (Ph.D.)

This department offers course work and study pertinent to Civil Engineering, Engineering Mechanics, Material Science, and Environmental Engineering. Areas of concentration are Environmental/Water Resources Engineering; Structures/Materials/Geotechnical Engineering; and Geotechnical/Transportation Engineering.

Students completing the program may enter the profession as engineers in civil, structural, geotechnical, transportation, water resources, environmental, hydraulics, or materials disciplines. All of these disciplines share the need for knowledge in the areas of engineering mechanics, civil engineering, material science, and environmental engineering. Through choice of the proper area of concentration, a student has the opportunity to channel academic studies specifically towards his/her career choice.

Graduates of the program may commence their engineering careers in either industry, engineering consulting firms, or public service at the federal, state, or local level. Initial assignments may include planning, design and implementation of water resources systems; planning and design of transportation and housing systems; regional planning, design, and management for abatement of air, water and solid waste pollution problems; design of bridges and single and multi-story structures; and supervision of construction projects.

Mission Statement

The Civil Engineering Program of the Department of Civil and Environmental Engineering at the University of South Florida will provide undergraduate students with strong, broad-based, engineering education which gives them the basic intellectual and organization skills that allow them to work with complex systems with technological, social and environmental components. As many of the Program's graduates begin

work upon graduation in industry or with governmental organizations, the curriculum is designed to prepare students for these roles by requiring a number of courses in the various fields of civil engineering and by providing limited specialization in one given area. The curriculum is designed to encourage lifelong learning and to prepare students for undertaking advanced studies in engineering or in other professional areas.

Program Educational Objectives Associated with the Mission Statement

The program and curriculum of the Department of Civil and Environmental Engineering are designed to meet the needs of all students within the context of its Mission Statement. The Program Educational Objectives associated with the Department's Mission Statement are:

1. The Civil Engineering Program at the University of South Florida has as a program educational objective that graduates, within 3-6 years after graduation, can obtain positions in civil engineering firms or government agencies where they
 - deal effectively with clients, the public, or other engineering groups,
 - communicate effectively with co-workers and the public, and
 - are effective members of teams involved in the design and/or construction of civil engineering projects.
2. The Civil Engineering Program at the University of South Florida has as a program educational objective that graduates, within 3-6 years after graduation, are continuing their professional development by extending their professional knowledge through independent learning, continuing educational courses, conferences, workshops, short courses, and/or graduate study.
3. The Civil Engineering Program at the University of South Florida has as a program educational objective that graduates, within 3-6 years after graduation, that are working in engineering related public or private organizations encouraging professional registration will have made appropriate progress towards achieving that registration.

Concentrations

In addition to designated common coursework in engineering mechanics, civil, and environmental engineering, students undertake a concentration of 18 hours of coursework plus a 4-hour capstone design course.

Departmental Policies

In addition to the College's graduation requirements, the Department has the following policies:

All students must:

1. Participate in mandatory advising prior to each term;
2. Participate in Department assessment activities and successfully complete an exit interview before graduating;
3. Maintain a C or better in EGN 3311 Statics; EGN 3331 Mechanics of Materials; EGN 3353 Basic Fluid Mechanics; and EGN 3365 Materials Engineering to continue in the program, including a 2.5 GPA (best attempt) in all these courses.;
4. Earn a C- or better in all engineering courses used to meet graduation requirements.
5. Consider the advice of the college to complete and pass the Fundamentals of Engineering Exam (F.E. Exam).

Four-Year Curriculum - Civil Engineering

Prerequisites (State Mandated Common Prerequisites) for Students Transferring from a Florida Community College: If a student wishes to transfer without an A.A. degree and has fewer than 60 semester hours of acceptable credit, the student must meet the university's entering freshman requirements including ACT or SAT test scores, GPA, and course requirements.

Students should complete the **prerequisite courses** listed below at the lower level prior to entering the University. If these courses are not taken at the community college, they must be completed before the degree is granted. Unless stated otherwise, a grade of "C" is the minimum acceptable grade.

Students qualify for direct entry to their intended department if they have completed the following courses at a Community College or University in the Florida State University System (SUS) and meet all of the other admissions requirements of the University and College.

Some courses required for the major may also meet General Education Requirements thereby transferring maximum hours to the university. The following are transferable courses from the Community College that will be accepted in the Math/Science/Engineering areas:

Communications:

ENC 1101/1102 English I and II (6)

Humanities & Social Sciences:

Humanities Courses (6)

Social Science Courses (6)

Humanities or Social Sciences (3)

Mathematics:

USF

MAC 2281

MAC 2282

MAC 2283

MAP 2302

*or MAC 2281, MAC 2282, MAC 2283

Natural Sciences:

USF

CHM 2045

CHM 2045L

PHY 2048

PHY 2048L

PHY 2049

PHY 2049L

*or CHS 1440 Chemistry for Engineers

C/C

MAC 2311* (4)

MAC 2312* (4)

MAC 2313* (4)

MAP 2302 (3)

C/C

CHM 1045* (3)

CHM 1045L* (1)

PHY 2048 (3)

PHY 2048L (1)

PHY 2049 (3)

PHY 2049L (1)

Please be aware of the immunization, foreign language, and continuous enrollment policies of the university, as well as the qualitative standards required.

Civil and Environmental Engineering Admissions Requirements

Students entering the Civil & Environmental Engineering department must have completed the equivalent USF Engineering Calculus sequence, one year equivalent USF General Physics and one semester equivalent USF General Chemistry with a minimum of 2.3 GPA; and must have an overall and USF GPA of 2.0 or better.

Continuation Requirements

Continuation in the Civil & Environmental Engineering program requires a minimum grade of "C" as well as a 2.5 GPA (based on best attempt) over the following courses:

EGN 3311 - Statics

EGN 3331 - Mechanics of Materials

EGN 3353 - Basic Fluid Mechanics

EGN 3365 - Materials Engineering I

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The schedule that follows indicates how a diligent student who can devote full time to coursework can satisfy requirements in four academic years. Students without a solid foundation or those who cannot devote full time to academics should plan a slower pace. The following sequence is intended to facilitate registration planning and is subject to change based upon course availability. The sequence may also vary based upon individual considerations. Registration assistance will be provided by academic advisors.

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Semester I

ENC 1101	Composition I	3
MAC 2281	Engineering Calculus I	4
CHM 2045	General Chemistry I	3
CHM 2045L	General Chemistry I Lab	1
EGN 3000	Foundations of Engineering	1
Social Science Elective		3
Total		15

Semester II

ENC 1102	Composition II	3
MAC 2282	Engineering Calculus II	4
CHM 2046	General Chemistry II	3
PHY 2048	General Physics I	3
PHY 2048L	General Physics I Lab	1
EGS 1113	Introduction to Design Graphics	3
Total		17

Summer Semester

ALAMEA	Perspective Elective	3
	Historical Perspective Elective	3
EGN 3615	Engineering Economics with Social & Global Implications	3
Total		9

Semester III

PHY 2049	General Physics II	3
PHY 2049L	General Physics II Lab	1
MAC 2283	Engineering Calculus III	4
EGN 3311	Statics	3
Historical Perspective Elective		3
ENC 3246	Communication for Engineers (6A L&W)	3
Total		17

Semester IV

MAP 2302	Differential Equations	3
or		
EGN 3433	Modeling and Analysis of Engineering Systems	3
EGN 3321	Dynamics	3
EGN 3343	Thermodynamics	3
EGN 3443	Engineering Statistics	3
EGN 3365	Materials I	3
Total		16

Semester V

EGN 3353	Fluid Mechanics	3
EGN 3331	Mechanics of Materials	3
EGN 3331L	Mechanics of Materials Lab	1
ENV 4001	Environmental Engineering I	3
TTE 4004	Transportation Engineering I	3
EGN 4420	Numerical and Computer Tools	3
Total		16

Semester VI

CES 3102	Structures I	3
CWR 4202	Hydraulics	3
ENV 4004L	Environmental/Hydraulics Engineering Lab	1
EGN 3373	Introduction to Electrical Systems I	3
CE Concentration Elective		3
Total		13

Semester VII

CEG 4011	Geotechnical Engineering I	3
CEG 4011L	Geotechnical Engineering Lab	1
CE Concentration Elective		3
CE Concentration Elective		3
Fine Arts Elective		3
Total		13

Semester VIII

CE Concentration Elective		3
CE Concentration Elective		3

CE Concentration Elective	3
CE Capstone Design Requirement (MW/MI)	4
Social Science Elective	3
Total	16

Gordon Rule (6A) is fully met through the mathematics courses above, ENC1101, ENC1102, ENC 3246 and by selecting one technical or general education elective that is an approved 6A communication course or by completing an AA degree at a Florida Community College.

Exit Requirements in Major Works/Major Issues (MW/MI) and Literature and Writing (L&W) are fully met through ENC3246 and a Capstone Design Course indicated as MW/MI.

Civil Engineering Concentration AND CAPSTONE DESIGN Requirements

Civil Engineering students take one of the 3 tracks next listed:

Structures/Materials/Geotechnical Track

CES 4702	Concepts of Concrete Design	3
CES 4605	Concepts of Steel Design	3
CGN 4851	Concrete Construction Materials	3
CEG 4012	Geotechnical Engineering II	
or		
TTE 4005	Transportation Engineering II	3
Technical Elective		3
Technical Elective		3
CES 4740	Capstone Structures/Materials/Geotechnical Design	3

Geotechnical/Transportation Track

CGN 4851	Concrete Construction Materials	3
CEG 4012	Geotechnical Engineering II	3
TTE 4005	Transportation Engineering	3
Technical Elective		3
Technical Elective		3
Technical Elective		3
CEG 4850	Capstone Geotechnical/Transportation Design	3

Environmental/Water Resources Track

ENV 4417	Water Quality and Treatment	3
CWR 4103	Water Resources Engineering	3
CEG 4012	Geotechnical Engineering II	
or		
TTE 4005	Transportation Engineering II	3
Technical Elective		3
Technical Elective		3
Technical Elective		3
CWR 4812	Capstone Water Resources/Environmental Design	4

The Program supports the following technical elective courses:

CCE 4034	Construction Management	3
CEG 4012	Geotechnical Engineering II	3
CES 4605	Concepts of Steel Design	3
CES 4702	Concepts of Concrete Design	3
CGN 4851	Concrete Construction Materials	3
CGN 4933	Special Topics in Civil & Environmental Engineering **	3
CWR 4103	Water Resources Engineering I	3
ENV 4417	Water Quality and Treatment	3
SUR 2101	Engineering Land Survey	3
TTE 4005	Transportation Engineering II	3
TTE 4006	Transportation and Society	3

**Please see academic advisor for selected special topics courses.

• COMPUTER SCIENCE AND ENGINEERING

Undergraduate Degrees Offered:

Bachelor of Science in Computer Engineering (B.S.Cp.E.)

Bachelor of Science in Computer Science (B.S.C.S.)

Bachelor of Science in Information Systems (B.S.I.S.)

Graduate Degrees Offered:

Master of Science in Computer Science (M.S.C.S.)

Master of Science in Computer Engineering (M.S.Cp.E.)

Doctor of Philosophy in Computer Science and Engineering (Ph.D.)

Doctor of Philosophy in Engineering Science (Ph.D.)

This department offers coursework and study in all areas fundamental to Computer Science, Computer Engineering, and Information Systems. Topics covered may include computer architecture and hardware design, software engineering, computer system organization, operating systems, algorithms and data structures, computer graphics, user interface, software testing, computer networks, database systems, robotics, theory of computation and artificial intelligence.

Our research areas of faculty concentration include 1) computer architecture and VLSI design/testing, 2) artificial intelligence and robotics, 3) graphics/image processing/computer vision, 4) networks, and 5) software testing.

Computing facilities available to students in the Department include several microprocessor and design laboratories for hardware-oriented studies, personal computer laboratories for general use in programming assignments, and networked SUN workstations for use by majors. The Department maintains a number of research laboratories equipped with special purpose hardware. In addition, the Department has access to College of Engineering SUN Solaris and PC workstations and SOLARIS servers.

The Department offers three undergraduate degrees: Computer Engineering, Computer Science and Computer Information Systems. These degree tracks or programs offer different educational emphases as preparation for careers or graduate education within the computer domain. While all three tracks share a common core of foundational materials, each has additional course that provide a distinctive flavor to the work.

The Computer Engineering program emphasizes the application of engineering principles to the design of computer hardware and software. While all department programs provide coverage of computer hardware and software, this program allocates additional time to issues of computer architecture and hardware design. Students in this program also acquire a broad background in engineering science through the study of the engineering core.

The Computer Science program focuses on the theory of computation and computer organization. Additional course work in programming languages, algorithms, software engineering, and a wide range of elective supplement the core coverage of hardware and software.

The Information Systems program combines a basic coverage of hardware and software with a core of business related courses and additional course work in areas such as networks and database. The emphasis in this program is on the application of computing.

Graduates from these programs follow fruitful careers developing either scientific or business applications of computers, as well as in the design of computer systems. They are often involved in the systems level definition of large scale IT operations for both manufacturers of computers and for users. A wide and expanding variety of design and applications opportunities characterize this field. The rapid growth and continual change within this field makes it essential for students to acquire a broad foundation in applied mathematics and the physical sciences, and to develop communication skills and to become familiar with the domains of potential computer application in the Humanities and Social Sciences.

Research and development opportunities as a computer scientist and engineer, often following graduate education, are present in the areas of computer architecture and VLSI design, artificial intelligence, software engineering, digital data communications, software testing, robotics, database, networks, user interface, fault-tolerant computing and testing, computer-graphics, image processing and computer vision, and simulation.

Mission Statement

In keeping with the mission of the College of Engineering, the Computer Science & Engineering Department strives for excellence in teaching, research, and public service.

Specifically the Department aspires to:

1. Lead the advancement of computer science through internationally recognized research and graduate education, as well as technology transfer to regional industries.
2. Prepare students for full and ethical participation in a diverse society and encourage lifelong learning.
3. Educate undergraduates in the best practices of the field as well as integrate the latest research into the curriculum.
4. Foster the development of problem solving and communication skills as an integral component of the profession.
5. Provide quality learning experiences through small classes, active learning styles of teaching, and opportunities for meaningful interactions between students and faculty.

Objectives

The Computer Science & Engineering Department has established the following objectives for graduates of the department. Since the department offers three degree programs, the objectives are defined for each program.

Computer Engineering Program Educational Objectives

Objective 1: Our graduates will apply their knowledge and skills to succeed in a computer engineering career and/or obtain an advanced degree.

Objective 2: Our graduates will function ethically and responsibly and will remain informed and involved as full participants in our profession and our society. Our graduates will successfully function in multi-disciplinary teams.

Objective 3: Our graduates will apply the basic principles and practices of computing grounded in mathematics and science to successfully complete hardware and/or software related engineering projects to meet customer business objectives and/or productively engage in research.

Objective 4: Our graduates will apply the basic principles and practices of engineering in the computing domain to the benefit of society.

Computer Science Program Educational Objectives

Objective 1: Our graduates will apply their knowledge and skills to succeed in a computer science career and/or obtain an advanced degree.

Objective 2: Our graduates will function ethically and responsibly and will remain informed and involved as full participants in our profession and our society. Our graduates will successfully function in multi-disciplinary teams.

Objective 3: Our graduates will apply the basic principles and practices of computing grounded in mathematics and science to successfully complete software related engineering projects to meet customer business objectives and/or productively engage in research.

Objective 4: Our graduates will apply the basic computing principles and the knowledge of major areas of application of those fundamentals to the benefit of society.

Computer Information Systems Program Educational Objectives

Objective 1: Our graduates will apply their knowledge and skills to succeed in an information systems career.

Objective 2: Our graduates will function ethically and responsibly and will remain informed and involved as full participants

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in our profession and our society. Our graduates will successfully function in multi-disciplinary teams.

Objective 3: Our graduates will apply the basic principles and practices of computing grounded in mathematics, science and business to successfully complete projects and perform services related to information systems to meet customer business objectives.

Objective 4: Our graduates will apply the basic computing principles and the knowledge of major areas of application of those fundamentals to the benefit of society.

Departmental Policies

In addition to the College's graduation requirements, the department has the following policies:

1. Mandatory academic advising of students for each term.
2. Exit interviews as a graduation requirement.
3. In addition to the College's graduation requirements, the department policy concerning grades is:
 - a. The minimum grade in specialization courses is a "C-", except as stated in department admission requirements.
 - b. The minimum grade in math, science, and engineering courses which are required for the degree is a "C-", except as stated in department admission requirements.

Four-Year Curriculum in Computer Science

Prerequisites (State Mandated Common Prerequisites) for Students Transferring from a Florida Community College: If a student wishes to transfer without an A.A. degree and has fewer than 60 semester hours of acceptable credit, the student must meet the university's entering freshman requirements including ACT or SAT test scores, GPA, and course requirements.

Students should complete the following **prerequisite courses** listed below at the lower level prior to entering the University. If these courses are not taken at the community college, they must be completed before the degree is granted. Unless stated otherwise, a grade of "C" is the minimum acceptable grade ("C-" is insufficient).

Students qualify for direct entry to the department if they have completed the following courses at a Community College or University in the Florida State University System (SUS) and meet all other admissions requirements of the University and College.

Some courses required for the major may also meet General Education Requirements thereby transferring maximum hours to the university.

COP	XXXX*	3
MAC	X311	4
MAC	X312	4
PHY	X048/X048L	4
or		
PHY	X048C	4
PHY	X049/X049L	4
or		
PHY	X049C	4

*Introductory Programming in Ada, C, C++, or PASCAL or equivalent language.

Natural Sciences:
XXX XXXX** 6

**Two (2) science courses for science majors.

Please be aware of the immunization, foreign language, continuous enrollment policies of the university, and qualitative standards required.

Computer Science Admissions Requirements

All students must complete the equivalent of USF Composition I & II, Engineering Calculus I & II and calculus-based General Physics I & II (with labs) with an overall grade point average of 3.00 or higher in these courses (best attempt) to be

admitted to the CSE department. Continuation in the major requires successful completion of CDA 3103 and COP 3514 with the required GPA as stated in the Computer Science & Engineering prerequisite statement in the College of Engineering general section.

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

The schedule that follows indicates how a diligent student who can devote full time to coursework can satisfy requirements in four academic years. Students without a solid foundation or those who cannot devote full time to academics should plan a slower pace. The following sequence is intended to facilitate registration planning and is subject to change based upon course availability. The sequence may also vary based upon individual considerations. Registration assistance will be provided by academic advisors.

Semester I

MAC 2281	Engineering Calculus I	4
ENC 1101	Composition I	3
EGN 3000	Foundations of Engineering	1
Science Elective		3
Social Science Elective		3
Total		14

Semester II

MAC 2282	Engineering Calculus II	4
PHY 2048	General Physics I	3
PHY 2048L	General Physics I Lab	1
ENC 1102	Composition II	3
COP 2510	Programming Concepts	3
Total		14

Semester III

MAC 2283	Engineering Calculus III	4
PHY 2049	General Physics II	3
PHY 2049L	General Physics II Lab	1
COP 3514	Program Design	3
Science Elective		3
Total		14

Semester IV

CDA 3103	Computer Organization	3
COT 3100	Intro Discrete Structures	3
COP 3331	Object Oriented Software Design	3
Historical Perspectives Elective		3
Total		12

Summer Semester

EEL 4851	Data Structures	3
CDA 3201	Computer Logic Design	3
CDA 3201L	Computer Logic Design Lab	1
EGN 4450	Linear Systems	2
Total		9

Semester V

CDA 4205	Computer Architecture	3
COP 4600	Operating Systems	3
COT 4400	Analysis of Algorithms	3
EGN 3443	Engineering Statistics I	3
Social Science Elective		3
Total		15

Semester VI

CSE Theory Elective		3
CSE Software Elective		6
CSE Elective		3
ENC 3246	Communication for Engineers	3
Total		15

Semester VII

Fine Arts Elective	3
ALAMEA Elective	3
Historical Perspective	3
CSE Elective	<u>6</u>
Total	15

Semester VIII

CIS 4250 Ethical Issues (6A MW/MI)	3
Upper Level Humanities, Social Science or Fine Arts Elective	3
CSE Elective	<u>6</u>
Total	12

Gordon Rule (6A) is fully met through the mathematics courses above, ENC1101, ENC1102, ENC3246 and CIS4250 or by completing an AA degree at a Florida Community College. Exit Requirements in Major Works/Major Issues (MW/MI) and Literature and Writing (L&W) are fully met through ENC3246 and CIS4250.

Four-Year Curriculum in Computer Engineering

Prerequisites (State Mandated Common Prerequisites) for Students Transferring from a Florida Community College: If a student wishes to transfer without an A.A. degree and has fewer than 60 semester hours of acceptable credit, the student must meet the university's entering freshman requirements including ACT or SAT test scores, GPA, and course requirements.

Students should complete the following **prerequisite courses** listed below at the lower level prior to entering the University. If these courses are not taken at the community college, they must be completed before the degree is granted. Unless stated otherwise, a grade of "C" is the minimum acceptable grade.

Students qualify for direct entry to the department if they have completed the following courses at a Community College or University in the Florida State University System (SUS) and meet all other admissions requirements of the University and College.

Some courses required for the major may also meet General Education Requirements thereby transferring maximum hours to the university.

Communications:

ENC 1101/1102 English I and II (6)

Humanities & Social Sciences:

Humanities Courses (6)
Social Science Courses (6)
Humanities or Social Sciences (3)

Mathematics:

USF	C/C
MAC 2281	MAC 2311* (4)
MAC 2282	MAC 2312* (4)
MAC 2283	MAC 2313* (4)
MAP 2302	MAP 2302 (3)

*or MAC 2281, MAC 2282, MAC 2283

Natural Sciences:

USF	C/C
CHM 2045	CHM 1045* (3)
CHM 2045L	CHM 1045L* (1)
PHY 2048	PHY 2048 (3)
PHY 2048L	PHY 2048L (1)
PHY 2049	PHY 2049 (3)
PHY 2049L	PHY 2049L (1)

*or CHS 1440 Chemistry for Engineers

Please be aware of the immunization, foreign language, continuous enrollment policies of the university, and qualitative standards required.

Computer Engineering Admissions Requirements

All students must complete the equivalent of USF Composition I & II, Engineering Calculus I & II and calculus-based General Physics I & II (with labs) with an overall grade point average of 3.00 or higher in these courses (best attempt) to be admitted to the CSE department. Continuation in the major requires successful completion of CDA 3103 and COP 3514 with the required GPA as stated in the Computer Science & Engineering prerequisite statement in the College of Engineering general section.

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

The schedule that follows indicates how a diligent student who can devote full time to coursework can satisfy requirements in four academic years. Students without a solid foundation or those who cannot devote full time to academics should plan a slower pace. The following sequence is intended to facilitate registration planning and is subject to change based upon course availability. The sequence may also vary based upon individual considerations. Registration assistance will be provided by academic advisors.

Semester I

MAC 2281 Engineering Calculus I	4
ENC 1101 Composition I	3
EGN 3000 Foundations of Engineering	1
CHM 2045 General Chemistry I	3
CHM 2045L General Chemistry I Lab	1
Social Science Elective	<u>3</u>
Total	15

Semester II

MAC 2282 Engineering Calculus II	4
ENC 1102 Composition II	3
PHY 2048 General Physics I	3
PHY 2048L General Physics I Lab	1
COP 2510 Programming Concepts	<u>3</u>
Total	14

Semester III

MAC 2283 Engineering Calculus III	4
PHY 2049 General Physics II	3
PHY 2049L General Physics II Lab	1
COP 3514 Program Design	3
Social Science Elective	<u>3</u>
Total	14

Semester IV

CDA 3103 Computer Organization	3
COT 3100 Intro Discrete Structures	3
COP 3331 Object Oriented Software Design	3
Historical Perspectives Elective	3
MAP 2302 Differential Equations	
or	
EGN 3433 Modeling and Analysis of Engineering Systems	<u>3</u>
Total	15

Summer Semester

CDA 3201 Logic Design	3
CDA 3201L Logic Design Lab	1
EEL 4851 Data Structures	3
EGN 4450 Linear Systems	<u>2</u>
Total	9

Semester V

CDA 4205 Computer Architecture	3
COP 4600 Operating Systems	3
EEL 3394 Electronic Materials	3
EGN 3373 Electrical Systems I	3

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COT 4400	Analysis of Algorithms	3
Total		15

Semester VI

CDA 4203	Computer System Design	3
CDA 4203L	Computer System Design Lab	1
CSE Elective		3
EGN 3615	Engineering Economics with Social and Global Implications	3
Science Elective		3
CSE Hardware Elective		3
Total		16

Semester VII

CDA 4213	CMOS-VLSI Design	3
CIS 4930	Special Topics in Computer Science I*	1-4
EGN 3443	Engineering Statistics	3
ENC 3246	Communication for Engineers (6A L&W)	3
Fine Arts Elective		3
CSE Elective		3
Total		16

Semester VIII

CIS 4910	Senior Project	2
CIS 4250	Ethical Issues (6A MW/MI)	3
ALAMEA Elective		3
Historical Perspective Elective		3
CSE Hardware Elective		3
Total		14

*Please see your academic advisor for required special topics course.

Gordon Rule (6A) is fully met through the mathematics courses above, ENC1101, ENC1102, ENC3246 and CIS4250 or by completing an AA degree at a Florida Community College. Exit Requirements in Major Works/Major Issues (MW/MI) and Literature and Writing (L&W) are fully met through ENC3246 and CIS4250.

Four-Year Curriculum in Information Systems

Prerequisites (State Mandated Common Prerequisites) for Students Transferring from a Florida Community College: If a student wishes to transfer without an A.A. degree and has fewer than 60 semester hours of acceptable credit, the student must meet the university's entering freshman requirements including ACT or SAT test scores, GPA, and course requirements.

Students should complete the following **prerequisite courses** listed below at the lower level prior to entering the University. If these courses are not taken at the community college, they must be completed before the degree is granted. Unless stated otherwise, a grade of "C" is the minimum acceptable grade ("C-" is insufficient).

Students qualify for direct entry to the department if they have completed the following courses at a Community College or University in the Florida State University System (SUS) and meet all other admissions requirements of the University and College.

Some courses required for the major may also meet General Education Requirements thereby transferring maximum hours to the university.

COP	XXXX*	3
MAC	X311	4
MAC	X312	4
PHY	X048/X048L	4
PHY	X049/X049L	4
or		
PHY	X049C	4

*Programming in Ada, C, C++, or PASCAL or equivalent language.

Natural Sciences:

XXX XXXX**

6

**Two (2) science courses for science majors.

Please be aware of the immunization, foreign language, continuous enrollment policies of the university, and qualitative standards required.

Information Systems Admissions Requirements

All students must complete the equivalent of USF Composition I & II, Engineering of Life Science Calculus I & II and General Physics I & II (with labs) with an overall grade point average of 3.00 or higher in these courses (best attempt) to be admitted to the CSE department. Continuation in the major requires successful completion of CDA 3103 and COP 3514 with the required GPA as stated in the Computer Science & Engineering prerequisite statement in the College of Engineering general section.

BACHELOR OF SCIENCE IN INFORMATION SYSTEMS

The schedule that follows indicates how a diligent student who can devote full time to coursework can satisfy requirements in four academic years. Students without a solid foundation or those who cannot devote full time to academics should plan a slower pace. The following sequence is intended to facilitate registration planning and is subject to change based upon course availability. The sequence may also vary based upon individual considerations. Registration assistance will be provided by academic advisors.

Semester I

MAC 2281/2241	Calculus I	4
ENC 1101	Composition I	3
Science Elective		3
Social Science Elective		3
Total		13

Semester II

MAC 2282/2242	Calculus II	4
ENC 1102	Composition II	3
PHY 2048/2053	Physics I	3
PHY 2048L/2053L	Physics I Lab	1
COP 2510	Programming Concepts	3
Total		14

Semester III

ACG 2021	Accounting I	3
COP 3514	Program Design	3
PHY 2049/2054	Physics II	3
PHY 2049L/2054L	Physics II Lab	1
ECO 2013	Macroeconomics	3
Total		13

Semester IV

CDA 3103	Computer Organization	3
COT 3100	Intro Discrete Structures	3
COP 3331	Object Oriented Software Design	3
Social Science Elective		3
Historical Perspective Elective		3
Total		15

Summer Semester

ECO 2023	Microeconomics	3
EEL 4851	Data Structures	3
Fine Arts Elective		3
Total		9

Semester V

EGN 3443	Engineering Statistics I	3
COP 4600	Operating Systems	3
MAN 3025	Principles of Management	3

COT 4400	Analysis of Algorithms	3
	Historical Perspectives	3
	Total	15

Semester VI

CEN 4020	Software Engineering	3
CEN 4023	Software System Development	3
EGN 3615	Engineering Economics with Social & Global Implications	3
	Science Elective	3
	CSE Software Elective	3
	Total	15

Semester VII

EGN 4450	Introduction to Linear Systems	2
	ALAMEA Elective	3
	CSE Software Elective	6
	CSE Elective	3
	Total	14

Semester VIII

ENC 3246	Communication for Engineers	3
CIS 4250	Ethical Issues (6A MW/MI)	3
	CSE Electives	6
	Total	12

Gordon Rule (6A) is fully met through the mathematics courses above, ENC1101, ENC1102, ENC3246 and CIS4250 or by completing an AA degree at a Florida Community College. Exit Requirements in Major Works/Major Issues (MW/MI) and Literature and Writing (L&W) are fully met through ENC3246 and CIS4250.

• ELECTRICAL ENGINEERING

Undergraduate Degree Offered:

Bachelor of Science in Electrical Engineering (B.S.E.E.)

Graduate Degrees Offered:

Master of Science in Electrical Engineering (M.S.E.E.)

Master of Engineering (M.E.)

Master of Science in Engineering (M.S.E.)

Master of Science in Engineering Science (M.S.E.S)

Doctor of Philosophy in Electrical Engineering (Ph.D.)

Doctor of Philosophy in Engineering Science (Ph.D.)

This department offers study in all areas fundamental to Electrical Engineering and the electrical sciences: circuit analysis and design, electronics, communications, electromagnetics, controls, solid state, system analysis, digital circuit design and microelectromechanical systems (MEMS). Basic concepts are augmented with well-equipped laboratories in circuits, electronics, digital systems, microwave techniques, wireless circuits & systems, and controls and communications. In addition, a general-purpose computer facility, a microprocessor and digital signal processing laboratory, and a microelectronics fabrication, design/test and metrology laboratory are available to undergraduate and graduate students.

Mission Statement

The mission of the Electrical Engineering Department at the University of South Florida is to provide internationally recognized educational programs; to conduct and disseminate internationally recognized research benefiting humanity; to provide service to society; and to emphasize the need for lifelong learning, ethical conduct and an understanding of the diverse social context in which engineering is practiced.

Objectives

The Department objectives are to produce graduates

1. with the knowledge and skills necessary to practice Electrical Engineering successfully.
2. who can pursue advanced topics through graduate or professional studies.

Students pursuing the Bachelor of Science in the Electrical Engineering program take designated coursework in network analysis, electronics, communications, electromagnetic theory, control systems, microelectronics and microprocessors. This coursework is supplemented by electives in many specialized areas of electrical engineering.

Students completing this program normally pursue industrial careers in electronics, communications, power and controls, digital systems, microelectronics, and information systems. The electrical graduate may apply his/her knowledge to such diverse areas as wireless and satellite communications, remote guidance, MEMS, sensing technology, systems integration, automation, computer and information systems, electronic power generation and transmission, electrically propelled transportation, etc. The graduate may do this by performing needed engineering functions related to research and development (often requires an advanced degree), design, production, operation, sales, or management of these products/services.

Departmental Policies

In addition to the College's graduation requirement, the department has the following policies:

1. Mandatory academic advising of students for each term.
2. Exit interviews as a graduation requirement.
3. Students must pass all required BSEE courses, except EGN 3373 and EGN 3374, humanities and social sciences, with a grade of "C" or better. EGN 3373 and EGN 3374 must be passed with a grade of B or better to continue in the program while a D is acceptable in humanities and social sciences.

Four-Year Curriculum in Electrical Engineering

Prerequisites (State Mandated Common Prerequisites) for Students Transferring from a Florida Community College: If a student wishes to transfer without an A.A. degree and has fewer than 60 semester hours of acceptable credit, the student must meet the university's entering freshman requirements including ACT or SAT test scores, GPA, and course requirements.

Students should complete the following **prerequisite courses** listed below at the lower level prior to entering the University. If these courses are not taken at the community college, they must be completed before the degree is granted.

Students qualify for direct entry to the department if they have completed the following courses at a Community College or University in the Florida State University System (SUS) and meet all other admissions requirements of the University and College.

Some courses required for the major may also meet General Education Requirements thereby transferring maximum hours to the university.

Communications:

ENC 1101/1102 English I and II (6)

Humanities & Social Sciences:

Humanities Courses (6)

Social Science Courses (6)

Humanities or Social Sciences (3)

*Mathematics:***USF**

MAC 2281

MAC 2282

MAC 2283

MAP 2302

*or MAC 2281, MAC 2282, MAC 2283

*Natural Sciences:***USF**

CHM 2045

CHM 2045L

PHY 2048

PHY 2048L

C/C

MAC 2311* (4)

MAC 2312* (4)

MAC 2313* (4)

MAP 2302 (3)

C/C

CHM 1045* (3)

CHM 1045L* (1)

PHY 2048 (3)

PHY 2048L (1)

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PHY 2049 PHY 2049 (3)
 PHY 2049L PHY 2049L (1)
 *or CHS 1440 Chemistry for Engineers
 Please be aware of the immunization, foreign language, continuous enrollment policies of the university, and qualitative standards required.

Electrical Engineering Admissions Requirements

Transfer students must have completed the equivalent of the USF Engineering Calculus and Physics sequences and Chemistry I and Chemistry I lab with a minimum GPA in these courses of 2.25 including all attempts; must have an overall GPA of 2.0 or better.

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

The schedule that follows indicates how a diligent student who can devote full time to coursework can satisfy requirements in four academic years. Students without a solid foundation or those who cannot devote full time to academics should plan a slower pace. The following sequence is intended to facilitate registration planning and is subject to change based upon course availability. The sequence may also vary based upon individual considerations. Registration assistance will be provided by academic advisors.

Semester I

ENC 1101	Composition I	3
MAC 2281	Engineering Calculus I	4
	Social Science Elective	3
	Fine Arts Elective	3
	Historical Perspective Elective	3
Total		16

Semester II

ENC 1102	Composition II	3
MAC 2282	Engineering Calculus II	4
PHY 2048	Physics I	3
PHY 2048L	Physics Lab I	1
CHM 2045	Chemistry I	3
CHM 2045L	Chemistry Lab I	1
EGN 3000	Foundations of Engineering	1
Total		16

Semester III

MAC 2283	Engineering Calculus III	4
PHY 2049	Physics II	3
PHY 2049L	Physics Lab II	1
EGN 3443	Engineering Statistics	3
EGN 3615	Engineering Economics with Social & Global Implications	3
Total		14

Semester IV

EGN 3433	Modeling & Analysis of Engineering Systems	
or		
MAP 2302	Differential Equations	3
EGN 3420	Engineering Analysis	3
EGN 3373	Electrical Systems I	3
EEL 2161	EE Computing Methods	3
EEE 3394	Electronic Materials	3
Total		15

Summer Term

	Historical Perspective	3
EGN 3374	Electrical Systems II	3
ENC 3246	Communications for Engineers (6A L&W)	3
Total		9

Semester V

EEL 3100	Network Analysis	3
EEL 4705	Logic Design	3
EEL 4705L	Logic Lab	1
EEL 3315L	Lab I (Circuits)	1
EEL 4471	Electromagnetics	3
EEE 4351C	Semiconductor Devices	3
Total		14

Semester VI

EEL 4102	Linear Systems Analysis	3
EEL 3375	Electromechanical Systems	3
EEL 4744	Microprocessors	3
EEL 4743L	Microprocessor Lab	1
EEE 3302	Electronics I	3
ELR 4423L	Wireless Circuits & Systems Lab	2
Total		15

Semester VII

EEL 4906	Prof. Issues & Eng. Design (MW/MI)	3
EEL 3116L	EE Lab II (Electronics)	1
EEL 4657	Linear Control Systems	3
EEL 4657L	Linear Controls Laboratory	1
EEE 4301	Electronics II	3
EEL 4512C	Communication Systems	3
Total		14

Semester VIII

EEL 4914	EE Design Project	3
	Social Science Elective	3
	Tech Elective*	3
	Tech Elective*	3
	ALAMEA Elective	3
Total		15

*Some electives with lab components will incur a lab fee.

Gordon Rule (6A) is fully met through the mathematics courses above, ENC 1101, ENC 1102, ENC 3246 and by selecting one technical or general education elective that is an approved 6A communication course or by completing an AA degree at a Florida Community College. Exit Requirements in Major Works/Major Issues (MW/MI) and Literature and Writing (L&W) are fully met through ENC 3246 and EEL 4906.

Departmental Policy: For EE majors a minimum grade of B is required for both EGN 3373 and EGN 3374.

INDUSTRIAL AND MANAGEMENT SYSTEMS ENGINEERING

Undergraduate Degree Offered:

Bachelor of Science in Industrial Engineering (B.S.I.E.)

Graduate Degrees Offered:

Master of Science in Industrial Engineering (M.S.I.E.)

Master of Engineering (M.E.)

Master of Science in Engineering Science (M.S.E.S.)

Master of Science in Engineering Management (M.S.E.M)

Master of Industrial Engineering (M.I.E.)

Doctor of Philosophy in Industrial Engineering (Ph.D.)

Doctor of Philosophy in Engineering Science (Ph.D.)

This department offers study pertinent to the design, evaluation and operation of a variety of industrial systems, ranging from the analysis of public systems to the operation of manufacturing plants. Topics include production planning and control, production and plant design, applied statistics, operations research, human factors and productivity, manufacturing, and automation. The department has excellent laboratory facilities that support class projects and research in microcomputer applications, computer-aided manufacturing, human performance, automation, and applications of robotics. Evening and off-campus programs are available through the Master of

Science in Engineering Management (M.S.E.M.) program. The department also administers the manufacturing option in the M.S.E. program.

Mission Statement

The Department of Industrial and Management Systems Engineering is committed to strong and innovative educational and research programs, economic development, and community initiatives. Our efforts are focused on attracting high-potential students and teaching them to think critically and to communicate effectively. The IMSE department strives for a cutting edge, internationally recognized research program. Our curriculum educates students to work successfully in the global environment and to pursue advanced studies.

Objectives

The objectives of the Department are to:

1. Attract and recruit high quality students;
2. Educate, motivate and serve students with the ultimate goal of preparing them for their professional careers;
3. Engage in an agile and interdisciplinary research program deserving of international recognition that creates significant broader impact in the areas of technology transfer and development of leaders in engineering;
4. Recruit and mentor a diverse faculty with interdisciplinary interests;
5. Develop strong and internationally recognized academic programs in Industrial Engineering and Engineering Management;
6. Engage the alumni in the growth and development of the department;
7. Take a leadership role in providing service to the profession, industry, and society at large.

Departmental Policies

In addition to the College's graduation requirement, the department has the following policies:

1. Mandatory academic advising of students for each term.
2. Exit interviews as a graduation requirement.

**Four-Year Curriculum in
Industrial and Management Systems
Engineering**

Prerequisites (State Mandated Common Prerequisites) for Students Transferring from a Florida Community College: If a student wishes to transfer without an A.A. degree and has fewer than 60 semester hours of acceptable credit, the student must meet the university's entering freshman requirements including ACT or SAT test scores, GPA, and course requirements.

Students should complete the following **prerequisite courses** listed below at the lower level prior to entering the University. If these courses are not taken at the community college, they must be completed before the degree is granted. Unless stated otherwise, a grade of "C" is the minimum acceptable grade.

Students qualify for direct entry to the department if they have completed the following courses at a Community College or University in the Florida State University System (SUS) and meet all other admissions requirements of the University and College.

Some courses required for the major may also meet General Education Requirements thereby transferring maximum hours to the university.

Communications:

ENC 1101/1102 English I and II (6)

Humanities & Social Sciences:

Humanities Courses (6)

Social Science Courses (6)

Humanities or Social Sciences (3)

Mathematics:

USF

MAC 2281

MAC 2282

MAC 2283

MAP 2302

*or MAC 2281, MAC 2282, MAC 2283

Natural Sciences:

USF

CHM 2045

CHM 2045L

PHY 2048

PHY 2048L

PHY 2049

PHY 2049L

*or CHS 1440 Chemistry for Engineers

Please be aware of the immunization, foreign language, continuous enrollment policies of the university, and qualitative standards required.

C/C

MAC 2311* (4)

MAC 2312* (4)

MAC 2313* (4)

MAP 2302 (3)

C/C

CHM 1045* (3)

CHM 1045L* (1)

PHY 2048 (3)

PHY 2048L (1)

PHY 2049 (3)

PHY 2049L (1)

Industrial Engineering Admissions Requirements

Transfer students must have completed the equivalent USF Engineering Calculus sequence with a 2.0 GPA; must have completed one year of equivalent USF General Physics and Chemistry courses with a minimum of 2.0 GPA; must have a USF and overall GPA of 2.0 or better.

**BACHELOR OF SCIENCE IN INDUSTRIAL
ENGINEERING**

The schedule that follows indicates how a diligent student who can devote full time to coursework can satisfy requirements in four academic years. Students without a solid foundation or those who cannot devote full time to academics should plan a slower pace. The following sequence is intended to facilitate registration planning and is subject to change based upon course availability. The sequence may also vary based upon individual considerations. Registration assistance will be provided by academic advisors.

Semester I

CHM 2045	Chemistry I	3
CHM 2045L	Chemistry I Lab	1
EGN 3000	Foundations of Engineering	1
ENC 1101	Composition I	3
MAC 2281	Engineering Calculus I	4
Social Science Elective		3
Total		15

Semester II

CHM 2046	Chemistry II	3
Historical Perspectives Elective		3
ENC 1102	Composition II	3
MAC 2282	Engineering Calculus II	4
PHY 2048	Physics I	3
PHY 2048L	Physics I Lab	1
Total		17

Semester III

EGN 3443	Engineering Statistics	3
MAC 2283	Engineering Calculus III	4
PHY 2049	Physics II	3
PHY 2049L	Physics II Lab	1
Historical Perspectives Elective		3
Total		14

Semester IV

EGN 3311	Statics	3
COP 2510	Programming Concepts	3
EGN 4450	Linear Systems	2
EGN 3433	Modeling & Analysis of Engineering Systems	

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or		
MAP 2302	Differential Equations	3
	Fine Arts Elective	<u>3</u>
	Total	14

Summer Term

EGS 1113	Engineering Graphics	3
EGN 3615	Engineering Economy with Social and Global Implications (SS)	3
	ALAMEA Elective	<u>3</u>
	Total	9

Semester V

EGN 3365	Materials Engineering I	3
EGN 3373	Introduction to Electrical Systems I	3
EIN 4312C	Work Analysis	3
EIN 4621	Manufacturing Processes	3
ESI 4312	Deterministic OR	<u>3</u>
	Total	15

Semester VI

EGN 3343	Thermodynamics	3
EIN 4333	Production Control	3
ESI 4221	Industrial Statistics/Quality Control	3
ESI 4313	Probabilistic OR	3
	Tech Elective Engineering Science	<u>3</u>
	Total	15

Semester VII

EIN 4364C	Facilities Design	3
EIN 4352	Engineering Cost Analysis	3
ESI 4244	Design of Experiments	3
ESI 4523	Industrial Systems Simulation	3
	Tech Elective Industrial Engineering	<u>2</u>
	Total	14

Semester VIII

EIN 4243C	Human Factors (6A)	3
EIN 4891	Capstone Design (MW/MI)	3
EIN 4601	Automation/Robotics	3
ENC 3246	Communication for Engineers (6A L&W)	3
	Tech Elective Industrial Engineering	<u>3</u>
	Total	15

Gordon Rule (6A) is fully met through the mathematics courses above, ENC 1101, ENC 1102, ENC 3246 and EIN 4313 or by completing an AA degree at a Florida Community College. Exit Requirements in Major Works/Major Issues (MW/MI) and Literature and Writing (L&W) are fully met through ENC 3246 and EIN 4365.

• MECHANICAL ENGINEERING

Undergraduate Degree Offered:

Bachelor of Science in Mechanical Engineering (B.S.M.E.)

Graduate Degrees Offered:

Master of Mechanical Engineering (M.M.E.)

Master of Science in Mechanical Engineering (M.S.M.E.)

Master of Engineering (M.E.)

Master of Science in Engineering (M.S.E.)

Doctor of Philosophy in Mechanical Engineering (Ph.D.)

Doctor of Philosophy in Engineering Science (Ph.D.)

Coursework includes basic science and mathematics, thermal and fluid sciences, material science, solid mechanics, dynamics, machine design, vibrations, instrumentation and control.

Graduates of this program are employed in research, design, production, marketing, service, installation (contracting), maintenance and operation in such industries as mining, petroleum, paper, food, power, manufacturing, air-conditioning, defense systems, aerospace, data processing, communications, and automotive.

Laboratories are available for basic instrumentation, thermal and fluid sciences, solid mechanics, data acquisition and control, CAD/CAE, vibrations, and aerodynamics.

Students pursuing the Bachelor of Science in Mechanical Engineering program take coursework in thermodynamics and heat transfer, instrumentation and measurements, solid and fluid mechanics, dynamics, machine analysis and design, mechanical design, manufacturing processes, vibrations and controls. This is supplemented by elective coursework in such areas as power plant analysis, refrigeration and air conditioning, mechanical design, advanced mechanics, robotics, propulsion, computer-aided design, manufacturing, bio-engineering, alternative energy, thermal design, composite materials, and aerodynamics.

Graduates of this program are employed in design, manufacturing, contracting, operations, marketing, and management in virtually all segments of industry and government, including, but not limited to: aeronautics, aerospace & propulsion; automotive, internal combustion engines, fuel cells & transportation; propulsion systems; electronic utilities & power generation; heating, ventilation & air conditioning; structures & machinery design; mining & oil exploration; paper, textile, food, & petrochemical industries/processing/manufacturing; micro & nano materials and semiconductors; and biomaterials & bioengineering. There are abundant career opportunities in a wide range of industries because mechanical equipment is required in every aspect of modern industry.

Mission Statement

The Mission of the Mechanical Engineering Department is:

- to provide an exemplary undergraduate and graduate education for students entering the mechanical engineering profession or seeking careers in related fields;
- to advance scientific knowledge through basic and applied research;
- to disseminate technical information through scholarly publication and presentation, and continuing education;
- to advance the profession through service within the associated societies;
- to promote activities which embrace global development.

Objectives

The objectives of the Undergraduate Program in Mechanical Engineering are:

- Our graduates will successfully apply concepts of science, mathematics, computation, and engineering in their chosen endeavor;
- Our graduates will possess knowledge and skills essential to engineering processes, such as design, analysis, synthesis, fabrication and experimental techniques;
- Our graduates will demonstrate skills for professional interaction and leadership including multi-disciplinary collaboration, and effective oral and written communication.
- Our graduates will understand technology within a global, societal and economic context. They will also demonstrate continued career development as well as professional and ethical responsibility.

Departmental Policies

In addition to the College's graduation requirement, the department has the following policies:

- Mandatory academic advising of students for each term, and;
- Exit interviews as a graduation requirement.
- Students are strongly encouraged to take the FE Exam.

Four-Year Curriculum in Mechanical Engineering

Prerequisites (State Mandated Common Prerequisites) for Students Transferring from a Florida Community College: If a student wishes to transfer without an A.A. degree and has

fewer than 60 semester hours of acceptable credit, the student must meet the university's entering freshman requirements including ACT or SAT test scores, GPA, and course requirements.

Students should complete the following **prerequisite courses** listed below at the lower level prior to entering the University. If these courses are not taken at the community college, they must be completed before the degree is granted. Unless stated otherwise, a grade of "C" is the minimum acceptable grade.

Students qualify for direct entry to the department if they have completed the following courses at a Community College or University in the Florida State University System (SUS) and meet all other admissions requirements of the University and College.

Students qualify for direct entry to the department if they have completed the following courses at a Community College or University in the Florida State University System (SUS) and meet all other admissions requirements of the University and College.

Some courses required for the major may also meet General Education Requirements thereby transferring maximum hours to the university.

Communications:

ENC 1101/1102 English I and II (6)

Humanities & Social Sciences:

Humanities Courses (6)

Social Science Courses (6)

Humanities or Social Sciences (3)

Mathematics:

USF	C/C
MAC 2281	MAC 2311* (4)
MAC 2282	MAC 2312* (4)
MAC 2283	MAC 2313* (4)
MAP 2302	MAP 2302 (3)

*or MAC 2281, MAC 2282, MAC 2283

Natural Sciences:

USF	C/C
CHM 2045	CHM 1045* (3)
CHM 2045L	CHM 1045L* (1)
PHY 2048	PHY 2048 (3)
PHY 2048L	PHY 2048L (1)
PHY 2049	PHY 2049 (3)
PHY 2049L	PHY 2049L (1)

*or CHS 1440 Chemistry for Engineers

Please be aware of the immunization, foreign language, continuous enrollment policies of the university, and qualitative standards required.

Mechanical Engineering Admissions Requirements

Students entering the Mechanical Engineering department must have completed the equivalent USF Engineering Calculus sequence, one year equivalent USF General Physics and one semester equivalent USF General Chemistry with a minimum of 2.5 GPA; and must have an overall and USF GPA of 2.0 or better.

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

The schedule that follows indicates how a diligent student who can devote full time to coursework can satisfy requirements in four academic years. Students without a solid foundation or those who cannot devote full time to academics should plan a slower pace. The following sequence is intended to facilitate registration planning and is subject to change based upon course availability. The sequence may also vary based upon individual considerations. Registration assistance will be provided by academic advisors.

Semester I		
ENC 1101	Composition I	3
MAC 2281	Engineering Calculus I	4
CHM 2045	General Chemistry I	3
CHM 2045L	General Chemistry I Lab	1
EGS 1113	Intro. to Design Graphics	3
EGN 3000	Foundations of Engineering	1
Total		15

Semester II		
ENC 1102	Composition II	3
MAC 2282	Engineering Calculus II	4
PHY 2048	General Physics I	3
PHY 2048L	General Physics I Lab	1
Fine Arts Elective		3
Total		14

Semester III		
MAC 2283	Engineering Calculus III	4
PHY 2049	General Physics II	3
PHY 2049L	General Physics II Lab	1
EGN 3311	Statics	3
EGN 3615	Engineering Economics with Social and Global Implications	3
Total		14

Semester IV		
EGN 3321	Dynamics	3
EGN 3365	Materials Engineering I	3
EGN 3373	Electrical Systems I	3
EML 3035	Programming Concepts for Mechanical Engineers	1
MAP 2302	Differential Equations	3
Social Science Elective		3
Total		16

Summer Term		
EGN 3343	Thermodynamics I	3
EGN 3443	Engineering Statistics I	3
EML 3500	Mechanics of Solids	3
Historical Perspectives Elective		3
Total		12

Semester V		
EML 3041	Computational Methods	3
EML 3701	Fluid Systems	3
EML 3262	Kinematics and Dynamics of Machinery	3
ENC 3246	Communication for Engineers (6A L&W)	3
EGN 4325	Mechanical Manufacturing Processes	3
Total		15

Semester VI		
EML 4501	Machine Design	3
EML 3303	Mechanical Engineering Lab I	3
EML 4124	Heat Transfer	3
Approved Technical/Design/Science Elective		3
ALAMEA Elective		3
Total		15

Semester VII		
EML 4106	Thermal Systems	3
EML 4302	Mechanical Engineering Lab II	3
EML 4220	Vibrations	3
Approved Technical/Design/Science Elective		3
Historical Perspectives Elective		3
Total		15

Semester VIII		
EML 4312	Mechanical Controls	3
EML 4551	Capstone Design (MW/MI)	3
Approved Technical/Design/Science Elective		3
Approved Technical/Design/Science Elective		3
Total		12

Gordon Rule (6A) is fully met through the mathematics courses above, ENC 1101, ENC 1102, ENC 3246 and by selecting one technical or general education elective that is an approved 6A communication course or by completing an AA degree at a Florida Community College. Exit Requirements in Major Works/Major Issues (MW/MI) and Literature & Writing (L&W) are fully met through EML 4551 and ENC 3246.

• GENERAL ENGINEERING

BACHELOR OF SCIENCE IN ENGINEERING (B.S.E)

The College of Engineering also offers the Bachelor of Science in Engineering degree. This program is tailored to meet the needs of students with academic and career goals that are not best met by following a prescribed disciplinary program. The program is often cross-disciplinary in nature and a specific curriculum is not predetermined. Therefore, this degree cannot be accredited by the Accreditation Board for Engineering and Technology and it is not often recommended. Nevertheless, it can be a valuable program in some cases. The curriculum plan for each student pursuing this option is developed in consultation with faculty advisors and must be approved by the Associate Dean for Academic Affairs or his designee.

Premedical students may elect this option. It accommodates up to 24 hours of special pre-med coursework (Biology, Organic Chemistry, etc.) to meet the requirements for applying to medical schools. Pre-law students find this option permits a strong technical background and rigorous undergraduate preparation including a focus on ethics and professionalism in the engineering profession.

Objectives

The Objectives of the Undergraduate Program in General Engineering are to prepare students to:

1. Think critically and employ the concepts of math, science, engineering and modern data acquisition.
2. Effectively utilize the skills essential to the design process, including problem formulation, conceptualization, testing and analysis.
3. Interact proficiently in a multidisciplinary professional environment through well-developed oral and written communication skills.
4. Enter into professional practice with an awareness of ethical responsibility, the need for continuing education, and global and societal considerations.

Students pursuing the Bachelor of Science in Engineering complete courses in mathematics, science and general engineering, and courses in an area of engineering specialization. Students completing this program often pursue graduate or professional degrees in management, medicine, or law. The critical thinking skills and technological expertise an engineering education provides result in career opportunities within a wide range of settings within the engineering field and other professional, industrial, governmental, military, administrative and business settings.

Graduation Requirements

In addition to the University's graduation requirements and completion of the required courses and approved specialization courses, graduation requirements for the Bachelor of Engineering degree program include:

1. Mandatory academic advising of students each term
2. Exit interviews as a graduation requirement
3. No grade lower than a C (not a C-) in degree applicable math, science or engineering courses.

Note: Please refer to the University of South Florida requirements for graduation for GPA requirements.

Four-Year Curriculum - General Engineering

Prerequisites (State Mandated Common Prerequisites) for Students Transferring from a Florida Community College: If a student wishes to transfer without an A.A. degree and has fewer than 60 semester hours of acceptable credit, the student must meet the university's entering freshman requirements including ACT or SAT test scores, GPA, and course requirements.

Students should complete the following prerequisite courses listed below at the lower level prior to entering the University. If these courses are not taken at the community college, they must be completed before the degree is granted. Unless stated otherwise, a grade of "C" is the minimum acceptable grade.

Some courses required for the major may also meet General Education Requirements thereby transferring maximum hours to the university.

Some courses required for the major may also meet General Education Requirements thereby transferring maximum hours to the university.

Communications:

ENC 1101/1102 Composition I and II (6)

Humanities & Social Sciences:

Humanities Courses (6)

Social Science Courses (6)

Humanities or Social Sciences (3)

Mathematics:

USF

MAC 2281

MAC 2282

MAC 2283

MAP 2302

C/C

MAC 2311* (4)

MAC 2312* (4)

MAC 2313* (4)

MAP 2302 (3)

*or MAC 2281, MAC 2282, MAC 2283

Natural Sciences:

USF

CHM 2045

CHM 2045L

PHY 2048

PHY 2048L

PHY 2049

PHY 2049L

C/C

CHM 1045* (3)

CHM 1045L* (1)

PHY 2048 (3)

PHY 2048L (1)

PHY 2049 (3)

PHY 2049L (1)

*or CHS 1440 Chemistry for Engineers

Please be aware of the immunization, foreign language, continuous enrollment policies of the university, and qualitative standards required.

Admissions Requirements

Students entering the General Engineering degree must have completed the equivalent USF Engineering Calculus sequence, one year equivalent USF General Physics and one semester equivalent USF General Chemistry with a minimum 2.0 GPA; and must have a USF and an overall GPA of 2.0 or better.

Continuation Requirements: Completion of the following: EGN 3311, EGN 3343, EGN 3443 and EGN 3373 with grades of C or better, (C- is insufficient), is required before registration in specialization courses will be permitted.

Department Policies:

1. Advising is mandatory prior to each term.
2. A grade of C or better is required in Math, Science and Engineering Courses (C- is insufficient).
3. College Electives must be relevant to specialization and approved by the Program Coordinator.

Semester I		
ENC 1101	Composition I	3
MAC 2281	Engineering Calculus I	4
CHM 2045	General Chemistry I	3
CHM 2045L	General Chemistry I Laboratory	1
	Historical Perspectives Elective	3
	Total	14
Semester II		
ENC 1102	Composition II	3
MAC 2282	Engineering Calculus II	4
EGN 3000	Foundations of Engineering	1
PHY 2048	General Physics I	3
PHY 2048L	General Physics I Laboratory	1
XXX XXXX	Social Science Elective	3
	Total	15
Semester III		
MAC 2283	Engineering Calculus III	4
EGN 3311	Statics	3
PHY 2049	General Physics II	3
PHY 2049L	General Physics II Laboratory	1
	Social Science Elective	3
XXX XXXX	ALAMEA Elective	3
	Total	17
Semester IV		
EGN 3433	Modeling & Analysis of Engineering Systems	4
or		
MAP 2302	Differential Equations	3
EGN 3373	Introduction to Electrical Systems I	3
EGN 3443	Engineering Statistics I	3
EGN 3343	Thermodynamics I	3
	Historical Perspectives Elective	3
	Total	15
Summer		
XXX XXXX	College Elective	3
	Fine Arts Elective	3
	Elective	3
	Total	9
Semester V		
ENC 3246	Communication for Engineers	3
XXX XXXX	College Elective	3
XXX XXXX	College Elective	3
XXX XXXX	College Upper-Level Elective	3
XXX XXXX	College Upper-Level Elective	3
	Total	15
Semester VI		
XXX XXXX	College Upper-Level Elective	3
XXX XXXX	College Upper-Level Elective	3
XXX XXXX	College Upper-Level Elective	3
XXX XXXX	College Upper-Level Elective	3
XXX XXXX	College Upper-Level Elective	3
	Total	15
Semester VII		
XXX XXXX	College Upper-Level Elective	3
XXX XXXX	College Upper-Level Elective	3
XXX XXXX	College Upper-Level Elective	3
XXX XXXX	College Upper-Level Elective	3
XXX XXXX	College Upper-Level Elective	3
	Total	15
Semester VIII		
XXX XXXX	College Upper-Level Elective	1
XXX XXXX	College Upper-Level Elective	3
XXX XXXX	College Upper-Level Elective	3

XXX XXXX	Exit - College MW/MI Elective	3
XXX XXXX	Elective	3
	Total	13

Gordon Rule (6A) is fully met through the mathematics courses above, ENC1101, ENC1102, ENC 3211 and by selecting one technical or general education elective that is an approved 6A communication course or by completing an AA degree at a Florida Community College.
Exit Requirements in Major Works/Major Issues (MW/MI) and Literature and Writing (L&W) are fully met through ENC3211 and a Capstone Design Course indicated as MW/MI.

ENGINEERING FACULTY

Chemical & Biomedical Engineering

Chair: B. Joseph; *Emeritus Professor:* J.C. Busot, J.A. Llewellyn; *Professors:* V.R. Bhethanabotla, S.W. Campbell, R. Gilbert, Y. Goswami, W.E. Lee, III, C. A. Smith, A. K. Sunol; *Associate Professors:* V. Gupta, M. Jaroszeski, J. T. Wolan; *Assistant Professors:* N. Alcantar, R. G. Toomey, M.D. VanAuker; *Courtesy Faculty:* A. Ghaneh-Ford, T. Koob, S. Kranc, D. McMillan, M. Ossowski, N. Poor, J. Strom, S. Sunol.

Civil and Environmental Engineering

Chairperson (Interim): W. Carpenter; *Professors Emeriti:* M. W. Anderson, R.P. Carnahan, W. Echelberger, J.E. Griffith, S. Kranc; *Distinguished Professor:* A. A. Sagüés; *Professors:* W. C. Carpenter, M. Gunaratne, J.J. Lu, M.A. Ross, A. A. Sagüés, R. Sen; *Associate Professors:* G. Mullins, M. Nachabe, A. Zayed; *Assistant Professors:* J. Cunningham, D. Simkins, P. Stroot, A. Tejada, M. Trotz, D. Yeh; *Instructor:* K. Nohra; *Courtesy Faculty:* E. Mierzejewski, J. Obeysekera, S.E. Polzin, N. Poor, A. Stuart, F.L. Young.

Computer Science and Engineering

Chairperson: L. Hall; *Distinguished Professor:* A. Kandel, N. Ranganathan; *Professors:* K. Christensen, D. Goldgof, L. Hall, A. Kandel, R. Kasturi, R. Murphy, R. Perez, L. Piegl, S. Sarkar, K. Valavanis; *Associate Professors:* S. Katkooi, M. Labrador, D. Rundus; *Assistant Professors:* A. Iamnitshi, J. Ligatti, R. Tripathi, Y. Tu, H. Zheng; *Instructor:* J. Harlow, H. Jeanty, E. Kellner, R. Tindell, R. Turner, J. Wang.

Electrical Engineering

Chairperson: D. L. Morel; *Professors:* Y. Chiou, A. Domijan, L.P. Dunleavy, C. S. Ferekides, V.K. Jain, D.L. Morel, R. S. Sadow, R. Sankar, E.K. Stefanakos, T.E. Wade, T. M. Weller; *Associate Professors:* S. Bhansali, K.A. Buckle, A.M. Hoff, W.A. Moreno, R. Schlaf, P.H. Wiley; *Assistant Professors:* H. Arslan, S. Bhanja, H. Cao, J. Wang; *Visiting Professor:* C. Baylis, R. Fehr; *Lecturers:* J.T. Leffew, S.W. Thomas.

Industrial and Management Systems

Chairperson: J. Zayas-Castro; *Professors:* T. K. Das, S. K. Khator, O. G. Okogbaa, J. Zayas-Castro; *Associate Professors:* M. X. Weng, A. Yalcin; *Assistant Professors:* G. Centeno, Q. Huang, N. Kong, S. Lai-Yung, K. Reeves, A. Savachkin; *Lecturers:* D. K. Gooding, P. R. McCright, P. Schnitzler.

Mechanical Engineering

Chairperson: R. V. Dubey; *Professors:* R.A. Crane, R.V. Dubey, D.P. Hess, A.K. Kaw, A. Kumar, J.L.F. Porteiro; *Associate Professors:* G.H. Besterfield, M.M. Rahman, S. Wilkinson; *Assistant Professors:* N. Crane, C. Lusk, Y.P. Moussy, F. Pyrtle III, A. Volinsky; *Adjuncts:* D.L. Dekker; *Professor Emeritus:* L. A. Scott, W. A. Smith, S. J. Ying.