

COLLEGE OF ENGINEERING



Changes to Note

The follow curricular changes for the College of Engineering were approved by the USF Graduate Council on the date noted. *Program Terminations were approved as noted, but may still be active at the State level pending final termination from the Degree Inventory.

Accelerated Programs

Chemistry BS / Biomedical Engineering MS	BS/MS	New Accelerated Program (Approved by UGC on 11/9/15) APPROVED with correction re: 4000-level courses and UGC approval of revision, as well as pending SACSCOC approval.	12/7/15
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Program Changes

Biomedical Engineering	M.S.B.E.	Update course option (GMS 6440 "or BME 6410")	5/16/16
Biomedical Engineering	Ph.D.	Update course option (GMS 6440 "or BME 6410")	5/16/16
Chemical Engineering	M.S.Ch.	Add statement "or strong evidence of undergrad chm eng exp".	5/2/16
Chemical Engineering	M.S.Ch.	Update course option (ECH 6105 "or ECH 6107")	5/16/16
Civil Engineering	M.C.E.	Remove 4000 level courses	5/2/16
Environmental Eng	M.E.V.E.	Update wording, portfolio	5/2/16
Civil Engineering	M.S.C.E.	Remove 4000 level courses	5/2/16
Environmental Eng	M.S.E.V.	Remove 4000 level courses	5/2/16
Civil Eng	Ph.D.	Update wording, course #	5/2/16
Environmental Eng	PhD	Update wording	5/2/16

Dual Degree Program Changes

Biomedical Engineering	M.S.B.E.	Update course option (GMS 6440 "or BME 6410")	5/16/16
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University of South Florida
College of Engineering
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College Dean: Robert H. Bishop, Ph.D.

Associate Dean: Jose Zayas-Castro, Ph.D.

Accreditation:

The Commission on Colleges of the Southern Association of College and Schools. Contact College for additional accreditation information.

MISSION STATEMENT

The mission of the USF College of Engineering is to improve the quality of life in our community by providing a high quality education for our engineering graduates and practicing professionals; by creating new knowledge and solving real world problems via innovative research; and by engaging in effective community service and outreach.

WHAT WE DO

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.

Degrees, Programs, Concentrations:

See individual listings for current active status

*Degree**Program**Concentration***Master of Civil Engineering (M.C.E.)**

Civil Engineering (ECE)
Geotechnical (GTL)
Materials (MTL)
Structures (STR)
Transportation (TPT)
Water Resources (WRS)

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

Environmental Engineering (EVE)

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

Mechanical Engineering (EME)

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

Biomedical Engineering (EBI)
Pharmacy (PRMY)

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

Chemical Engineering (ECH)
Biomedical & Biotechnology (BEB)

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

Civil Engineering (ECE)
Engineering for International Development (EFD)
Geotechnical (GTL)
Materials (MTL)
Structures (STR)
Transportation (TPT)
Water Resources (WRS)

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

Computer Engineering (ECP)

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

Computer Science (ECC)

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

Electrical Engineering (EEL)

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

Engineering Management (EMA)

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

- Engineering Science (EGC)
 - Chemical and Biomedical Engineering (CHB)
 - Electrical Engineering (PEE)
 - Environmental Engineering (EVE)
 - Transportation Engineering (TPE)

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

- Environmental Engineering (EVE)
- Engineering for International Development (EFD)

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

- Industrial Engineering (EIE)

Master of Science in Information Technology (M.S.I.T.)

- Information Technology (ITC)

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

- Materials Science and Engineering (MSE)

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

- Mechanical Engineering (EME)

Doctor of Philosophy (Ph.D.)

- Biomedical Engineering (EBI)
- Chemical Engineering (ECH)
 - Biomedical & Biotechnology (BEB)
 - Manufacturing (MFT)
- Civil Engineering
 - Environmental Engineering (ENV)
 - Geotechnical (GTL)
 - Materials (MTL)
 - Structures (STR)
 - Transportation (TPT)
 - Water Resources (WRS)
- Computer Science and Engineering (CSE)
- Electrical Engineering (EEL)
- Engineering Science (EGC)
- Environmental Engineering (EVE)
- Industrial Engineering (EIE)
- Mechanical Engineering (EGR)
 - Manufacturing (MFG)

Accelerated Degree Programs

- BS/M.E. or BS/M.S. – Engineering
- BS in Chemistry / MSBE in Biomedical Engineering – pending UGC and SACSCOC approval

Dual Degree Programs:

- Dual Degrees in Biomedical Engineering (Ph.D.) and Medicine (M.D.)
- Dual degrees in Biomedical Engineering (M.S.B.E.) and Entrepreneurship in Applied Technologies (M.S.)

Graduate Certificates Offered: See Graduate Certificates

COLLEGE REQUIREMENTS

General Program Requirements

The requirements for graduate degrees from the College of Engineering consist of University requirements, College requirements, and Program requirements. For University requirements refer to the Office of Graduate Studies Policies and Procedures. College requirements are listed below. Refer to the degree program sections for other requirements.

Master's Degree Programs

The Master's degree is awarded for advanced study beyond the baccalaureate degree within an area of specialty. The College of Engineering offers several programs leading to degrees at the master's level.

Master of Science in Designated Engineering Field - This degree is normally awarded to a Master's graduate who holds a Bachelor's degree in the designated field. Some programs offer this degree in two options: (1) thesis option (30 credits), and (2) non-thesis option (30 credits).

Master of Science in Engineering Science - This program is designed to meet the needs of students who wish to pursue an interdisciplinary course of study and research. This degree is individually tailored to student needs. Some programs offer this degree in two options: (1) thesis option (30 credits), and (2) non-thesis option (30 credits).

Master of Designated Discipline - This degree is normally awarded to a Master's graduate who has an undergraduate degree in the discipline and who follows an all coursework program or a project program.

College of Engineering Requirements for Master's Degree

1. A thesis program must contain a minimum of 24 credit hours of coursework and a minimum of 6 credit hours of thesis. (If a student transfers from a thesis program to an all coursework program, no thesis hours may be transferred, converted or counted toward the degree.)
2. Non-thesis program requirements vary according to department but must contain a minimum of 30 credits of approved coursework.
3. Students must maintain an overall grade point average of 3.00. No grade below "C" will be accepted in a graduate program. If a student's average falls below 3.00, the student will be placed on probation.
4. Most programs require students to pass a final oral or written comprehensive examination prior to receiving the degree. These examinations are arranged and administered by the student's department.

Accelerated Programs Leading to Accelerated Bachelor's and Master's Degrees

Students who are clearly interested in graduate study are invited to pursue an accelerated program leading to a Bachelor's Degree and Master's degree in the College of Engineering. Students in the Accelerated Program may apply up to 12 credit hours of coursework, which must be approved by the Graduate Program Coordinator, to count towards both degrees.

Students apply for admission to this program through their advisors, who should be consulted regarding additional requirements. Several factors, which vary by academic department, are considered for admission. However, all applicants must have a minimum GPA of at least 3.00.

Doctoral Degree Programs

The Doctor of Philosophy degree is awarded in recognition of demonstrated scholarly competence and ability to conduct and report original and significant research. Unlike the baccalaureate and Master's degrees, the Ph.D. degree cannot be earned by an accumulation of course credits over a period of residence alone. After adequate fundamental preparation to gain competence, the student must

demonstrate research capability through completion of an authoritative investigation in the chosen engineering field, culminating in a written dissertation. The dissertation must demonstrate that the student possesses the ability to reason logically, the talent for engaging in significant and original research, and the ability to organize and present conclusions in a professional manner.

Doctor of Philosophy in Designated Engineering Field - This degree is awarded to students pursuing a program in one of the following Engineering disciplines: Biomedical Engineering, Chemical Engineering, Civil Engineering, Computer Science and Engineering, Electrical Engineering, Environmental Engineering, Industrial Engineering, and Mechanical Engineering. Students receiving this degree must demonstrate a thorough foundation in the designated discipline.

Doctor of Philosophy in Engineering Science - This program is designed to meet the needs of students who wish to pursue doctoral studies in interdisciplinary areas closely related to engineering.

College of Engineering Requirements for Doctoral Degrees

1. Supervisory Committee. An advisor will be appointed by the chair of the appropriate department or program for each student during the first semester of registration at the University of South Florida. The advisor will help determine the student's area of research interest and will delineate preliminary course assignments. At the earliest possible date, a major professor will be appointed and a supervisory committee formed. This committee will monitor the student's program of studies and has full responsibility for conducting the student's qualifying examination. The Supervisory Committee consists of a minimum of five members. One member of the committee must be outside the College of Engineering. (The requirement may be waived if special reasons exist and prior approval is obtained from the Engineering Associate Dean for Academic Affairs.) A majority of the committee will be from the College of Engineering, with at least two departments of the College represented.
2. Credit Hours. A minimum of 72 hours beyond the baccalaureate degree, including a minimum of 20 hours of dissertation, and a minimum of 30 hours of coursework (excluding independent study and directed research) is required by the College. Further requirements may be imposed by the candidate's doctoral program and supervisory committee. See individual programs for specific requirements.
3. Learning Focus. Throughout the student's program of study, independent learning will be emphasized. For the first time in the participant's career, in most cases, the student will be responsible for mastering a new domain of knowledge without the aid of organized lectures and textbooks. The principal information source will be current literature. Such experience is a necessary preparation for a meaningful career in engineering and other fields where the professional must keep pace with a large, ever-changing body of knowledge.
4. Qualifying Examination. A written and oral qualifying examination, conducted by the supervisory committee, will be taken by each Ph.D. student as soon as a substantial majority of coursework is completed.
5. Admission to Candidacy. Students must be admitted to candidacy before they register for dissertation. Before admission to candidacy, students must have officially formed a Ph.D. Supervisory Committee and passed the qualifying examination of paragraph 4. Once admitted to candidacy students must enroll for a minimum of 2 credit hours each semester of the academic year until completion of program.

6. Dissertation Research. The student must carry out an investigation resulting in an original and significant contribution to the knowledge in the field of research. The requirement of uniqueness means that the dissertation research will provide an important creative experience for the student. As the final stage of the student's program, the candidate must prepare a written dissertation covering the research. Students in the Ph.D. program must take an appropriate number of doctoral dissertation credits, but not less than 20 hours; the exact number is determined by department and/or individual requirements. The defense of the dissertation will conform to Office of Graduate Studies general rules.
7. Residency. Minimum residency requirements may be satisfied by completing the University's minimal requirement at the University of South Florida. Any graduate work counted toward the fulfillment of the requirement for the Ph.D. degree after admission to candidacy must be accomplished within 5 calendar years.

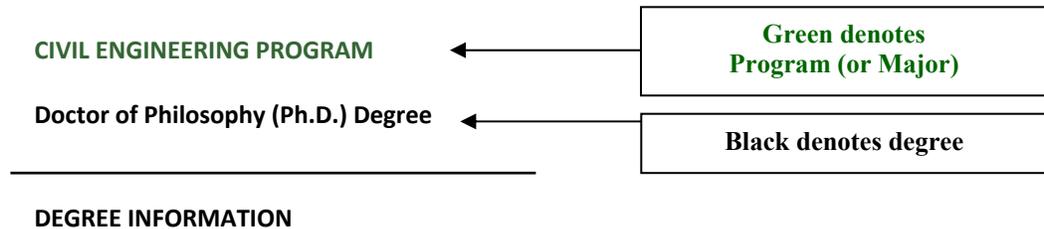
Collaboration with Other Colleges and Departments

Advanced study and research challenges exist at the interfaces between engineering and other academic disciplines. Examples include surface physics and chemistry applied to semiconductor processing technology; semiconductor physics applied to VLSI and analog integrated circuit design, manufacture and quality control; chemical processing and its relation to chemical principles; environmental engineering and chemical identification of minute impurities; environmental and transportation engineering and its relation to public health and public administration; water resources engineering and geo-hydrology; and biomedical engineering, to name only a few. The College collaborates with other academic units of the University in research activities and selectively educates students to become proficient in such interdisciplinary fields.

About the Catalog

The University of South Florida Graduate Catalog is organized with the degree programs offered listed in the section of the College that offers them. For example, the Master of Science degree with a “program” (also known as major) in Biology is listed in the College of Arts and Sciences section. Some colleges offer areas of specialization, or “concentrations” within a degree program.

PROGRAMS



CONCENTRATIONS

Concentration Requirements are listed separately under each Program.

The Program and Concentration are listed on the official transcript. Other areas, such as application tracks, are not listed on the transcript.

Example:
**Doctor of Philosophy in Civil Engineering
with a Concentration in Transportation**

BIOMEDICAL ENGINEERING PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15 (Sept 15 – Int'l)
Summer:	February 15 (Jan 15 – Int'l)

Minimum Total Hours:	30
Program Level:	Masters
CIP Code:	14.0501
Dept. Code:	DEA
Program (Major/College):	EBI EN
Approved:	1999

Concentrations:

Pharmacy (PRMY)

Also offered as Accelerated Program:

BS-Chemistry / M.S.B.E. - Biomedical Engineering*

*pending UGC and SACSCOC approval

CONTACT INFORMATION

College:	Engineering
Department:	Chemical & Biomedical Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

Biomedical Engineering is a highly interdisciplinary program that combines engineering and the medical sciences. The student works with an advisor to develop a graduate program that draws on courses from engineering, medicine, public health, and the life sciences. Current active areas of research include: biomechanics, biomaterials, medical imaging, neuroengineering, tissue engineering, sensors, cellular-level drug delivery, and rehabilitation engineering. In addition to USF Health, participating institutions include the James Haley Veterans Administration Hospital, Florida Orthopedics Institute, and Tampa General Hospital. For more information, please contact the BME Program Advisor.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

Major Research Areas: Biomechanics, Biomaterials, Neuroengineering, Photo Sensors, Cellular-level drug discovery and Tissue Engineering

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- Undergraduate GPA of 3.00 or higher;
- GRE with preferred Minimum scores of Quantitative >75% and Analytical Writing 4 or >;
- An undergraduate Bachelor's degree in Engineering or Science;
- TOEFL 550 (paper-based total) for international students or 213 (computer-based total);
- Two (2) letters of recommendation; and
- A statement of purpose
- CV

- Applicants from countries where English is not the official language must demonstrate proficiency in English. See the Admissions Policy section of the Graduate Catalog for approved ways of demonstrating proficiency. http://www.grad.usf.edu/policies_Sect4_full.php

Note: Exceptionally qualified students with bachelor's degrees in other disciplines may be admitted into the BME M.S. Program on a case-by-case evaluation of their credentials.

DEGREE PROGRAM REQUIREMENTS

Total Minimum Program Hours:

30 credit hours

Both the thesis and non-thesis options are available at the M.S. level.

Core Requirements

Currently there are five (5) required courses:

GMS 6440 (3) Basic Medical Physiology OR
BME 6410 (3) Engineering Physiology

GMS 6605 (3) Basic Medical Anatomy
PHC 6051 (3) Biostatistics II
BME 6000 (3) Biomedical Engineering I
BME 6931 (3) Biomedical Engineering II

Students may either opt for the General Track of the Concentration in Pharmacy, completing 15 hours as noted:

General Track Electives – 15 hours

Students select from additional approved courses to complete the 30 hour requirement. A minimum of 16 hours must be at the 6000 level. In addition, all of the elective courses must consist of engineering-prefix courses, although the Thesis Committee (thesis option) or the BME Program Advisor (non-thesis option) may approve courses in relevant areas such as chemistry, physics, pharmacy, communications sciences & disorders, public health or medicine, in their place.

Concentration in Pharmacy (PRMY)– 15 hours

Students may select from the following options, or other pharmacy courses, as approved by their Pharmacy and BME Advisors:

PHA 6140 3 Introduction to Nanotechnology (Online)
PHA 6116 3 Micro-Nano Drug Delivery Systems (Online)
PHA 6118 3 Nanomaterials and BioMEMS (Online)
PHA 6xxx 3 Nanotechnology and Risk Management (Online)
PHA 6xxxx 3 Nanoformulations and nanopharmaceutics (Online)
PHA 6xxx 3 Introduction to Personalized medicine (Online)

Thesis Option

Thesis option students can count up to six hours of thesis research towards the elective requirements

Comprehensive Exam

Students in the non-thesis track will complete a comprehensive exam. For students in the thesis track, the thesis and oral defense serve as the comprehensive exam.

Accelerated Degree Program

B.S. in Chemistry / M.S.B.E. in Biomedical Engineering – *PENDING UGC and SACSCOC Approval*

This program intends for students to complete a Bachelor of Science in Chemistry and an M.S. in Biomedical Engineering over the span of five years. Completion of this program allows students to complete 9 credits toward the M.S. in during the junior or senior year of their B.S. degree.

Target students and expected outcomes

The accelerated program is an attractive and viable path for students seeking to expedite their entry to the workforce as an engineer, obtain a leadership position, or to pursue M.D. or Ph.D. studies. Students who complete this program will maximize: department and professional resources, obtaining an industry position in the rapidly growing field of biomedical engineering, and opportunities for research and technology transfer for medical devices, systems or drug development.

Description and Requirements

For consideration of admission to the program a student must:

1. Have completed 15 credit hours in the B.S. Chemistry major, upon applying;
2. Have a minimum 3.33 GPA overall;
3. Have a minimum undergraduate 3.5 GPA in the major;
4. Have met with the Undergraduate Advisor and Graduate Director and/or Graduate Advisor to discuss a plan of study

Undergraduate Degree Requirements for the B. S. in Chemistry

All Chemistry major students will complete graduation requirements listed in the USF undergraduate catalog.

University and College Requirements:

- 120 credit hours.
- USF Residency - Students must complete 30 hours of the last 60 hours in USF coursework.
- Pursue the normal 8 semester sequence listed in the current USF Undergrad Catalog for Chemistry Majors.
- But the Engineering/Science and General electives, and open summer course slots would be utilized to complete the required 5 engineering undergrad courses, and the 3 BME Masters courses which are double-counted.
- Then, upon the BS graduation, accelerated students will complete the USF Accelerated Program Progression Form, and enter the BME Master's Program.

List of 5 undergrad engineering courses to be taken:

EGN 3433 Modeling and analysis of engineering systems

Students must complete 12 credit hours from the following courses:

*EGN 3311	Statics
EGN 3321	Dynamics
EGN 3331	Mechanics of Materials
EGN 3365	Materials Engineering I
*EGN 3373	Electrical Systems I
*EGN 3343	Thermodynamics
ECH 3702	Instrument Systems I
EML 3701	Fluid Systems

Students should note that EGN 3311 is a prerequisite for several of the listed courses.

*Indicate most highly recommended courses

Master's Degree Requirements: Master of Science in Biomedical Engineering (M.S.B.E.)

Program (Major): Biomedical Engineering (EBI)

CIP Code: 14.0501; Major/College Code: EBIEN

Total Program Hours: 30

Specific Course Requirements - 5 electives, and these 5 required courses:

GMS 6440 Basic Medical Physiology

GMS 6605 Basic Medical Anatomy

PHC 6051 Biostatistics II

BME 6000 Biomedical Engineering I
BME 6931 Biomedical Engineering II

Comprehensive Exam Required:
Written for non-Thesis students; Defense of Thesis for Thesis students.
Thesis is not required for non-Thesis Masters students
6 credits of Thesis required, for Thesis students

For the BME Master's program, students can get a C, C+ or B-, as long as their GPA stays above 3.00. GPA below 3.00 results in Probation, or eventually can result in Dismissal.

Note 1: Any 3 of the BME courses listed above or the electives can be double-counted (a total of 9 hours of graduate credit may be shared.)

COURSES

See <http://ugs.usf.edu/course-inventory>

BIOMEDICAL ENGINEERING PROGRAM

Doctor of Philosophy (Ph.D.) Degree

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	90
Program Level:	Doctoral
CIP Code:	14.0501
Dept. Code:	ECH
Program (Major/College):	EBI EN
Approved:	2005

CONTACT INFORMATION

College:	Engineering
Department:	Chemical & Biomedical Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The Ph.D. in Biomedical Engineering at the University of South Florida prepares individuals to contribute in this highly interdisciplinary field both as individuals and as members of interdisciplinary teams. Graduates are prepared to solve complex problems in areas such as diagnostic instrumentation, artificial organs, prosthetic devices, rehabilitation, and health care system design and operations, biomechanics, biomaterials, imaging, neuroengineering, tissue engineering, sensors, cellular-level drug delivery. The doctoral program capitalizes on USF's strong programs in Engineering and in the Health Sciences as well as the contiguously located H. Lee. Moffitt Cancer Center and Research Institute, and the James Haley Veterans Administration Hospital.

Students in the program may choose to concentrate in one of several nationally recognized areas of Biomedical Engineering strength at USF including:

- Medical Imaging
- Rehabilitation Engineering
- Biomechanics and Biomaterials
- Molecular, Cellular and Tissue Engineering
- Drug and Gene Delivery
- Neuroengineering
- Photonics and Diagnostic Engineering

The Biomedical Engineering Program at USF provides students with an integrated knowledge of engineering, biomedical science and other appropriate disciplines to allow participation in and advancement of the interdisciplinary field of Biomedical Engineering. The program also facilitates biomedical engineering research at USF through interactions with USF faculty and with industry and other health care institutions and catalyzes the growth of biomedical product companies throughout the region by the development, dissemination, and commercialization of new biomedical technologies. Overall, the program strives to develop and promote technologies and processes that will lead to better health care and improved quality of life.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

Major Research Areas: Neuroengineering, biomechanics, biomaterials, medical imaging, sensors, cellular-level drug delivery, and rehabilitation engineering and tissue engineering

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

Successful applicants to the Ph.D. degree program in biomedical engineering will typically have presented the following preferred qualifications:

- GRE required with preferred scores: Verbal >50% percentile and Quantitative > 75th percentile and Analytical Writing > 4.0.
- An undergraduate GPA of >3.5 (out of a possible 4.0) based on official transcripts.
- Completion of a Master's degree in biomedical engineering or a related field.
- Evidence of sustained interest in biomedical engineering.
- A statement of purpose and CV.
- Three (3) Letters of recommendation.

Note: Admissions decisions will be made using multiple measures indicated above. We strongly encourage applicants to contact specific faculty conducting research related to the student's interests. Such direct contact with individual faculty members can greatly strengthen an application.

DEGREE PROGRAM REQUIREMENTS

Total Minimum Hours:

90 hours

Core Courses:

A minimum of 15 credits including:

GMS 6440	3	Basic Medical Physiology OR
BME 6410	3	Engineering Physiology

GMS 6605	3	Basic Medical Anatomy
PHC 6051	3	Biostatistics II
BME 6000	3	Biomedical Engineering I
BME 6931	3	Biomedical Engineering II

2) Specialization Courses:

A minimum of 12 credit hours selected from one of these areas of specialization:

- Medical Imaging
- Rehabilitation Engineering
- Biomechanics and Biomaterials
- Cardiovascular Engineering
- Neuroengineering
- Tissue Engineering

Courses completed as part of a Master's degree may be used to partially meet the above course requirements.

3) Dissertation:

A minimum of 30 credits of dissertation research are required. As with other engineering Ph.D. degrees, evidence of the significance of the conducted research is provided by publication in appropriate refereed journals.

OTHER INFORMATION

Graduate Assistantships and Fellowships

Financially competitive teaching and research graduate assistantships and fellowships will be offered to incoming students. Of special importance are the research opportunities and support available through affiliated institutions including the H. Lee Moffitt Cancer Center and Research Institute, the James Haley VA Hospital. In addition, particularly outstanding applicants will be nominated for university fellowships including Presidential Fellowships which provide competitive stipends plus tuition, fees and Health Insurance renewable for five years.

Results

Doctoral graduates of this program have been prepared for and are successfully engaged in research careers in Government, Corporate, and University Laboratories. In addition, since much of Biomedical Engineering research translates directly into biomedical devices, drugs, and instrumentation, graduates have also been directly involved in technology transfer, including the establishment of new Biomedical Engineering related businesses.

Graduate Certificates

As a valuable complement to graduate training in Biomedical Engineering, students are encouraged to also consider earning a graduate certificate particularly in the areas of:

Aging and Neuroscience
Biochemistry and Molecular Biology
Bioinformatics
Biostatistics
Biotechnology
Clinical Epidemiology
Entrepreneurship
Health Management and Leadership
Infection Control
Materials Science & Engineering
Regulatory Affairs – Medical Devices.
Technology Management
Total Quality Management

COURSES

See <http://ugs.usf.edu/course-inventory>

BIOMEDICAL ENGINEERING AND ENTREPRENEURSHIP IN APPLIED TECHNOLOGIES DUAL DEGREE PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	30
Program Level:	Masters
CIP Code:	14.0501 / 52.0701
Dept. Codes:	ECH / DEA
Program (Major/College):	EBI EN / EAT GS

CONTACT INFORMATION

Colleges:	Engineering and Graduate Studies
Department:	Chemical & Biomedical Engineering Entrepreneurship

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The M.S. Biomedical Engineering (BME) and M.S. Entrepreneurship In Applied Technologies (EAT) Dual Degree Program is designed to prepare students who can effectively function in the complex world of Biotechnology companies ("Biotechs"). The program's objectives are to provide a strong BME foundation for technical product development and research and development along with the skill set to effectively participate in the entrepreneurship, venture capital, business and financial aspects of Biotechs. Students would pursue appropriate coursework within both the College of Engineering and the Center For Entrepreneurship, double counting a total of nine credit hours.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements for each program. Students must satisfy the requirements for the two degrees separately. Refer to the individual program listings for the specific requirements for each degree.

DEGREE PROGRAM REQUIREMENTS

Course requirements:

Biomedical Engineering

30 hours required

BME 6000	3	Biomedical Engineering I
BME 6931	3	Biomedical Engineering II

GMS 6440	3	Basic Medical Physiology OR
BME 6410	3	Engineering Physiology

GMS 6605	3	Basic Medical Anatomy
PHC 6051	3	Biostatistics II
	12	Additional approved BME courses (can include up to 6 thesis hours for thesis option)

Common BME/EAT courses 9
30 hours total

Common Courses (counted towards both the BME and EAT degrees)**9 hrs total**

BME 6000 Biomedical Engineering 3
GMS 7930 Principles of Intellectual Property 3
EIN 6391 New Product Development 3

Entrepreneurship in Applied Technologies**30 hours required**

EIN 6324 Technical Entrepreneurship 3
EIN 6935 Technology Venture Strategies 3
EIN 6935 Strategic Marketing Assessments 3
EIN 6934 Venture Cap Private Equity 3
GMS 7930 Medical Ethics and Humanities 2
EIN 6430 Overview of Regulated Industries 3
MAN 6930 Entrepreneurship Research Seminar 1
EIN 6936 Strategies in Entrep Technology 3
Common BME/EAT courses 9

COURSESSee <http://ugs.usf.edu/course-inventory>

BIOMEDICAL ENGINEERING AND MEDICINE DUAL DEGREE PROGRAM

Doctor of Philosophy (Ph.D.) Degree in Biomedical Engineering and Doctor of Medicine (M.D.) Degree in Medicine

DEGREE INFORMATION

Program Admission Deadlines:

Fall: November 1

Spring: No Admit

Summer: No Admit

Minimum Total Hours: 90/

Program Level: Doctoral/Professional

CIP Code: 14.0501

Dept. Code: ECH

Program (Major/College): EBI EN

CONTACT INFORMATION

Colleges: Engineering/Medicine
Departments: Chemical & Biomedical
Engineering; Medicine

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The Objectives of the M.D./Ph.D. Program are: 1) Produce Highly Trained Professionals who can work effective in the area of Biomedical Translational Research, more specifically Engineer-Physicians who can conduct research in a Biomedical Engineering Area that addresses a significant clinical problem, and bring that research through to Clinical application; and 2) provide an integrated educational experience leading to both the M.D. degree and the Ph.D.(BME) Degree. In order to accomplish the first objective, advances in health care increasingly involves the application of emerging science and technology (I.E., Engineering) to clinical problems, including problems in diagnostics treatment and the health care system itself. Unlike more basic research that often aims to increase science and technology knowledge in itself, translational research seeks to specifically address the science and technology needed to solve problems with the end product an actual application or product (of course, adding new significant knowledge in the process).

In order to conduct effective biomedical translational research, the investigator must be trained in both clinical science (i.e. the MD Degree) and Engineering (Specifically Biomedical Engineering). This need has been delineated by both academics and industry and is validated by the growing number of MD/PH.D. (BME) programs nationally. USF has the necessary educational components and research infrastructure for this endeavor; both degrees are currently available. The proposed program seeks to provide an integrated experience where the student really feels a part of both the medical/clinical and engineering worlds simultaneously, hence the need for an integrated dual degree program.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

Major Research Areas:

Biomechanics, Biomaterials, Cellular and Tissue Engineering, Cardiovascular Engineering, Neuroengineering, Photonics, Rehabilitation Engineering

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements for each program. Students must satisfy the requirements for the two degrees separately. Refer to the individual program listings for the specific requirements for each degree.

Program Admission Requirements

Students apply for the BME degree through the Office of Graduate Studies; Students apply separately for the M.D. Degree through the College of Medicine. Admissions are on the same time schedule as that for general M.D. students. Applicants should contact a program advisor prior to application.

For specific admission requirements, refer to the Ph.D. in Biomedical Engineering program page in the Graduate Catalog and refer to the M.D. program requirements in the College of Medicine.

DEGREE PROGRAM REQUIREMENTS

For specific degree requirements, refer to the Ph.D. in Biomedical Engineering program page in the Graduate Catalog and to the curriculum requirements for the M.D. as posted by the College of Medicine.

This is a seven (7) year program. Students initially complete a non-thesis M.S. in Biomedical Engineering. Then proceed to complete the first three (3) years of the Medical School Curriculum. The following two (2) years focus on the Ph.D. requirements, specifically the completion of coursework, qualifying exams, and dissertation research. In the seventh (7th) year, students complete the fourth (4th) year of Medical School and also complete any Ph.D. requirements as needed. Students must have at least one publication in an appropriate peer-reviewed journal prior to graduation.

Other Requirements

Students establish a Graduate Committee immediately after starting the program, with members from both Engineering and Medicine. This committee guides the student through the program until a formal Ph.D. committee is established, typically in year four or five.

COURSES

See <http://ugs.usf.edu/course-inventory>

CHEMICAL ENGINEERING PROGRAM

Master of Science in Chemical Engineering (M.S.Ch.) Degree

DEGREE INFORMATION

Program Admission Deadlines:
Fall: February 15
Spring: October 15
Summer: February 15

Minimum Total Hours: 30
Program Level: Masters
CIP Code: 14.0701
Dept. Code: ECH
Program (Major/College): ECH EN
Approved: 1981

Concentrations:

Biomedical and Biotechnology (BEB)

CONTACT INFORMATION

College: Engineering
Department: Chemical & Biomedical Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The Master of Science in Chemical Engineering degree is usually awarded to a student who has an undergraduate degree in Chemical Engineering or strong evidence of undergraduate chemical engineering experience.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

Major Research Areas:

The Chemical & Biomedical Engineering faculty research and development interests cover a broad range of areas in reacting systems, thermodynamics, transport phenomena, systems engineering and characterization, all fundamental as well as applied in biomedical, materials including microelectronic, and environmental domains. Strong collaboration with the College of Medicine, Center of Microelectronic Research, as well as, Departments of Biology, Chemistry, Industrial Engineering, Civil Engineering, Mechanical Engineering, Electrical Engineering, and Computer Science and Engineering makes most programs in Chemical Engineering truly interdisciplinary.

The Department offers core courses in thermodynamics, transport phenomena, reacting systems, math, and process analysis and modeling. A rich variety of electives are available regularly within the department as well as the University. Chemical & Biomedical Engineering research facilities include modern laboratories for polymer synthesis and characterization, supercritical fluid technology, life sciences, process control, instrumentation, computer aided process design, and phase behavior.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- GRE required with preferred minimum scores of >720(Q), >350 (V), and Analytical Writing of 3.0 or greater. Applicants who have successfully completed the Fundamentals of Engineering (FE) Exam offered by the Society of Professional Engineers will be exempted from the GRE requirement.
- An undergraduate Bachelor's degree or equivalent in Chemical Engineering;
- TOEFL score of 79 (internet-based test), 213 (computer-based test) or 550 (written test)
- Two (2) letters of reference; and
- Statement of research interests.

DEGREE PROGRAM REQUIREMENTS

Total Minimum Program Hours: 30 hours post-bachelors

Core Requirements – 12 hours

Course Requirements – 18 hours

This degree requires an undergraduate degree in Chemical Engineering or strong evidence of undergraduate chemical engineering experience. .

A background with undergraduate chemical engineering courses is needed.

Course Requirements – 12 hours

ECH 6105 3 Advanced Thermodynamics **OR**

ECH 6107 3 Molecular Thermodynamics

ECH 6285 3 Advanced Transport **OR**

BME 6634 3 Biotransport Phenomenon

ECH 6515 3 Advanced Reaction Engineering

ECH 6840 3 Math Methods **OR**

ECH 6412 3 Processes Analysis and Modeling

Additional Course Requirements – 18 hours

Other 5000 or 6000 course or ECH 6907 Individual Study 3

Other 5000 or 6000 course or ECH 6907 Individual Study 3

Other 5000 or 6000 course or ECH 6907 Individual Study 3

Additional approved 5000 or 6000 ECH courses 9

Must have a minimum of 16 hours at 6000 level

Must have a minimum of 12 hours of ECH 6000 level

May include a maximum of 4 hours of independent study

Thesis Option- 6 hours minimum

ECH 6971 6 Thesis

At least 2 members of the Thesis committee must be from tenured or tenure track Chemical & Biomedical Engineering faculty. All thesis option students are required to present a departmental seminar based on their research as part of their oral examination. The examination must be scheduled after the Thesis Supervisory Committee has approved the Thesis. The Graduate Coordinator should be notified so he can coordinate the seminar scheduling. Students in this program are also required to pass the FE (Fundamentals of Engineering Examination) offered by the Society of Professional Engineers.

Comprehensive Exam

Candidates who have at least one publication in a journal or proceedings or presentation at a conference (based on their M.S. Thesis research) may be exempted from this comprehensive examination requirement.

Students wishing to continue on for a Ph.D. must apply to the Office of Graduate Studies.

COURSES

See <http://ugs.usf.edu/course-inventory>

CHEMICAL ENGINEERING PROGRAM

Doctor of Philosophy (Ph.D.) Degree

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	90
Program Level:	Doctoral
CIP Code:	14.0701
Dept. Code:	ECH
Program (Major/College):	ECH EN
Approved:	1981

Concentrations:

Manufacturing (MFT)
Biomedical and Biotechnology (BEB)

CONTACT INFORMATION

College:	Engineering
Department:	Chemical & Biomedical Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

Contact Program for Information

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

Major Research Areas:

The Chemical & Biomedical Engineering faculty research and development interests cover a broad range of areas in reacting systems, thermodynamics, transport phenomena, systems engineering and characterization, all fundamental as well as applied in biomedical, materials including microelectronic, and environmental domains. Strong collaboration with the College of Medicine, Center of Microelectronic Research, as well as, Departments of Biology, Chemistry, Industrial Engineering, Civil Engineering, Mechanical Engineering, Electrical Engineering, and Computer Science and Engineering makes most programs in Chemical Engineering truly interdisciplinary.

The Department offers core courses in thermodynamics, transport phenomena, reacting systems, math, and process analysis and modeling. A rich variety of electives are available regularly within the department as well as the University. Chemical & Biomedical Engineering research facilities include modern laboratories for polymer synthesis and characterization, supercritical fluid technology, life sciences, process control, instrumentation, computer aided process design, and phase behavior.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- GRE required with preferred minimum scores of >720 (Q), >500 (V), and Analytical Writing of 4.0 or greater;
- An undergraduate Bachelor's degree or equivalent in Chemical Engineering.
- TOEFL 550 (paper-based total) for international students or 213 (computer-based total);
- Three (3) letters of reference.
- Statement of Research Interests.

DEGREE PROGRAM REQUIREMENTS

Requires an undergraduate degree in Chemical Engineering. Complete Background courses in Chemical Engineering as needed.

Course Requirements:

ECH 6105 Advanced Thermodynamics	3
ECH 6285 Advanced Transport	3
ECH 6840 Math Methods	3
ECH 6515 Advanced Reaction Engineering	3
ECH 6r12 Processes Analysis and Modeling	3
Seminar courses	At least 3 required
2 Tools of Research (Directed Research in 1 st year of study)	At least 4 hours
Concentration area (Engineering)	Minimum 27 hours in one area; at least 20 at 6000 level
5000 or 6000 Math level Courses	At least 9 hours
Dissertation hours (Can register only after you have been admitted as a candidate for Ph.D.)	At least 20 hours but no more than 30 hours

Other 5000 or 6000 course (need a total of 60 hours of coursework)

Other Elements:

1. Diagnostic Examination completed by the end of first year of study. Waived for students who have successfully passed the FE (Fundamentals of Engineering Examination) offered by the Florida Society of Professional Engineers. See details of the diagnostic exam under Departmental requirements for a Ph.D.
2. Qualifying Examination, Complete by the end of the second year of study.
3. Publication in a refereed journal with the student as the first and primary author. At least 1 is required with the expectation that most Ph.D. students will have 3 or more. The publication must be based on your Dissertation research. Presentation at a conference or publication in a proceeding (even if refereed) is not sufficient.
4. See complete list of requirements under *Departmental requirements for a Ph.D.*

COURSES

See <http://ugs.usf.edu/course-inventory>

CIVIL ENGINEERING PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	30
Program Level:	Masters
CIP Code:	14.0801
Dept. Code:	EGX
Program (Major/College):	ECE EN
Approved:	1983

Concentrations:

Geotechnical Engineering (GTL)
 Materials Engineering and Science (MTL)
 Structural Engineering (STR)
 Transportation Engineering (TPT)
 Water Resources (WRS)

CONTACT INFORMATION

College:	Engineering
Department:	Civil and Environmental Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The field of Civil Engineering has long been known for its breadth and ability to adapt to the new technological needs of society. The traditional areas of public works, such as highways, bridges, water supply, building design, and wastewater treatment, remain very important. In addition, the modern area of managing the environment has been included in the Civil Engineering domain. Graduates of the programs are prepared for careers with public agencies or private industry and firms involved in planning, design, research and development, or regulation.

. The Department has a high bay structures laboratory, which includes an MTS 250 kip testing machine. There are also well-equipped environmental, soils, pavement and hydraulics laboratories. These laboratories include equipment such as an ion chromatograph, atomic absorption spectrometer, environmental chamber, constant rate of stress consolidometer, triaxial units and superpave testing equipment.

The M.C.E. degree provides a student with the opportunity to earn the advanced degree by coursework only. This degrees is recommended for part-time students who find it difficult to do thesis research because of their work commitment or for those who wish to complete degree requirements quickly. Many of the department's graduate courses are offered online or on weekday evenings, which permits working students the opportunity to seek a graduate degree.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- Undergraduate GPA \geq 3.0 preferred.
- GRE with preferred minimum scores of V 145 (25th percentile), Q 155 (60th percentile), AW 3.0 (15th percentile); or valid fundamentals of engineering (FE) certificate. Verification of FE certification should be obtained from the professional engineering (PE) board where the FE certification was obtained. See the CEE department website for more information: <http://www2.eng.usf.edu/cee/graduate/apply.htm>.
- TOEFL (International applicants only) 79 (550 paper based exam) or IELTS 6.5 (IELTS).
- Two (2) Letters of Reference provided at the time of application.
- Statement of Purpose provided at the time of application
- Resume provided at the time of application.

DEGREE PROGRAM REQUIREMENTS

The minimum coursework requirement is 30 credit hours for students with an undergraduate engineering degree. Students without an engineering bachelor's degree will be required to complete undergraduate engineering pre-requisite courses as determined by the Department.

Pre-requisites – 12 hours

All students must complete the following pre-requisites or equivalent courses:

EGN 3311	3	Statics
EGN 3343	3	Thermodynamics I
EGN 3353	3	Basic Fluid Mechanics
EGN 3615	3	Engineering Economics

Most entering students will have taken these courses (or equivalent versions) prior to admission to the M.C.E. program. Students who have not taken these courses prior to beginning the M.C.E. degree program are encouraged to do so as quickly as possible, as these may be pre-requisites for a number of graduate-level courses in the program.

Total Minimum Hours

30 hours

The minimum coursework requirement is 30 credit hours for students with an undergraduate engineering degree. For students pursuing a Concentration area (as detailed below), the 30 credit hours will include at least 15 credit hours of Concentration Requirements, with remaining credit hours to consist of technical electives as approved by the Department. For students pursuing no Concentration area, the 30 credit hours will consist wholly of technical electives as approved by the Department, but with a minimum of 18 credit hours taken within the Department of Civil and Environmental Engineering. Students without an engineering bachelor's degree will be required to complete undergraduate engineering pre-requisite courses as determined by the Department. Please contact the Graduate Program Director for more information.

Concentration Requirements - 15 hours

The Department supports M.C.E. concentration areas in Geotechnical Engineering (GTL), Materials Engineering and Science (MTL), Structures Engineering (STR), Transportation Engineering (TPT), and Water Resources (WRS). Students may select from one of these Concentrations, or may select no concentration.

Geotechnical Engineering (GTL)

CEG 5115	3	Foundation Engineering
CES 6118	3	Applied Finite Elements
	9	Additional credit hours of coursework in Geotechnical engineering or closely related areas.

Materials Engineering and Science (MTL)

At least 2 courses (6 credit hours) from the following list:

CGN 6933	3	Advanced Construction Materials
CGN 6720	3	Electrochemical Diagnostic Techniques
CGN 6933	3	Structural Life Prediction

EMA 5326	3	Corrosion Control
EMA 6510	3	Characterization of Materials
	9	Additional credit hours of coursework in Materials Engineering and Science or closely related areas.

Structures Engineering (STR)

At least 1 course (3 credit hours) from the following list of design courses:

CES 6706	3	Advanced Concrete
CES 6835	3	Design of Masonry Structures
CES 5715C	3	Pre-stressed Concrete

At least 1 course (3 credit hours) from the following list of analysis courses:

CES 6118	3	Applied Finite element
CGN 6933	3	Advanced Structural Analysis
CGN 6933	3	Advanced Structural Mechanics
CES 5209	3	Structural Dynamics

9 Additional credit hours of coursework in Structures Engineering or closely related areas.

Transportation Engineering (TPT)

TTE 5205	3	Traffic Systems Engineering
TTE 5501	3	Transportation Planning and Economics
TTE 6507	3	Travel Demand Modeling
	6	Additional credit hours of coursework in Transportation Engineering or closely related areas.

Water Resources (WRS)

4 courses (12 credit hours) from the following list:

CWR 6235	3	Free Surface Flow
CWR 6239	3	Waves and Beach Protection
CWR 6305	3	Urban Hydrology
CWR 6534	3	Coastal and Estuary Modeling
CWR 6535	3	Hydrologic Models
CGN 6933	1-4	Vadose Zone Hydrology
CGN 6933	1-4	Groundwater Hydraulics
CGN 6933	1-4	Advanced Computational Fluid Mechanics
GLY 6836	3	Numerical Modeling of Hydrogeologic Systems
GLY 6827C	4	Advanced Hydrogeology
CWR 6820	3	Coastal Waves and Structures
CWR 6538	3	Advanced Hydrologic Model

3 Additional credit hours in Water Resources engineering or closely related areas.

Portfolio / Comprehensive Exam

Portfolio and oral interview are used in lieu of a comprehensive exam. The purpose of the portfolio and interview is for students to demonstrate that they have achieved a minimum level of proficiency in stipulated competencies. Specifically, by the time they graduate, students will demonstrate

- an ability to plan, compose, and integrate verbal, written, virtual, and graphical communication of a project to technical and non-technical audiences, and
- an ability to formulate and solve complex problems in Civil Engineering using relevant data and techniques.

Additional details regarding portfolio requirements will be provided to students by the Department.

Other requirements

- A maximum of 12 credits taken outside the CEE department may be applied to meet the degree requirements.
- A maximum of 6 credits of independent study may be applied to meet the degree requirements.

COURSES

See <http://ugs.usf.edu/course-inventory>

CIVIL ENGINEERING PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	30
Program Level:	Masters
CIP Code:	14.0801
Dept. Code:	EGX
Program (Major/College):	ECE EN
Approved:	1981

Concentrations:

Engineering for International Development (EFD)
 Geotechnical Engineering (GTL)
 Materials Engineering and Science (MTL)
 Structures Engineering (STR)
 Transportation Engineering (TPT)
 Water Resources (WRS)

CONTACT INFORMATION

College:	Engineering
Department:	Civil and Environmental Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The field of Civil Engineering has long been known for its breadth and ability to adapt to the new technological needs of society. The traditional areas of public works, such as highways, bridges, water supply, building design, and wastewater treatment, remain very important. In addition, the modern area of managing the environment has been included in the Civil Engineering domain. Graduates of the programs are prepared for careers with public agencies or private industry and with firms involved in planning, design, research and development, or regulation.

The Department has a high bay structures laboratory, which includes an MTS 250 kip testing machine. There are also well-equipped environmental, soils, pavement and hydraulics laboratories. These laboratories include equipment such as an ion chromatograph, atomic absorption spectrometer, environmental chamber, constant rate of stress consolidometer, triaxial units, and Superpave testing equipment.

The M.S.C.E. is a research-oriented degree in which the student writes, as a major part of the degree requirements, a thesis that defines, examines, and reports in depth on a subject area relevant to Civil Engineering. The purpose of the thesis is to instill in the student the ability to inspect, evaluate, and report on a subject of interest to the engineering profession.

Accreditation: Accredited by the Commission on Colleges of the Southern Association of College and Schools.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- Undergraduate GPA \geq 3.0 preferred.
- GRE with preferred minimum scores of V 145 (25th percentile), Q 155 (60th percentile), AW 3.0 (15th percentile); or valid Fundamentals of Engineering (FE) certificate. Verification of FE certification should be obtained from the

professional engineering (PE) board where the FE certification was obtained. See the CEE department website for more information: <http://www2.eng.usf.edu/cee/graduate/apply.htm>.

- TOEFL (international applicants only) 79 (550 paper-based exam); or IELTS 6.5.
- Two Letters of Reference provided at the time of application (three required for EFD concentration).
- Statement of Purpose provided at the time of application.
- Resume provided at the time of application.
- Exceptions made on a case-by-case basis where warranted.

DEGREE PROGRAM REQUIREMENTS

Pre-requisites – 12 hours

All students must complete the following pre-requisites or equivalent courses:

EGN 3311	3	Statics
EGN 3343	3	Thermodynamics I
EGN 3353	3	Basic Fluid Mechanics
EGN 3615	3	Engineering Economics

Most entering students will have taken these courses (or equivalent versions) prior to admission to the M.C.E. program. Students who have not taken these courses prior to beginning the M.C.E. degree program are encouraged to do so as quickly as possible, as these may be pre-requisites for a number of graduate-level courses in the program.

Total Minimum Hours

30 hours

Coursework – 24 hours

Thesis – 6 hours

The program consists of a minimum of 24 credit hours of coursework and 6 credit hours of thesis. For students pursuing a Concentration area (as detailed below), the 24 credit hours of coursework will include at least 12 credit hours of Concentration Requirements, with remaining credit hours to consist of technical electives as approved by the Department. For students pursuing no Concentration area, the 24 credit hours of coursework will consist wholly of technical electives as approved by the Department, but with a minimum of 15 credit hours taken within the Department of Civil and Environmental Engineering. Students without an Engineering undergraduate degree will be required to complete undergraduate engineering pre-requisite courses as determined by the Department. Contact the Graduate Program Director for more information.

Concentration Requirements -12 hours minimum

The Department supports M.S.C.E. concentration areas in Engineering for International Development (EFD), Geotechnical Engineering (GTL), Materials Engineering and Science (MTL), Structures Engineering (STR), Transportation Engineering (TPT), and Water Resources (WRS). Students may select from one of these Concentrations, or may select no concentration.

Engineering for International Development (EFD)

This concentration acknowledges coursework and international field experience in the area of engineering for international development that considers issues of sustainability, environment, health, gender, and society. Students must take the following four courses, and must engage in an extended international engineering field experience, which in most cases will form the basis of the Master's thesis.

ENV 6510 Sustainable Development Engineering

A minimum of 1 course (3 credits) from the following anthropology courses:

ANG 6766	3	Research Methods in Applied Anthropology
ANG 6730	3	Socio-cultural Aspects of HIV/AIDS
ANG 6469	3	Health, Illness and Culture

A minimum of 1 course (3 credits) from the following global public health courses:

PHC 6764	3	Global Health Principles & Contemporary Issues
PHC 6761	3	Global Health Assessment Strategies

3 additional credit hours of coursework in international development engineering or closely related areas.

Students engaged in full-time global training and service as part of the EFD concentration (e.g., in the U.S. Peace Corps or equivalent) may register for CST 6990 for 0 credit hours while in their country of service.

Geotechnical Engineering (GTL)

CEG 5115 Foundation Engineering

CES 6118 Applied Finite Elements

6 additional credit hours of coursework in Geotechnical engineering or closely related areas.

Materials Engineering and Science (MTL)

At least 2 courses (6 credit hours) from the following list:

CGN 6933 Advanced Construction Materials

CGN 6720 Electrochemical Diagnostic Techniques

CGN 6933 Structural Life Prediction

EMA 5326 Corrosion Control

EMA 6510 Characterization of Materials

6 additional credit hours of coursework in Materials Engineering and Science or closely related areas.

Structures Engineering (STR)

At least 1 course (3 credit hours) from the following list of design courses:

CES 6706 Advanced Concrete

CES 6835 Design of Masonry Structures

CES 5715C Pre-Stressed Concrete

At least 1 course (3 credit hours) from the following list of analysis courses:

CES 6118 Applied Finite element

CGN 6933 Advanced Structural Analysis

CGN 6933 Advanced Structural Mechanics

CES 5209 Structural Dynamics

6 additional credit hours of coursework in Structures Engineering or closely related areas.

Transportation Engineering (TPT)

TTE 5205 Traffic Systems Engineering

TTE 5501 Transportation Planning and Economics

TTE 6507 Travel Demand Modeling

3 additional credit hours of coursework in Transportation Engineering or closely related areas.

Water Resources (WRS)

4 courses (12 credit hours) from the following list:

CWR 6235 Free Surface Flow

CWR 6239 Waves and Beach Protection

CWR 6305 Urban Hydrology

CWR 6534 Coastal and Estuary Modeling

CWR 6535 Hydrologic Models

CGN 6933 Vadose Zone Hydrology

CGN 6933 Groundwater Hydraulics

CGN 6933 Advanced Computational Fluid Mechanics

GLY 6836 Numerical Modeling of Hydrogeologic Systems

GLY 6827C Advanced Hydrogeology

CWR 6820 Coastal Waves and Structures

CWR 6538 Advanced Hydrologic Model

Comprehensive Exam

The thesis and defense are used in lieu of a comprehensive exam.

Thesis - 6 hours minimum

Students pursuing the M.S.C.E. are required to complete at least six (6) credits of Thesis. Students must conduct a suitable research project under the guidance of their thesis advisor, write an original thesis based upon the results of the research project, and defend the thesis to a committee that must subsequently approve the completed thesis. For students in the EFD Concentration, the thesis must be associated with research in a developing-world context.

Other Requirements

- A maximum of 9 credits taken outside the CEE department may be applied to meet the degree requirements.
- A maximum of 6 credits of independent study may be applied to meet the degree requirements.

COURSES

See <http://ugs.usf.edu/course-inventory>

CIVIL ENGINEERING PROGRAM

Doctor of Philosophy (Ph.D.) Degree

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	78 post-bachelor's
Program Level:	Doctoral
CIP Code:	14.0801
Dept. Code:	EGX
Program (Major/College):	ECE EN
Approved:	1982

Concentrations:

Environmental Engineering (ENV)
 Geotechnical Engineering (GTL)
 Materials Engineering and Science (MTL)
 Structures Engineering (STR)
 Transportation Engineering (TPT)
 Water Resources (WRS)

CONTACT INFORMATION

College:	Engineering
Department:	Civil and Environmental Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The Ph.D. degree is awarded in recognition of demonstrated scholarly competence and ability to conduct and report original and significant research in Civil Engineering.

The field of Civil Engineering has long been known for its breadth and ability to adapt to the new technological needs of society. The traditional areas of public works, such as highways, bridges, water supply, building design, and wastewater treatment, remain very important. In addition, the modern area of managing the environment, including sustainable development, has been included in the Civil Engineering domain. Graduates of the program are prepared for careers in academia, with public agencies, or with private industry, including firms involved in planning, design, research and development, or regulation.

Ph.D. students may work in any of the areas of Civil Engineering, including Engineering Mechanics, Environmental Engineering, Geotechnical Engineering, Pavement Engineering, Materials Engineering and Science, Structures Engineering, Transportation Engineering and Planning, and Water Resources Engineering.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

Major Research Areas:

Civil Engineering, including Engineering Mechanics, Environmental Engineering, Geotechnical Engineering, Pavement Engineering, Materials Engineering and Science, Structures Engineering, Transportation Engineering and Planning, and Water Resources Engineering.

The department has a high bay structures laboratory, which includes an MTS 250 kip testing machine. There are also well-equipped environmental, soils, pavement and hydraulics laboratories. These laboratories include equipment for water and air quality analysis, bench and pilot scale reactor studies, field instrumentation for environmental and water resources studies, constant rate of stress consolidometer, triaxial units, and Superpave testing equipment.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- Undergraduate GPA ≥ 3.3 preferred
- GRE with preferred minimum scores of V 150 (45th percentile), Q 159 (75th percentile), and AW 4.0 (55th percentile)
- TOEFL (International applicants only) 79 (550 paper based exam) or IELTS 6.5
- Resume provided at the time of application.
- Three (3) letters of reference provided at the time of application
- Statement of Purpose provided at the time of application
- Exceptions made on a case-by-case basis where warranted.

DEGREE PROGRAM REQUIREMENTS

Total Program Hours:

78 hours minimum post-bachelor's
48 hours minimum post-master's

Core requirement – 1 hour

Concentration/primary area of study – 15 hours

Electives – 33 hours

Dissertation – 20 hours

Other course requirement – 9 hours

Core Requirement 1 hour

CGN 6945 1 Graduate Research Methods

An additional 48 credit hours of coursework are required. The following requirements apply to the 48 credit hours of additional coursework:

- At least 15 credit hours must be in the student's primary area of study (see also Concentration Requirements, below). These 15 credit hours must be structured coursework, i.e., may not include thesis credits or independent study.
- Up to 30 credit hours from a previously completed Master's degree may be applied, pending course-by-course evaluation and transfer, approved by the Department, the College, and the Office of Graduate Studies. However, no more than 6 credits of Master's Thesis may be applied to meet the coursework requirement.
- No more than 9 credit hours of Independent Study may be applied to meet the coursework requirement.
- Directed research and/or dissertation credits may not be counted towards the coursework requirement.

Concentration Requirements - 15 hours minimum

The Department supports Ph.D. concentration areas in

Environmental Engineering (ENV)

Geotechnical Engineering (GTL)

Materials Engineering and Science (MTL)

Structures Engineering (STR)

Transportation Engineering (TPT)

Water Resources (WRS).

Students may select from one of these Concentrations, or may select no concentration.

ENVIRONMENTAL ENGINEERING (ENV) - 15 hours

ENV 6002	3	Physical Chemical Principles of Environmental Engineering
EES 6107	3	Biological Principles of Environmental Engineering
ENV 6666	3	Aquatic Chemistry

At least one course from the following:

CGN 6933	3	Green Engineering for Sustainability
CGN 6933	3	Green Infrastructure for Sustainable Communities
ENV 6510	3	Sustainable Development Engineering

Additional 3 credit hours of coursework in Environmental Engineering

GEOTECHNICAL ENGINEERING (GTL) - 15 hours

CEG 5115	3	Foundation Engineering
CES 6118	3	Finite Element Analysis

Additional 9 credit hours of coursework in Geotechnical Engineering or closely related areas

MATERIALS ENGINEERING AND SCIENCE (MTL) - 15 hours

At least 2 courses (6 credit hours) from the following list:

CGN 6933	3	Concrete Construction Materials
CGN 6720	3	Electrochemical Diagnostic Techniques
CGN 6933	3	Structural Life Prediction
EMA 5326	3	Corrosion Control
EMA 6510	3	Characterization of Materials

Additional 9 credit hours of coursework in Materials Engineering and Science or closely related areas

STRUCTURES ENGINEERING (STR) - 15 hours

1 course (3 credit hours) from the following list of courses:

CES 6706	3	Advanced Concrete
CES 6835	3	Design of Masonry Structures
CES 5715C	3	Pre-stressed Concrete

1 course (3 credit hours) from the following list:

CES 6118	3	Applied Finite Elements
CGN 6933	3	Advanced Structural Mechanics
CGN 6933	3	Advanced Structural Analysis
CES 5209	3	Structural Dynamics
EGN 6333	3	Continuum Mechanics

Additional 9 credit hours of coursework in Structures Engineering or closely related areas

TRANSPORTATION ENGINEERING (TPT) - 15 hours

TTE 5205	3	Traffic Systems Engineering
TTE 5501	3	Transportation Planning and Economics
TTE 6507	3	Travel Demand Modelling

Additional 6 credit hours of coursework in Transportation Engineering or closely related areas

WATER RESOURCES (WRS) - 15 hours

A minimum of 4 courses (12 credit hours) from the following list:

CWR 6235	3	Free Surface Flow
CWR 6239	3	Waves and Beach Protection
CWR 6305	3	Urban Hydrology
CWR 6534	3	Coastal and Estuary Modeling
CWR 6535	3	Hydrologic Models
CGN 6933	3	Vadose Zone Hydrology
CGN 6933	3	Groundwater Hydraulics
CGN 6933	3	Advanced Computational Fluid Mechanics
GLY 6836	3	Numerical Modeling of Hydrogeologic Systems
GLY 6827C	4	Advanced Hydrogeology
CWR 6820	3	Coastal Waves and Structures
CWR 6538	3	Advanced Hydrologic Modeling

Additional 3 credit hours of coursework in Water Resources or closely related areas

Electives - 33 hours

Selected in consultation with the student's major research advisor and/or advisory committee

Qualifying Exam

Doctoral students are expected to pass a qualifying examination no later than the semester following the completion of 48 credits of coursework beyond a bachelor's degree. At minimum, the exam will include a written dissertation proposal and oral defense by the dissertation committee. A written exam in the area of concentration may also be required. Poor performance on the qualifying exam based on the judgment of the committee may result in the student failing the exam. If a student does not pass on the first attempt, he/she may request in writing to repeat the exam. Students who fail the Qualifying examination the second time will be dismissed by the Program.

Dissertation Requirements - 20 hours minimum

CGN 7980 20 Dissertation

A minimum of 20 credits of dissertation, an approved PhD dissertation, and a dissertation defense are required. Students may not sign up for dissertation credits until they have defended their proposal and advanced to candidacy (see Qualifying Exam, above).

Additional Requirements - 9 hours minimum

Nine (9) credits of additional coursework, dissertation, or directed research are required.

Publication Requirement

Students must have at least one paper accepted to a peer-reviewed journal or peer-reviewed conference based on their research carried out during their doctoral studies at USF.

COURSES

<http://ugs.usf.edu/course-inventory> or <http://www2.eng.usf.edu/cee/graduate/gradautecourses.htm>

COMPUTER ENGINEERING PROGRAM

Master of Science in Computer Engineering (M.S.C.P.) Degree

DEGREE INFORMATION

Program Admission Deadlines:

U.S. Students

Fall:	February 15
Spring:	October 15
Summer:	no admit

International Students in the U.S.:

Fall:	February 15
Spring:	October 15
Summer:	no admit

International Students outside the U.S.

Fall:	January 15
Spring:	September 15
Summer:	no admit

Minimum Total Hours:	30 thesis; 30 non-thesis
Program Level:	Masters
CIP Code:	14.0901
Dept. Code:	ESB
Program (Major/College):	ECP EN
Approved:	1960

CONTACT INFORMATION

College:	Engineering
Department:	Computer Science and Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The Department of Computer Science and Engineering offers both a thesis and non-thesis option for the degree of Master of Science in Computer Engineering (M.S.C.P.). The thesis option requires students to pursue a more concentrated range of topics, while the non-thesis option allows students to explore various areas of computer engineering. There is considerable freedom in the choice of the courses.

The breadth of subjects that comprise computer engineering together with the immense diversity of its applications, make it imperative that students in the Master's program maintain close contact with the Graduate Program Director, or, if choosing the thesis option, with their major professor to achieve a coherent plan of study directed towards a specific goal. In particular, selection of courses should only be made with prior consultation and approval of the major professor or the Graduate Program Director.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

Major Research Areas:

An excellent selection of courses and laboratories support graduate studies in algorithms, artificial intelligence, machine learning, data mining, computer architecture, graphics, networks, computer vision, distributed systems, embedded systems, expert systems, formal verification, image processing, pattern recognition, robotics, databases, software engineering, computer security, compilers, programming languages, and VLSI design and CAD.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- The GRE is required for all Ph.D. and M.S. applicants. The median GRE scores of recently admitted students include 770 on the Quantitative portion and a Verbal Total of 450. For GRE tests taken after August 1, we require a minimum of 161 on the Quantitative portion (81 percentile) and a minimum of 150 (44 percentile) on the Verbal. If a candidate is admitted to the M.S. program and later decides to apply to the Ph.D. program, the GRE requirement must be met by the candidate as part of the application process. The GRE will be waived for M.S. degree applicants with an undergraduate degree from an ABET-accredited United States university.
- Minimum grade point average (GPA) of B or equivalent for all coursework completed during the last two years of undergraduate program.
- Submission of TOEFL scores with an Internet-based score of 79 or higher for applicants from non-English speaking countries. If consideration of an assistantship is desired, the speaking score component of the TOEFL must be 26 or above, or a score of 6.5 on the International English Language Testing System, (IELTS).
- The TOEFL requirements may be waived if the applicant meets one of the following conditions:
 - Has scored 500 or higher on the GRE Verbal Test, (Old Scores) or 153 with the New GRE scoring.
 - Has earned a college degree at a U.S. institution of higher learning.
 - Has earned a college degree from an institution whose language of instruction is English, (must be noted on the transcript).
 - Has scored 6.5 on International English Language Testing System, (IELTS).
- Three letters of recommendation
- Statement of purpose
- The applicant must also have mathematical preparation equivalent to that obtained from courses in Calculus through Differential Equations; knowledge of computer science and computer engineering, including logic design, computer architecture, data structure, operating systems and analysis of algorithms. The majority of students accepted to the program possess an undergraduate degree in Computer Science, Computer Engineering, Electrical Engineering, or Mathematics; however, students who hold an undergraduate degree in a related field are encouraged to apply.

DEGREE PROGRAM REQUIREMENTS

Total Minimum Hours: **30 hours**

Core Requirements: **9 hours**

Successful completion of three core graduate-level courses is required:

EEL 6764 Principles of Computer Architecture	3
COP 6611 Operating Systems	3
COT 6405 Introduction to the Theory of Algorithms	3

Electives:

Thesis option students must select at least 15 hours and non-thesis students must select at least 21 hours from the list of available graduate elective courses below in consultation with the Graduate Program Director or individual advisor:

CAP 5400	Digital Image Processing	3
CDA 5416	Introduction to Computer-Aided Verification	3
CAP 5625	Introduction to Artificial Intelligence	3
CAP 5682	Expert and Intelligent Systems	3
CAP 5771	Data Mining	3
EEL 5771	Introduction to Computer Graphics I	3
CNT 6215	Computer Networks	3
CAP 6415	Computer Vision	3
CAP 6455	Advanced Robotic Systems	3
CAP 6615	Neural Networks	3
COP 6621	Programming Languages and Translation	3
EEL 6706	Testing and Fault Tolerance in Digital Systems	3
CAP 6736	Geometric Modeling	3
EEL 6766	Advanced Computer Architecture	3
CIS 6900	Independent Study	1-19
CIS 6930	Special Topics	1-5
CIS 6940	Graduate Instruction Methods	1-4
CIS 6946	Internships/Practicums/Clinical Practice	0-3
CIS 6971	Thesis: Master's	2-19

Thesis Option:

The thesis option requires completion of 24 credit hours of CSE graduate-level courses (9 credit hours core and 15 hours of electives) and 6 credit hours of thesis in computer engineering related problems, as determined by the Major Professor and documented in the Plan of Work. At least 16 credit hours must be at the 6000 level. . With prior permission from the Graduate Program Director, students can take a maximum of 3 hours of Independent Study or Internship, a maximum of 3 hours of one-hour seminar courses, and up to one graduate level course (3 credit hours) outside of the department.

Non-Thesis Option:

The non-thesis option requires 30 credit hours, with 9 credit hours of core courses and 21 hours of electives. At least 16 credit hours must be at the 6000 level. At least 6 hours of electives should be in the following topic areas: CMOS VLSI Design, Digital Circuit Synthesis, Formal Verification, Testing and Fault Tolerance, Low-Power VLSI, Robotics, or Computer Networks, as determined by the Graduate Program Coordinator and documented in the Plan of Work. With prior permission from the Graduate Program Director, students can take a maximum of 3 hours of Independent Study or Internship, a maximum of 3 hours of one-hour seminar courses, and up to one graduate level course (3 credit hours) outside of the department.

Graduation Requirements:

For the thesis option, students must defend and pass the thesis and have a GPA of 3.0 or better. Non-Thesis Option students must obtain a letter "B" or better in the core graduate courses and have a GPA of 3.0 or better.

COURSES

See <http://ugs.usf.edu/course-inventory>

COMPUTER SCIENCE PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	No admit

International Students in the U.S.:

Fall:	February 15
Spring:	October 15
Summer:	no admit

International Students Outside the U.S.:

Fall:	January 15
Spring:	September 15
Summer:	no admit

Minimum Total Hours:	30 thesis; 30 non-thesis
Program Level:	Masters
CIP Code:	11.0701
Dept. Code:	ESB
Program (Major/College):	ECC EN
Approved:	1960

CONTACT INFORMATION

College:	Engineering
Department:	Computer Science and Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The Department of Computer Science and Engineering offers a thesis and non-thesis option for the degree of Master of Science in Computer Science (M.S.C.S.) The thesis option requires students to pursue a more concentrated range of topics. The non-thesis option offers students some experience in many areas of computer science. There is considerable freedom in the choice of the courses.

The breadth of subjects which are part of computer science together with the immense diversity of its applications, make it imperative that students in the Master's program maintain close contact with the Graduate Program Director, or, if choosing the thesis option, with their major professor in order to achieve a coherent plan of study directed towards a specific goal. In particular, election of courses should only be made with prior consultation and approval of the Major Professor or the Graduate Program Director.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

Major Research Areas:

An excellent selection of courses and laboratories support graduate studies in algorithms, artificial intelligence, machine learning, data mining, computer architecture, graphics, networks, computer vision, distributed systems, embedded systems, expert systems, formal verification, image processing, pattern recognition, robotics, databases, software engineering, computer security, compilers, programming languages, and VLSI design and CAD.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- The GRE is required for all Ph.D. and M.S. applicants. The median GRE scores of recently admitted students include 770 on the Quantitative portion and a Verbal Total of 450. For GRE tests taken after August 1, we require a minimum of 161 on the Quantitative portion (81 percentile) and a minimum of 150 (44 percentile) on the Verbal. If a candidate is admitted to the M.S. program and later decides to join the Ph.D. program, the GRE requirement must be met by the candidate as part of the application process. The GRE will be waived for M.S. degree applicants with an undergraduate degree from an ABET-accredited United States university.
- Minimum grade point average (GPA) of "B" (or equivalent) for all coursework completed during the last two years of undergraduate program.
- Submission of TOEFL scores with an Internet-based score of 79 or higher for applicants from non-English speaking countries. If consideration of an assistantship is desired, the speaking score component of the TOEFL must be 26 or above. The TOEFL requirements may be waived if the applicant meets one of the following conditions:
 - Has scored 500 or higher on the GRE Verbal Test, (Old Scores) or 153 with the New GRE scoring.
 - Has earned a college degree at a U.S. institution of higher learning.
 - Has earned a college degree from an institution whose language of instruction is English, (must be noted on the transcript).
 - Has scored 6.5 on International English Language Testing System, (IELTS).
- Three letters of recommendation.
- Statement of purpose.
- The applicant must also have mathematical preparation equivalent to that obtained from courses in Calculus through Differential Equations; knowledge of computer science and computer engineering, including logic design, computer architecture, data structure, operating systems and algorithms. The majority of students accepted to the Program possess an undergraduate degree in Computer Science, Computer Engineering, Electrical Engineering, or Mathematics. However, students who hold an undergraduate degree in a related field are encouraged to apply.

DEGREE PROGRAM REQUIREMENTS

Total Minimum hours: **30 hours**

Core Requirements: **9 hours**

Successful completion of three core graduate-level courses is required. For non-thesis option, students must make a grade of "B" or higher in these core courses:

COP 6611 Operating Systems	3
EEL 6764 Principles of Computer Architecture	3
COT 6405 Introduction to the Theory of Algorithms	3

Electives:

Thesis option students must select at least 15 hours and non-thesis option students must select at least 21 hours from the list of available graduate elective courses below in consultation with the Graduate Program Director or individual advisor:

CAP 5400	Digital Image Processing	3
CDA 5416	Introduction to Computer-Aided Verification	3
CAP 5625	Introduction to Artificial Intelligence	3
CAP 5682	Expert and Intelligent Systems	3

CAP 5771	Data Mining	3
EEL 5771	Introduction to Computer Graphics I	3
CNT 6215	Computer Networks	3
CAP 6415	Computer Vision	3
CAP 6455	Advanced Robotic Systems	3
CAP 6615	Neural Networks	3
COP 6621	Programming Languages and Translation	3
EEL 6706	Testing and Fault Tolerance in Digital Systems	3
CAP 6736	Geometric Modeling	3
EEL 6766	Advanced Computer Architecture	3
CIS 6900	Independent Study	1-19
CIS 6930	Special Topics	1-5
CIS 6940	Graduate Instruction Methods	1-4
CIS 6946	Internships/Practicums/Clinical Practice	0-3

Thesis Option:

CIS 6971	Thesis: Master's	2-19
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The thesis option requires the completion of 24 credit hours of CSE graduate-level courses (9 credit hours of core courses and 15 hours of electives) and 6 credit hours of thesis in computer science related problems, as determined by the Major Professor and documented in the Plan of Work. At least 16 credit hours must be at the 6000 level. With prior permission from the Graduate Program Director, students can take a maximum of 3 hours of Independent Study or Internship, a maximum of 3 hours of one-hour seminar courses, and up to one graduate level course (3 credit hours) outside of the department.

Non-Thesis Option:

The non-thesis option requires 30 credit hours, with 9 credit hours of core courses and 21 hours of electives. At least 16 credit hours must be at the 6000 level. At least 6 hours of electives should be in the following topic areas: advanced algorithms, compilers, databases, parallel computing and distributed systems, computer security, data mining, machine learning, programming languages, or software engineering, as determined by the Graduate Program Director and documented in the Plan of Work. With prior permission from the Graduate Program Director, students can take a maximum of 3 hours of Independent Study or Internship, a maximum of 3 hours of one-hour seminar courses, and up to one graduate level course (3 credit hours) outside of the department.

Graduation Requirements:

For the thesis option, students must defend and pass the thesis and have a GPA of 3.00 or better. Non-Thesis Option students must obtain a letter "B" or better in the core graduate courses and have a GPA of 3.00 or better.

COURSES

See <http://ugs.usf.edu/course-inventory>

COMPUTER SCIENCE AND ENGINEERING PROGRAM

Doctor of Philosophy (Ph.D.) Degree

DEGREE INFORMATION

Program Admission Deadlines:
US Students:

Fall:	February 15
Spring:	October 15
Summer:	No admit

International Students inside the U.S.:

Fall:	February 15
Spring:	October 15
Summer:	No admit

International Students Outside the U.S.:

Fall:	January 15
Spring:	September 15
Summer:	no admit

Minimum Total Hours: 72 post-bachelors

Program Level: Doctoral

CIP Code: 14.0901

Dept. Code: ESB

Program (Major/College): CSE EN

Approved: 1984

CONTACT INFORMATION

College: Engineering
Department: Computer Science and Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The degree of Doctor of Philosophy is conferred in recognition of a candidate's highest level of scholarly competence and demonstrated capability to independently conduct and report significant research in computer science and engineering. This achievement requires more than an accumulation of course credits over a stated period of residence. Scholarly competence is achieved through systematic study and investigation in the chosen discipline at an advanced level. The major professor and at least two committee members will be from the Computer Science and Engineering department. Research capability is developed during the course of study and is achieved through the completion of significant and independent research. The results of this research must be formally presented in a written dissertation and successfully defended before an examining committee. The dissertation must demonstrate the significance of the research as well as the candidate's ability to organize and present her/his results in a professional manner.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

Major Research Areas:

An excellent selection of courses and laboratories support graduate studies in algorithms, artificial intelligence, machine learning, data mining, computer architecture, graphics, networks, computer vision, distributed systems, embedded systems, expert systems, formal verification, image processing, pattern recognition, robotics, databases, software engineering, computer security, compilers, programming languages, VLSI design, and CAD.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- The GRE is required for all Ph.D. applicants. The median GRE scores of recently admitted students include 770 on the Quantitative portion and a Verbal Total of 450. For GRE tests taken after August 1, we require a minimum of 161 on the Quantitative portion (81 percentile) and a minimum of 150 (44 percentile) on the Verbal.
- Minimum grade point average (GPA) of B average (or equivalent) for all coursework completed during the last two years of undergraduate program.
- Submission of TOEFL scores with an Internet-based score of 79 or higher for applicants from non-English speaking countries. If consideration of an assistantship is desired, the speaking score component of the TOEFL must be 26 or above
- The TOEFL requirements may be waived if the applicant meets one of the following conditions:
 - Has scored 500 or higher on the GRE Verbal Test, (Old Scores) or 153 with the New GRE scoring.
 - Has earned a college degree at a U.S. institution of higher learning.
 - Has earned a college degree from an institution whose language of instruction is English, (must be noted on the transcript).
 - Has scored 6.5 on International English Language Testing System, (IELTS).
- Three letters of recommendation
- Statement of purpose
- The applicant must also have mathematical preparation equivalent to that obtained from courses in Calculus through Differential Equations; knowledge of computer science and computer engineering, including logic design, computer architecture, data structures, operating systems, and analysis of algorithms. Students are assumed to have good programming skills. The majority of students accepted to the program possess an undergraduate degree in Computer Science, Computer Engineering, Electrical Engineering, or Mathematics; however, students who hold an undergraduate degree in a related field are encouraged to apply.

DEGREE PROGRAM REQUIREMENTS

The requirements for obtaining the doctoral degree can be met by fulfilling the minimum requirements below. These requirements and the various committees appointed to oversee the completion of these requirements are explained in detail below:

1. Completion of the requisite coursework and the successful completion of qualifying examinations in Computer Architecture, Operating Systems, and Theory of Algorithms within one year of enrollment.
2. Completion of a Major Research-Area paper within one year after qualifier examinations are passed.
3. Completion of a doctoral dissertation representing significant, original research.

Total Program hours**72 minimum (post-baccalaureate)**

A minimum of 72 semester hours including dissertation hours beyond the baccalaureate degree are required of all Ph.D. students

Coursework – 33 credit hours
 Independent Study/Dir Research – 15 hours
 Dissertation – 20 credit hours
 Additional – 4 credit hours (courses or dissertation)

Core Requirements – 9 credit hours

All PhD Students are required to successfully complete: COT 6405 Introduction to the Theory of Algorithms – 9

Required Coursework – 48 hours (includes 9 hours of Core Requirements)

The distribution of these hours is as follows:

- At least 33 credit hours in coursework excluding independent study and directed research. The exact distribution of these hours in the Computer Science and Engineering discipline will be determined by the student and the supervisory committee to provide the student with a stimulating educational experience.
- Up to 15 credit hours of independent study/directed research.

CIS 6900	Independent Study	1-15
CIS 7910	Directed Research	1-15
- Additional 4 credit hours are required, either through the completion of additional courses or through additional dissertation hours.

Students select the specific courses in conjunction with the advisor and committee from the list of available graduate elective courses below in consultation with the Graduate Program Director or individual advisors/dissertation committee.

Departmental Course Options (examples)

CAP 5400	Digital Image Processing	3
CDA 5416	Introduction to Computer-Aided Verification	3
CAP 5625	Introduction to Artificial Intelligence	3
CAP 5682	Expert and Intelligent Systems	3
CAP 5771	Data Mining	3
EEL 5771	Introduction to Computer Graphics I	3
CNT 6215	Computer Networks	3
CAP 6415	Computer Vision	3
CAP 6455	Advanced Robotic Systems	3
CAP 6615	Neural Networks	3
COP 6621	Programming Languages and Translation	3
EEL 6706	Testing and Fault Tolerance in Digital Systems	3
CAP 6736	Geometric Modeling	3
EEL 6766	Advanced Computer Architecture	3
CIS 6900	Independent Study	1-19
CIS 6930	Special Topics	1-5
CIS 6940	Graduate Instruction Methods	1-4
CIS 6946	Internships/Practicums/Clinical Practice	0-3
CIS 6971	Thesis: Master's	2-19

Doctoral Screening/Qualifying Examination

Students must pass the Ph.D. Qualifying examinations in Computer Architecture, Operating Systems, and Theory of Algorithms within one year of enrollment.

Admission to Candidacy

A student will not be admitted to candidacy until a Doctoral committee has been appointed, and the committee has certified that the student has successfully completed the comprehensive qualifying examination and demonstrated the qualifications necessary to successfully complete the requirements for the degree. The admission to Candidacy form must be approved by the Dean of the college and forwarded to the Dean of Graduate Studies for final approval. The student may

elect to enroll in dissertation credits in the semester following approval of the Admission to Candidacy form by Graduate Studies.

Major Research-Area Paper

After an extensive review of literature on the area of research the student will author a paper and give an oral presentation on the subject. The written document should constitute a significant part of the student's literature-review chapter for his/her dissertation. The oral presentation will be open to the public. The paper and presentation is to be completed within one year of passing the Qualifying Examinations.

Dissertation**20 hours minimum****CIS 7980 Dissertation**

The student's progress in the program is monitored by a supervisory doctoral committee, which is usually appointed at an early stage in the student's program. This committee consists of at least five members, one of whom is outside the College of Engineering. The Major Professor will be a member of the Computer Science and Engineering Department. Normally, two more Computer Science and Engineering faculty serve on the committee with a member in another department in the college.

The student must conduct research of sufficient quality that demonstrates an independent and original contribution to the field of computer science and engineering. Students must take at least 20 semester hours of doctoral dissertation credits; the exact number of credits is determined by the candidate's supervisory committee. It is strongly recommended that doctoral students submit journal articles for publication relevant to dissertation research.

Dissertation Defense

A doctoral candidate must defend her/his research before her/his committee. The defense is usually open to the university community and conducted in accordance with the university's general rules and regulations. The defense involves a formal presentation of the dissertation followed by a critical exchange between the candidate and the committee. The committee chairman moderates the proceedings and determines procedure, originality of the research, and contributions made by the candidate.

COURSES

See <http://ugs.usf.edu/course-inventory>

ELECTRICAL ENGINEERING PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	30
Program Level:	Masters
CIP Code:	14.1001
Dept. Code:	EGE
Program (Major/College):	EEL EN
Approved:	1981

CONTACT INFORMATION

College:	Engineering
Department:	Electrical Engineering
Contact Information:	www.grad.usf.edu

PROGRAM INFORMATION

The Department of Electrical Engineering offers both doctoral and masters level degrees. The major areas of research and instruction in the Department are: semiconductor materials, microelectronic manufacturing, MEMS, nanotechnology, VLSI design, digital signal processing, communication theory, wireless communications, microwave engineering, power systems and controls, and biomedical materials and imaging. The Department's research efforts are supported by well-equipped laboratories in the areas of silicon processing, compound semiconductors, electro-optics, IC design, thin dielectric films, communications and signal processing, power systems, nanotechnology, MEMS, micro/millimeter waves, biomedical materials and imaging, and bioengineering.

Current and previous Ph.D. dissertations explored the areas of microelectronics (materials and devices of elemental and compound semiconductors, circuit design, modeling, testing, and reliability); communications and signal processing (communication networks, packet switching, satellite communications, communications software, and VLSI for signal processing); systems and controls; solid state material and device processing and characterization; electro-optics, electromagnetic, microwave and millimeter-wave engineering (antennas, devices, systems); and biomedical engineering. Master's programs include options in semiconductor materials and processes, VLSI design, communications and signal processing, power systems and controls, microwave and millimeter-wave engineering, and biomedical engineering.

Accreditation

Accredited by the Commission on Colleges of the Southern Association of Colleges and Schools.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- Minimum 3.00 GPA
- Three Letters of Recommendation
- Resume
- Statement of Purpose
- TOEFL score of 550; 213 on computerized test; 79 on internet based exam

DEGREE PROGRAM REQUIREMENTS

Thesis Option

Required Courses	24 hours
Include Program Core below, 18 hours including 6 hours of depth or capstone coursework, and 6 hours of elective coursework	
Required Thesis Hours	6 hours
Total hours:	30 hours

Course work only

Required Courses	30 hours
Include Program Core below, 18 hours including 6 hours of depth or capstone coursework, and 12 hours of elective coursework.	
Total Hours:	30 hours

Program Core:**18 hours**

Students must take two of the following applied mathematics courses as part of the degree program:

EGN 5421 Engineering Applications of Vector Analysis	3
EGN 5422 Engineering Applications of Partial Differential Equations	3
EGN 5423 Mathematics for Communications Engineering	3
EGN 5424 Engineering Applications of Complex Analysis	3
EGN 5425 Matrix Theory	3
EEL 6542 Random Processes	3
PHC 6050 Bio-Statistics	3

Students must take two of the following approved in depth sequences as part of their degree program:

EEL-6426	RF/MW Circuits I and EEL-6427 RF/MW Circuits II
EEL-6486C	EM Field Theory and EEL-6487 Adv. EM Field Theory or EEL-6481 Num. Techniques in Electromagnetics
EEL-5462	Antenna Theory and EEL-6463 Adv. Antenna Theory or EEL-6481 Num. Techniques in Electromagnetics
EEL-6935	Monolithic MW Circuits and EEL-6936 Adv. Monolithic MW Circuits
EEL-6534	Digital Communication Systems and EEL-6509 Satellite Comm. or EEL-6593 Mobile and Personal Com.
BME 6000	Intro to Biomedical Eng. and GM-7930 Anatomy for Bio Engineers or EEL-6936 Bio Image Processing
EEL-6935	Bioelectricity and EEL-6273 Chemical and Bio Sensor Microsystems
EEL-6502	DSP-I and EEL-6752 DSP-II or EEL-6586 Speech Signal Processing
EEL-6597	Wireless Network Architecture and Protocols and EEL-6936 Adv. Topics in Wireless Comm.
EEE-5344	Digital CMOS VLSI Design and EEL-6936 VHDL or EEL-6936 Low Power VLSI Design
EEE-5382	Physical Basis of Microelectronics and EEL-6353 Semiconductor Device Theory I
EEE-6353	Semi-Conductor Device Theory I and EEL-6358 Semi-Conductor Device Theory II
EEE 5356	Integrated Circuit Technology and EEL-6936 Adv. Integrated Circuit Technology
EEE-6355	Compound Semiconductor Technology and EEL-6318 Characterization of Semiconductors
EEL-5631	Digital Control Systems and EEL-6613 Modern Control Theory
EEE-6936	VHDL and EEL-6936 Rapid System Prototyping
EEL-5250	Electric Power Systems I and EEL-6935 Electric Power Systems II
EEL-6935	Industrial Power Distribution I and EEL-6936 Industrial Power Distribution II
EEL-5935	Utility Power Distribution I and EEL-6935 Utility Power Distribution II
EEL-6935	Electric Machines and Drives and EEL-6936 Power Electronics
EEL-6425	Intro to Nanotechnology and EEL-6936 Nanotechnology II
EEL-6935	Micro Electro Mechanical Systems I and EEL-6936 Micro Electro Mechanical Systems II

*Other sequence must be approved by the Graduate Program Director

Electives:

Minimum elective hours:

Thesis – 6 hours

Coursework only – 12 hours

Students may adopt suggested electives from the Department Graduate Handbook, by track or emphasis area of their choice. All courses must be graduate level. Students should refer to university requirements when choosing courses bearing in mind allowed quantities of 5xxx and 6xxx coursework. Special selections must be approved by the Program Coordinator.

Comprehensive Exam

The University requires all Master's students to be assessed by a comprehensive examination. The Department maintains two versions of this exam according to the student pathway to degree, i.e. Thesis or Non-Thesis as follows:

Thesis students:

Student's written thesis and Public Defense of same constitute the comprehensive exam. Student is provided a rubric that they will be assessed by relative to their written document and presentation. The Committee reports this assessment to the Department for final approval.

Non-Thesis Students:

In lieu of the Comprehensive Exam, a portfolio addressing the content from a capstone course in the primary area of study, content from a course in a secondary area of study, and content from a core mathematics course will be submitted upon graduation. The graduate program coordinator, chair of the department, and the vice chair of the department will evaluate the submissions according to the overall quality of the writing, the clarity of the explanation of how the outcomes were achieved, and the quality of the examples that are included.

Thesis – 6 hours

EEL 6971 Thesis (6)

COURSES

See <http://ugs.usf.edu/course-inventory>

ELECTRICAL ENGINEERING PROGRAM

Doctor of Philosophy (Ph.D.) Degree

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	72 (Post-bacc) 42 (post-master's)
Program Level:	Doctoral

CIP Code:	14.1001
Dept. Code:	EGE
Program (Major/College):	EEL EN
Approved:	1982

CONTACT INFORMATION

College:	Engineering
Department:	Electrical Engineering
Contact Information:	www.grad.usf.edu

PROGRAM INFORMATION

The Department of Electrical Engineering offers both doctoral and masters level degrees. The major areas of research and instruction in the Department are: semiconductor materials, microelectronic manufacturing, MEMS, nanotechnology, VLSI design, digital signal processing, communication theory, wireless communications, microwave engineering, power systems and controls, and biomedical materials and imaging. The Department's research efforts are supported by well-equipped laboratories in the areas of silicon processing, compound semiconductors, electro-optics, IC design, thin dielectric films, communications and signal processing, power systems, nanotechnology, MEMS, micro/millimeter waves, biomedical materials and imaging, and bioengineering.

Current and previous Ph.D. dissertations explored the areas of microelectronics (materials and devices of elemental and compound semiconductors, circuit design, modeling, testing, and reliability); communications and signal processing (communication networks, packet switching, satellite communications, communications software, and VLSI for signal processing); systems and controls; solid state material and device processing and characterization; electro-optics, electromagnetic, microwave and millimeter-wave engineering (antennas, devices, systems); and biomedical engineering. Master's programs include options in semiconductor materials and processes, VLSI design, communications and signal processing, power systems and controls, microwave and millimeter-wave engineering, and biomedical engineering.

Accreditation

Accredited by the Commission on Colleges of the Southern Association of Colleges and Schools.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- Minimum 3.00 GPA
- GRE (with preferred minimum scores of Q> 155 (61%) , V>146 (28%))
- TOEFL score of 550; 213 on computerized test; 79 internet based exam.
- Three (3) Letters of Reference
- Statement of Purpose
- Resume

DEGREE PROGRAM REQUIREMENTS

Total Minimum Program Hours: 72 post-bacc
42 post-masters

The student's supervisory committee is responsible for evaluating his/her overall transcript to ensure that the following distributional requirements are met:

Program of Study

<p>Core Requirements Minimum 30 hours formal regularly scheduled graduate course work in the engineering area of study, or other graduate courses associated with electrical engineering as approved by the Graduate Program Director. (not necessarily electrical engineering courses)</p>	30 hours
<p>Mathematics and Statistics Minimum 9 hours in mathematics or statistics courses (not necessarily math department courses).</p>	9 hours
<p>Electives/Directed Research/Independent Study</p>	13 hours
<p>Dissertation EEL 7980 Dissertation Each Professor will have his/her own section for dissertation hours.</p>	20 hours minimum
<p>Total hours:</p>	Minimum 72 hours total beyond B.S. degree.

Note: Students entering the doctoral program with an earned master's degree from another institution, other than USF, must take at least nine (9) credit hours of 6000 level EE courses at USF. The student's supervisory committee is responsible for evaluating his/her overall transcript to ensure that the distributional requirements are met.

Please contact Electrical Engineering for additional information

COURSES

See <http://ugs.usf.edu/course-inventory>

ENGINEERING MANAGEMENT PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	30
Program Level:	Masters
CIP Code:	15.1501
Dept. Code:	EGS
Program (Major/College):	EMA EN
Approved:	1982

CONTACT INFORMATION

College:	Engineering
Department:	Industrial & Management Systems Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

This program is designed to prepare engineers from various disciplines to make the transition to technical management. Courses in the program involve concepts in engineering management, resource management, strategic planning, and productivity. They combine qualitative approaches with quantitative techniques. Courses are available on campus or through distance learning.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- BS in Engineering or equivalent.
- Minimum 3.00 GPA upper level
- GRE may be required
- Letter of recommendation.
- TOEFL score of 79 or higher on internet-based test, 213 or higher on computer-based test, or 550 or higher on paper-based test
- Resume
- Two years professional experience or internship may be required as part of the program

DEGREE PROGRAM REQUIREMENTS

A minimum of 30 credits of approved coursework beyond the bachelor level is required, 18 credits of core work and 12 credits of electives. Up to 6 hours of advanced courses in the student's area of specialty may be taken as electives. A thesis option is available to M.S.E.M. students who are interested in applied research. In the thesis option, 18 credits of core work, 6 credits of electives, and 6 credits of thesis are the minimum required.

The required 18 credits of core work are divided into three components: 12 credits in the general core area, 3 credits in the quantitative core area, and 3 credits in the job design core area. An undergraduate statistics course with a grade of C or higher is a prerequisite for the quantitative core area. Otherwise students must additionally take EGN 3443 Probability & Statistics for Engineers as a prerequisite.

General Core Area: 12 credits

EIN 5182 Principles of Engineering Management
EIN 6386 Management of Technological Change
EIN 5350 Technology and Finance
EIN 6183 Engineering Management Policy & Strategy (Capstone: must be taken after all core work requirements have been fulfilled)

Quantitative Core Area: 3 credits must be selected from the following options, as approved by advisor. The other courses may be taken as electives.

ESI 5306 Operations Research for Engineering Managers
ESI 5219 Statistical Methods for Engineering Managers
ESI 6247 Statistical Design Models

Job Design Core Area: 3 credits must be selected from the following options, as approved by advisor. The other course may be taken as an elective.

EIN 6108 Engineering Management: Human Relations
EIN 6319 Work Design, Motivation & Productivity

Electives: 12 credits minimum must be selected from the following options, as approved by advisor. (Other Graduate Courses may be taken, with approval of the Graduate Program Director.)

EIN 6179 Advanced TQM Methods: Six Sigma
EIN 6936 Benchmarking
ESI 5522 Computer Simulation
EIN 6217 Construction Safety Engineering
EIN 5201 Creativity in Technology
EIN 6275 Design Controls for Medical Devices
EIN 5452 Engineering a Lean Enterprise
EIN 6215 Engineering Systems Safety
ESI 6605 Engineering Data Mining
EIN 6324 Engineering the Supply Chain
EIN 6936 Graduate Research Seminar
EIN 6433 Human Factors Engineering in Medical Devices
EIN 6112 Information Systems Design for Engineering
ESI 6448 Integer Programming
EIN 6934 International Project Management
EIN 6435 International Regulations for Medical Devices
EIN 6178 ISO 9000/14000
ESI 6491 Linear Programming & Network Optimization
EIN 5510 Manufacturing Systems Analysis
EIN 6392 New Product Development
EIN 6420 Non-Linear Programming
EIN 6216 Occupation Safety Engineering
EIN 6430 Overview of Regulated Industries
EIN 6336 Production Control Systems
EIN 6145 Project Management
EIN 6431 Regulatory Quality Systems & Controls for Medical Devices
EIN 6432 Regulated Product Approval Process
ESI 5236 Reliability Engineering
EIN 6935 Strategic Marketing Assessment

EIN 6936 Strategies in Technical Entrepreneurship
ESI 6213 Stochastic Decision Models I
EIN 6934 Tech Venture Strategy
EIN 6145 Technical Entrepreneurship
EIN 6106 Technology & Law
EIN 6121 Technology & Markets
EIN 5174 Total Quality Management (TQM) Concepts
EIN 6225 Total Quality Management (TQM) Seminar
EIN 6936 Venture Capital & Private Equity
EIN 5275 Work Physics / Biomechanics

COURSES

See <http://ugs.usf.edu/course-inventory>

ENGINEERING SCIENCE PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:
Fall: February 15
Spring: October 15
Summer: February 15

Minimum Total Hours: 30
Program Level: Masters
CIP Code: 14.0101
Dept. Code: DEA
Program (Major/College): EGC EN

Concentrations:

Chemical & Biomedical Engineering (CHB)
 Electrical Engineering (PEE)
 Environmental Engineering (EVE)
 Transportation Engineering (TPE)

CONTACT INFORMATION

Colleges: Engineering
Departments: Engineering
Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.usf.edu

PROGRAM INFORMATION

The M.S.E.S degree provides students without a first degree in engineering with the opportunity to earn an advanced degree by combining coursework with an optional research thesis. Students who have a prior bachelor's level degree in engineering can also take advantage of this degree program by pursuing interdisciplinary coursework and research through the academic programs hosted in the College of Engineering.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- An undergraduate Bachelor's degree or equivalent in Engineering or Science or closely related field;
- Undergraduate GPA of 3.00 or higher;
- GRE with preferred minimum scores of 143 (Verbal), 152 (Quantitative), 3.0 (Analytical Writing);
- TOEFL for international students: 213 (computer based total) or 79 (internet based) or 6.5 (IELTS);
- Two letters of recommendation (3 letters of recommendation for students interested in the Peace Corps Masters International Program);
- Statement of purpose/research interests and resume;
- Host Department must be selected on the following form:
<http://www.eng.usf.edu/programsOfStudy/MSESIntakeForms.htm>
 Exceptions to above requirements may be made on a case-by-case basis.

DEGREE PROGRAM REQUIREMENTS

Total Minimum Hours **30 credits**

Core – 1 hour

Concentration or Approved Area of Study – 18 hours

Electives – 11 hours

A program of study for all students must be approved by the Graduate Program Coordinator of the host Department.

Core Course Requirement – 1 hour

CGN 6945 1 Graduate Research Methods

Concentration or Area of Study – 18 hours

Students select from either one of the following concentrations or an area of study approved by the Graduate Program Director in the host department:

Chemical & Biomedical Engineering (CHB)

Two courses from the following:

ECH 6105	3	Advanced Thermodynamics
ECH 6285	3	Advanced Transport Phenomena
ECH 6840	3	Mathematical Methods for Chemical Engineering
ECH 6515	3	Reacting Systems
ECH 6412	3	Process Analysis and Modelling
BME 6634	3	Biotransport Phenomena

Plus 12 additional credits of coursework in ECH or BME (may include 6 credits of Thesis and 4 credits of Independent Study)

Electrical Engineering (PEE)

Two courses from the following

EGN 5421	3	Engineering Apps for Vector Analysis
EGN 5422	3	Engineering Apps of Partial Diff. Eq.
EGN 5423	3	Mathematics for Comm Eng 3
EGN 5425	3	Engineering Applications of Complex Analysis
EGN 5425	3	Matrix Theory
EEL 6545	3	Random Processes
PHC 6050	3	Biostatistics I

Plus 12 additional credits - Four courses, two sequences, from one of seven tracks. Each sequence consists of an entry level graduate course followed by a more advanced course that has the first course as a pre-requisite.

Some examples are:

EEL 5250 Power Systems Analysis – EEL 6936 Power Systems II

EEL 5935 Energy Delivery Systems – EEL 6936 Electrical Energy Distribution Systems

EEL 6502 Digital Signal Processing I – EEL 6752 Digital Signal Processing II

EEL 6432 RF/Microwave Circuits I – EEL 6427 RF/Microwave Circuits 2

Further examples may be found at: <http://ee.eng.usf.edu/Graduate/courseOptions.htm>.

Environmental Engineering (EVE)

ENV 6002	3	Physical Chemical Principles
EES 6107	3	Biological Principles of Environmental Engineering
ENV 6666	3	Aquatic Chemistry

Plus one course from the following:

CGN 6933	3	Green Engineering for Sustainability <i>or</i>
CGN 6933	3	Green Infrastructure for Sustainable Communities <i>or</i>
ENV 6510	3	Sustainable Development Engineering

And six additional credits of coursework in Environmental Engineering or related areas (may include up to 6 credits of thesis).

Transportation Engineering (TPE)

TTE 5205	3	Traffic Systems Engineering
TTE 5501	3	Transportation Planning and Economics
TTE 6507	3	Travel Demand Modeling

And nine additional credits of coursework in Transportation Engineering or related areas (may include up to 6 credits of thesis and 4 credits of independent study).

Electives – 11 credit hours

11 additional credits of coursework may be taken either inside or outside the host department, with approval from the graduate program director of the host department.

Comprehensive Exam

Students in this program are required to meet a comprehensive exam requirement for graduation. This exam requirement can be met through one of the following, with the approval of the Graduate Program Coordinator of the host Department:

- 1) approval of a written thesis of a research project and successful oral defense of the thesis,
- 2) a comprehensive evaluation of a student portfolio of scholarly work (publications, major projects, etc.) or
- 3) successful completion of the FE (Fundamentals of Engineering Examination) offered by the National Council of Examiners for Engineering and Surveying.

Thesis Option

Students enroll in the thesis course that corresponds with the Concentration or Area of Study they are in.

CGN 6971	6	Thesis (Civil and Environmental Engineering)
CIS 6971	6	Thesis (Computer Science and Engineering)
ECH 6971	6	Thesis (Chemical and Biomedical Engineering)
EEL 6971	6	Thesis (Electrical Engineering)
EIN 6971	6	Thesis (Industrial and Management Systems Engineering)
EML 6971	6	Thesis (Mechanical Engineering)

COURSES

See <http://ugs.usf.edu/course-inventory>

ENGINEERING SCIENCE PROGRAM

Doctor of Philosophy (Ph.D.) Degree

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	72
Program Level:	Doctoral
CIP Code:	14.0101
Dept. Code:	DEA
Program (Major/College):	EGC EN
Approved:	1973

CONTACT INFORMATION

College:	Engineering
Department:	
Contact Information:	www.grad.usf.edu

PROGRAM INFORMATION

This program is designed to meet the needs of students who wish to pursue studies in interdisciplinary engineering areas.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

The student should have a strong background in scientific and engineering principles. At least one major professor in the College of Engineering should agree to guide the student by approving the admission.

DEGREE PROGRAM REQUIREMENTS

Total Minimum Program Hours: **72 hours**

The student's Ph.D. program must meet University and College requirements (see main College of Engineering section), but is individually designed by the student's two Co-Major Professors based on the student's main areas of interest. While the student is hosted by a department, program approvals and the degree are authorized by the Co-Major Professors and the College of Engineering.

COURSES

See <http://ugs.usf.edu/course-inventory>

ENVIRONMENTAL ENGINEERING PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	30
Program Level:	Masters
CIP Code:	14.1401
Dept. Code:	EGX
Program (Major/College):	EVE EN
Approved:	1997

CONTACT INFORMATION

College:	Engineering
Department:	Civil and Environmental Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The M.E.V.E. degree provides a student with the opportunity to earn the advanced degree by coursework only. Students must have an accredited first degree in engineering or complete a list of makeup engineering coursework. Graduates of the program are prepared for careers with governmental agencies, nongovernmental organizations (NGOs), or private industry and firms involved in planning, design, research and development, or policy.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

Major Research Areas:

Water quality engineering; air quality engineering; fate and transport of contaminants in the environment; environmental biotechnology and nanotechnology; waste management; sustainability and ecological engineering; surface water hydrology and hydraulics; groundwater hydrology; water reuse; green engineering; renewable energy; fate of emerging contaminants; and humanitarian engineering with a focus on the developing world.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- Undergraduate GPA \geq 3.0 preferred.
- GRE with preferred minimum scores of V 145 (25th percentile), Q 155 (60th percentile), AW 3.0 (15th percentile); or valid Fundamentals of Engineering (FE) certificate. Verification of FE certification should be obtained from the professional engineering (PE) board where the FE certification was obtained. See the CEE department website for more information: <http://www2.eng.usf.edu/cee/graduate/apply.htm>.
- TOEFL (international applicants only) 79 (550 paper-based exam); or IELTS 6.5.
- Two Letters of Reference provided at the time of application.
- Statement of Purpose provided at the time of application.
- Resume provided at the time of application.
- Exceptions made on a case-by-case basis where warranted.

DEGREE PROGRAM REQUIREMENTS

Total Program Minimum Hours

30 hours

The minimum coursework requirement for the Master of Engineering in Environmental Engineering degrees is 30 credit hours. No research thesis is required. All students must take three "principles" courses (Physical/Chemical Principles; Biological Principles; Aquatic Chemistry), at least one "sustainability" course, and at least two environmental engineering "process" elective courses.

Core Courses (required) - 12 hours minimum

ENV 6002	3	Physical & Chemical Principles of Environmental Engineering
EES 6107	3	Biological Principles of Environmental Engineering
ENV 6666	3	Aquatic Chemistry

And at least one of the following:

CGN 6933	3	Green Engineering for Sustainability <i>or</i>
CGN 6933	3	Green Infrastructure for Sustainable Communities <i>or</i>
ENV 6510	3	Sustainable Development Engineering

Elective Courses-18 hours minimum

(≥18 hours, at least two courses must be from this list)

ENV 6105	3	Air Pollution Fundamentals
ENV 6438	3	Phys & Chemical Processes for Treatment of Drinking Water
ENV 6519	3	Phys & Chemical Processes for Groundwater Remediation
ENV 6564	3	Environmental Engineering Design
ENV 6667	3	Environmental Biotechnology

Comprehensive Exam

Portfolio and oral interview are used in lieu of a comprehensive exam. The purpose of the portfolio and interview is for students to demonstrate that they have achieved a minimum level of proficiency in stipulated competencies. Specifically, by the time they graduate, students will demonstrate

- an ability to plan, compose, and integrate verbal, written, virtual, and graphical communication of a project to technical and non-technical audiences, and
 - an ability to formulate and solve complex problems in Environmental Engineering using relevant data and techniques.
- Additional details regarding portfolio requirements will be provided to students by the Department.

COURSES

See <http://ugs.usf.edu/course-inventory>

ENVIRONMENTAL ENGINEERING PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	30
Program Level:	Masters
CIP Code:	14.1401
Dept. Code:	EGX
Program (Major/College):	EVE EN
Approved:	1996

Concentration

Engineering for International Development (EFD)

CONTACT INFORMATION

College:	Engineering
Department:	Civil and Environmental Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The M.S.E.V. degree provides a student with the opportunity to earn the advanced degree with coursework and a required research thesis. Students must have an accredited first degree in engineering or complete a list of makeup engineering coursework. An optional concentration in Engineering for International Development allows students to combine their graduate education and research with engineering service in the Peace Corps. The M.S.E.V. is a research-oriented degree in which the student writes, as a major part of the degree requirements, a thesis that defines, examines, and reports in depth on a subject area relevant to Environmental Engineering.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

Major Research Areas:

The field of Environmental Engineering has long been known for its breadth and ability to adapt to the new technological, societal, and global problems facing the environment. Major research areas include water quality engineering; air quality engineering; fate and transport of contaminants in the environment; environmental biotechnology and nanotechnology; waste management; sustainability and ecological engineering; surface water hydrology and hydraulics; groundwater hydrology; water reuse; green engineering; renewable energy; fate of emerging contaminants; and humanitarian engineering with a focus on the developing world. Graduates of the program are prepared for careers in academia, governmental agencies, nongovernmental organizations (NGOs), or private industry and firms involved in planning, design, research and development, or policy.

The environmental engineering laboratories provide state-of-the-art analytical and experimental equipment for chemical and biological research. Equipment includes an ion chromatograph, atomic absorption spectrophotometer, several gas chromatographs (including with mass spectrometry), HPLC, TOC machine, and environmental chambers. Field research sites are available locally and in several international settings that include developing world communities..

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- Undergraduate GPA \geq 3.0 preferred.
- GRE with preferred minimum scores of V 145 (25th percentile), Q 155 (60th percentile), AW 3.0 (15th percentile); or valid Fundamentals of Engineering (FE) certificate. Verification of FE certification should be obtained from the professional engineering (PE) board where the FE certification was obtained. See the CEE department website for more information: <http://www2.eng.usf.edu/cee/graduate/apply.htm>.
- TOEFL (international applicants only) 79 (550 paper-based exam); or IELTS 6.5.
- Two (2) Letters of Reference provided at the time of application. EFD students must submit 3 Letters of Reference.
- Statement of Purpose provided at the time of application.
- Resume provided at the time of application.
- Exceptions made on a case-by-case basis where warranted.

DEGREE PROGRAM REQUIREMENTS

Total Program Minimum Hours

30 hours

The program consists of a minimum of 24 credit hours of coursework and 6 credit hours of thesis. All students must take three "principles" courses (Physical/Chemical Principles; Biological Principles; Aquatic Chemistry), and at least one "sustainability" course. Students should consult their research advisors for guidance in selecting other coursework.

Core Courses (required)

12 hours minimum

ENV 6002 Physical Chemical Principles	3
EES 6107 Biological Principles of Environmental Engineering	3
ENV 6666 Aquatic Chemistry	3
And at least one of the following:	
CGN 6933 Green Engineering for Sustainability <i>or</i>	3
CGN 6933 Green Infrastructure for Sustainable Communities) <i>or</i>	3
ENV 6510 Sustainable Development Engineering	3

Concentration Requirements (optional)

12 hours

Engineering for International Development (EFD)

This optional concentration acknowledges coursework and international field experience in the area of engineering for international development that considers issues of sustainability, environment, health, gender, and society. Students must take the following four courses, and must engage in an extended international engineering field experience, which in most cases will form the basis of the Master's thesis.

ENV 6510 Sustainable Development Engineering

A minimum of 1 course (3 credits) from the following anthropology courses:

ANG 6766	Research Methods in Applied Anthropology
ANG 6730	Socio-cultural Aspects of HIV/AIDS
ANG 6469	Health, Illness and Culture

A minimum of 1 course (3 credits) from the following global public health courses:

PHC 6764	Global Health Principles & Contemporary Issues
PHC 6761	Global Health Assessment Strategies

3 additional credit hours of coursework in international development engineering or closely related areas.

Students engaged in full-time global training and service as part of the EFD concentration (e.g., in the U.S. Peace Corps or equivalent) may register for CST 6990 for 0 credit hours while in their country of service.

Elective Courses

12 hours minimum

Beyond the core coursework, 12 additional credit hours are required, based on approval of the student's graduate committee. Students in the EFD Concentration complete the concentration requirements in lieu of elective courses.

Thesis**6 hours minimum**

Students pursuing the M.S.E.V. are required to complete at least six (6) credits of Thesis. Students must conduct a suitable research project under the guidance of their thesis advisor, write an original thesis based upon the results of the research project, and defend the thesis to a committee that must subsequently approve the completed thesis. For students in the EFD Concentration, the thesis must be associated with research in a developing-world context.

Comprehensive Exam

The thesis and defense are used in lieu of a comprehensive exam.

COURSES

See <http://ugs.usf.edu/course-inventory>

ENVIRONMENTAL ENGINEERING PROGRAM

Doctor of Philosophy (Ph.D.) Degree

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	48/78
Program Level:	Doctoral
CIP Code:	14.1401
Dept. Code:	EGX
Program (Major/College):	ECE EN
Approved:	2013

CONTACT INFORMATION

College:	Engineering
Department:	Civil and Environmental Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The Ph.D. degree is awarded in recognition of demonstrated scholarly competence and ability to conduct and report original and significant research in Environmental Engineering.

The field of Environmental Engineering has long been known for its breadth and ability to adapt to the new technological, societal, and global problems facing the environment. Major research areas include water quality engineering; air quality engineering; fate and transport of contaminants in the environment; environmental biotechnology and nanotechnology; waste management; sustainability and ecological engineering; surface water hydrology and hydraulics; groundwater hydrology; water reuse; green engineering; renewable energy; fate of emerging contaminants; and humanitarian engineering with a focus on the developing world. Graduates of the program are prepared for careers in academia, governmental agencies, nongovernmental organizations (NGOs), or private industry and firms involved in planning, design, research and development, or policy.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

Major Research Areas:

Water quality engineering; air quality engineering; fate and transport of contaminants in the environment; environmental biotechnology and nanotechnology; waste management; sustainability and ecological engineering; surface water hydrology and hydraulics; groundwater hydrology; water reuse; green engineering; renewable energy; fate of emerging contaminants; and humanitarian engineering with a focus on the developing world.

The environmental engineering laboratories provide state-of-the-art analytical and experimental equipment for chemical and biological research. Equipment includes an ion chromatograph, atomic absorption spectrophotometer, several gas chromatographs (including with mass spectrometry), HPLC, TOC machine, and environmental chambers. Field research sites are available locally and in several international settings that include developing world communities.

Dissertation Requirements - 20 hours minimum

CGN 7980 20 Dissertation

A minimum of 20 credits of dissertation, an approved PhD dissertation, and a dissertation defense are required. Students may not sign up for dissertation credits until they have defended their proposal and advanced to candidacy (see Qualifying Exam, above).

Additional Requirements - 9 hours minimum

Nine (9) credits of additional coursework, dissertation, or directed research are required.

Publication Requirement

Students must have at least one paper accepted to a peer-reviewed journal or peer-reviewed conference based on their research carried out during their doctoral studies at USF.

COURSES

See <http://ugs.usf.edu/course-inventory>

INDUSTRIAL ENGINEERING PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	30
Program Level:	Masters
CIP Code:	14.3501
Dept. Code:	EGX
Program (Major/College):	EVE EN
Approved:	1981

CONTACT INFORMATION

College:	Engineering
Department:	Industrial and Management Systems Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The department participates in the College's M.S.E. programs. The department offers advanced degrees in areas of study pertinent to the design, evaluation, and operation of a variety of industrial systems, ranging from the analysis of public systems, to the service industry, to the operation of manufacturing concerns. Course topics and research opportunities include engineering analytics, production planning, production control, facilities design, applied engineering statistics, quality control and reliability, operations research, engineering economic analysis, human factors engineering, productivity analysis, manufacturing systems, robotics, automation, and computer applications. The department has advanced laboratory facilities that support class projects and research in microcomputer applications, computer-aided design and manufacturing, flexible automation, quality control, and applications in robotics.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- An undergraduate degree in Industrial Engineering or a related field with a strong background in mathematics with a 3.00/4.00 GPA; non engineering degrees will be required to take supplemental undergraduate courses
- GRE Required
- TOEFL for international students 213 (550 paper version)
- Three letters of reference
- Statement of purpose including evidence of research potential

DEGREE PROGRAM REQUIREMENTS

Total Minimum Hours: 30 credit hours

Thesis option: minimum of 24 credit hours of approved course work, including three core courses and five IE elective courses, and six credit hours of thesis.

Non-thesis option: minimum of 30 credit hours of approved course work, including three core courses, five IE elective courses, and two general elective courses.

Required Core Courses: 9 credit hours

ESI 6410 Optimization in Operations Research	3
ESI 6247 Statistical Design Models	3
ESI 6340 Probabilistic Systems Analysis	3

IE Elective Courses 15 credit hours

ESI 4333 Production Control	3
ESI 4221 Industrial Statistics & Quality Control	3
EIN 4364 Facilities Design	3
EIN 5350 Technology & Finance	3
ESI 5522 Computer Simulation	3
ESI 5236 Reliability Engineering	3
ESI 5306 OR for Engineering Management	3
EIN 6145 Project Management	3
EIN 6935 Lean Six Sigma	3
ESI 6324 Engineering the Supply Chain	3
EIN 6336 Production Control Systems	3
ESI 6448 Integer Programming	3
EIN 6936 Nonlinear Programming	3
ESI 6447 Large-scale Optimization	3
EIN 6319 Work Design & Productivity	3
EIN 6112 Information Systems Design	3
EIN 6934 Engineering Analytics I	3
EIN 6934 Engineering Analytics II	3
EIN 6608 Advanced Analytics I	3
EIN 6609 Advanced Analytics II	3

General Elective Courses

Any College of Engineering 5000+ level course, including IMSE courses, except for the courses listed as IE elective courses above. Examples include:

EIN 5182 Principles of Engineering Management	3
EIN 6386 Management of Technological Change	3
EIN 6934 Systems Integration	3
EIN 6936 Advanced Lean Six Sigma	3
EIN 6178 ISO 9000/14000	3
EIN 6179 Advanced TQM Methods.	3

In addition, students can choose electives from other department and/or non-departmental courses, with the approval of major advisor or program director. Contact the department for information. Also visit <http://imse.eng.usf.edu>

Thesis 6 credit hours

COURSES

See <http://ugs.usf.edu/course-inventory>

INDUSTRIAL ENGINEERING PROGRAM

Doctor of Philosophy (Ph.D.) Degree

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	90
Program Level:	Doctoral
CIP Code:	14.3501
Dept. Code:	EGS
Program (Major/College):	EIE EN
Approved:	1983

CONTACT INFORMATION

College:	Engineering
Department:	Industrial and Management Systems Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

Contact the department for information, <http://imse.eng.usf.edu/academics/phd.asp>.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

Although USF only requires Ph.D. students to complete two consecutive semesters as full-time students, the IMSE Dept. policy is for Ph.D. students to complete their total doctoral program as full-time Tampa campus students. Other requirements include:

- GRE Required
- TOEFL for international students 213 (550 paper version)
- Three letters of reference
- Statement of Purpose including evidence of research potential

DEGREE PROGRAM REQUIREMENTS

Total Minimum Program Hours

90 hours post bachelor's

Minimum of 90 credit hours beyond BS degree. Minimum of 60 credit hours of approved course work and 20 credit hours of dissertation research. Total hours of credit must equal or exceed 90 hours. Contact the department for additional information.

Must have 2 (at least one accepted, the other submitted) referred journal publications before graduation.

Must take the following 4 core courses:

Required Core Courses	12 hours minimum
ESI 6213 Stochastic Decision Models I	3
EIN 6935 Systems Modeling and Performance Analysis	3
ESI 6245 Advanced Statistical Design Models	3
ESI 6491 Linear Programming and Network Optimization	3

In addition a minimum of 8 hours of mathematics or statistics is required (the choice of such courses must be approved by the student's doctoral committee). Further requirements may be imposed by the candidate's committee.

Elective Courses	40 hours minimum
ESI 5522 Computer Simulation	3
EIN 6119 Decision Support Systems	3
ESI 6324 Engineering the Supply Chain	3
EIN 6433 Human Factors in Engineering Medical Devices	3
EIN 6112 Information Systems Design	3
ESI 6448 Integer Programming	3
EIN 6435 International Regs for Med Devices	3
EIN 6386 Management of Technology Change	3
EIN 6420 Non-Linear Programming	3
EIN 6336 Production Control Systems	3
EIN 6145 Project Management	3
ESI 5236 Reliability Engineering	3
EIN 6319 Work Design and Productivity	3
EIN 6608 Advanced Analytics I	3
EIN 6609 Advanced Analytics II	3

Directed Research **9 hours**

Dissertation **11 hours**

In addition, students may choose electives from other department and/or non-departmental courses, with the approval of major advisor or program director. Contact the department for information. Also visit <http://imse.eng.usf.edu>

COURSES

See <http://ugs.usf.edu/course-inventory>

INFORMATION TECHNOLOGY PROGRAM

Master of Science in Information Technology (M.S.I.T.) Degree

DEGREE INFORMATION

Program Admission Deadlines:
Domestic Applications:
Fall Semester: February 15

Spring Semester: October 15

Summer: No admit

International Students in the US:
Fall: February 15

Spring: October 15

Summer: No admit

International Students outside the US:
Fall: January 15

Spring: September 15

Summer: No admit

Minimum Total Hours: 30 (non-thesis)

Program Level: Masters

CIP Code: 11.0103

Dept Code: EIT

Program (Major/College): ITC / EN

Approved: Spring 2014

CONTACT INFORMATION

College: Engineering

Department: Computer Science and
Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

Program Description

The Department of Computer Science and Engineering offers a non-thesis option for the degree of Master of Science in Information Technology (M.S.I.T). The MSIT graduate will demonstrate strong information technology skills as well as problem solving skills needed for the deployment of technology solutions to achieve business and organizational goals. The degree is available in an online mode, and provides students with a broad and integrative understanding of both technology and operational and strategic business and organizational applications. There is considerable freedom in the choice of the courses.

The breadth of subjects which are part of information technology together with the immense diversity of its applications, make it imperative that students in the Master's program maintain close contact with the Graduate Program Director, in order to achieve a coherent plan of study directed towards a specific goal. In particular, election of courses should only be made with prior consultation and approval of the Major Professor or the Graduate Program Director.

Accreditation: Accredited by the Commission on Colleges of the Southern Association of College and Schools.

ADMISSIONS INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- The GRE is required for all MSIT applicants. For GRE tests taken after August 1, 2011, we require a minimum of 161 on the Quantitative portion (81 percentile) and a minimum of 150 (44 percentile) on the Verbal. The GRE will be waived for M.S. degree applicants with an undergraduate degree from an ABET-accredited United States university.
- Minimum grade point average (GPA) of "B" (or equivalent) for all coursework completed during the last two years of undergraduate program.
- Submission of TOEFL scores with an Internet-based score of 79 or higher for applicants from non-English speaking countries. If consideration of an assistantship is desired, the speaking score component of the TOEFL must be 26 or above. The TOEFL requirements for admission may be waived if the applicant meets one of the following conditions:
 - Has scored 500 or higher on the GRE Verbal Test, (Old Scores) or 153 with the New GRE scoring.
 - Has earned a college degree at a U.S. institution of higher learning.
 - Has earned a college degree from an institution whose language of instruction is English, (must be noted on the transcript).
 - Has scored 6.5 on International English Language Testing System, (IELTS).
- Three letters of recommendation.
- Statement of purpose.
- Bachelor' Degree in Information Technology, Computer Science, or a closely related field; or a bachelor's degree in another field, plus satisfactory completion of the courses listed below under "Undergraduate Prerequisites."
- Evidence of completion of a defined subset of the required core courses found in the University of South Florida's Bachelor of Science in Information Technology degree program or their equivalent (see "Undergraduate Prerequisites" below).

Undergraduate Prerequisites

To be successful in this program, an applicant should have certain base knowledge in the discipline demonstrated from undergraduate-level pre-requisite courses including:

- COP2224/2931 Object-Oriented Programming
- COP2510/2930 Programming Concepts
- COP 3515 IT Program Design
- CEN 4031 IT Software Engineering
- COP 4703 IT Database Systems`
- EEL 4854 IT Data Structures & Algorithms

The student should have taken these courses or their equivalent prior to beginning graduate coursework. All prerequisite courses are available online. In some cases, applicants lacking some of the prerequisites may be conditionally admitted to the MSIT program; such students will be required to complete missing prerequisites within the first year of graduate study.

Professional experience in information technology is typically focused on specific projects or systems, and is not as broad as the treatment of a topic one receives in a course. Therefore, except in unusual circumstances, professional experience cannot substitute for any of the above prerequisite courses.

DEGREE PROGRAM REQUIREMENTS

Total Minimum Hours:

30 hours

Core Requirements – 12 hours

CNT 6008	3	Network Programming for IT
ISM 6218	3	Advanced Database Administration
CGS 6425	3	Advanced Programming
CAP 6940	3	IT Graduate Practicum

Elective Courses – 18 hours

Select six of the following courses, or other graduate course as approved by the Graduate Program Director:

CAP 6011	3	Multimedia & E-Commerce for IT
ENG 6025	3	RFID and NFC Technologies for IT
CAP 6033	3	Information Security Architecture for IT
ISM 6136	3	Data Mining
ISM 6137	3	Statistical Data Mining
ISM 6145	3	Seminar on Software Testing
ISM 6155	3	Enterprise Information Systems Management
ISM 6266	3	Software Architecture
CAP 6663	3	IT Robotics Applications
CAP 6671	3	IT Intelligent Agents
CGS 6842	3	IT & Systems for E-Business

Note: ISM prefix courses are offered by the Department of Information Systems / Decision Sciences (College of Business).

Comprehensive Exam

The requirement for a comprehensive exam is satisfied by the successful completion of the IT Graduate Practicum (CAP6940) as described below.

Thesis / Non-Thesis

This is a non-thesis program. However, the required three semester hour IT Graduate Practicum (CAP 6940) serves as a comprehensive measure of student competency in the discipline. This practicum, to be taken over one or two semesters, requires satisfactory completion, as determined by a faculty panel consisting of faculty members and/or industrial supervisor, of a major development effort on a real-world scenario, capped by a formal presentation for faculty and other students. Upon completion of the practicum project, the student will submit a formal project report, including all written deliverables. A formal oral presentation will be made to a panel of faculty members and the industrial supervisor, if applicable, who will provide their evaluation of the presentation and project report to the student's IT Graduate Practicum Faculty Advisor.

COURSE DESCRIPTIONS

See <http://ugs.usf.edu/course-inventory>

MATERIALS SCIENCE AND ENGINEERING PROGRAM

Master of Science in Materials Science and Engineering (M.S.M.S.E.) Degree

DEGREE INFORMATION

Program Admission Deadlines:

Fall: February 15

Spring: October 15

Summer: February 15

Minimum Total Hours: 30

Program Level: Masters

CIP Code: 14.1801

Dept. Code: All Engineering Depts.
except Computer Science
and Engineering

Program (Major/College): MSE EN

Approved: 2001

CONTACT INFORMATION

Colleges: Engineering

Departments: Chemical & Biomedical
Eng

Civil Engineering
Electrical Engineering
Industrial Engineering
Mechanical Engineering

Contact Information: www.grad.usf.edu

PROGRAM INFORMATION

The field of Materials Science and Engineering (MSE) applies the fundamental principles of physics and chemistry to engineering materials, with a focus on the interrelationship between material structure, their properties, and the means by which they are processed. MSE impacts multiple facets of our economy, such as aerospace, electronics, transportation, communication, construction, recreation, entertainment, environment and energy. It is, by its very nature, an interdisciplinary field. The goal of the M.S.M.S.E. program in Materials Science and Engineering is to provide a route for well-qualified undergraduate students who desire in-depth graduate-level work including structured courses and research experience, in preparation for work in industry or for entrance into a relevant science or engineering Ph.D. program.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- Bachelor's degree in Engineering (Chemical, Mechanical, Industrial, Civil, Materials Science, Ceramic, Metallurgy, Manufacturing, Polymer and other related engineering disciplines) or Natural Sciences (Physics, Chemistry or Biology) from a regionally accredited institution.
- Minimum undergraduate GPA of 3.00
- GRE with preferred minimum scores of V 50%, Q 50% and AW 50%.
- TOEFL score of 550 (paper-based test) or 213 (computer-based test) or 79 (internet-based test) for international students
- Three letters of recommendation
- Statement of purpose

DEGREE PROGRAM REQUIREMENTS

Total Minimum Program Hours:	30 credit hours
Core Requirements	5 credit hours
EMA 6510 Characterization of Materials	3
ECH 6931 Graduate Seminar or PHY 6938 Graduate Seminar	2
Electives	19 credit hours minimum
Comprehensive Exam is not required.	
Thesis Option	6 credit hours
The thesis option requires the completion of 24 credit hours of graduate level courses (5 credit hours core and 19 hours of electives) and 6 credit hours of thesis. At least 16 credit hours must be at 6000 level with a maximum of 2 hours of Independent Study.	
XXX 6971 Thesis	
Non-Thesis Option:	6 credit hours
The non-thesis option requires 30 credit hours, with 5 credit hours core and 25 credit hours of electives. At least 26 hours must be at the 6000 level with a maximum of 2 hours of Independent Study. For Non-thesis Option six additional credit hours of elective courses is required in lieu of thesis hours.	

Courses See <http://ugs.usf.edu/course-inventory>

MECHANICAL ENGINEERING PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	----

Minimum Total Hours:	30
Program Level:	Masters
CIP Code:	14.1901
Dept. Code:	EGR
Program (Major/College):	EME EN
Approved:	1994

CONTACT INFORMATION

College:	Engineering
Department:	Mechanical Engineering
Contact Information:	www.grad.usf.edu
Other Resources:	www.usf4you.usf.edu

PROGRAM INFORMATION

The Department offers graduate programs leading to the M.S. and Ph.D. in Mechanical Engineering.

Research opportunities are available in the following areas: Mechanism Design, Kinematics, System Dynamics and Vibrations, Mechanical Controls, Tribology, Mechanical Design, Robotics, Rehabilitation Engineering, Composite Materials, Solid Mechanics, Fluid Dynamics, Thermal Energy Systems, Microelectronic Device Thermal Management, Clean and Renewable Energy Systems, Micro and Nano scale materials and systems, MEMS, Biosensors, Biofluids, Biomedical Engineering, and Engineering Education.

Department facilities include the following laboratories: Computational Fluid Dynamics, Computational Solid Mechanics, Computer-Aided Design, Dynamic Systems, Hydraulics, Rehabilitation Engineering, Robotics, Biofuel cells and Biomimetics, Nanomaterials and Thin Films, Advanced Materials Processing and Characterization, Biofluids and Biosensors, Microelectronic Thermal Management and Heat Transfer, and Compliant Mechanisms.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- As a rule, only students with a B.S. in Mechanical Engineering or a closely related field from an accredited engineering program will be considered for admission.
- All applicants must take the GRE.
- GRE required, with minimum percentile rank of 50% on the quantitative portion and a minimum average percentile rank of 50% in verbal and quantitative **OR** the student must have a grade point average (GPA) of 3.00/4.00 for the last two years of coursework from an ABET accredited engineering program for admission to the Master's Program.
- International students must score a minimum of 550 on the TOEFL paper-based examination, 79 on the internet-based test, or 213 on the computer-based test.
- A one-page Statement of Purpose must also be included in the application package.

DEGREE PROGRAM REQUIREMENTS

Total Minimum Program Hours:

30 credit hours

Core Requirements – 12 credit hours

All Master's Program students must complete a total of 12 core credit hours from two categories.

Fluid and Thermal Science - 6 credit hours

- EML 6105: Advanced Thermodynamics and Statistical Mechanics
- EML 6154: Advanced Conduction Analysis
- EML 6713: Advanced Fluid Mechanics
- EML 6930: Convection Heat Transfer

Mechanics and Systems - 6 credit hours

- EML 6223: Synthesis of Vibrating Systems
- EML 6273: Advanced Dynamics of Machinery
- EML 6653: Applied Elasticity
- EML 6930: Failure Mechanisms in Materials
- EML 6930: Advanced Materials
- EML 6570: Fracture Mechanics
- EML 6930: Engineering Design Principles and Practices

EML 6931: Advanced Mathematics or EML 6930: Advanced Mathematics II may be taken in lieu of one of the classes named above in order to satisfy a core requirement.

Additional Coursework

18 credit hours

In addition to the 12 core credit hours, the MME degree requires a minimum of 18 credit hours of approved coursework, for a total of 30 semester hours.

Comprehensive Exam

MME students must also pass a final Comprehensive Oral Examination.

The Department of Mechanical Engineering has available, on request, the Mechanical Engineering Graduate Program Handbook, which delineates the Department's entrance requirements, programs of study, supervisory committee formation, and program completion requirements. The M.M.E is a non-thesis program and the M.S.M.E. is a thesis program.

COURSES

See <http://ugs.usf.edu/course-inventory>

MECHANICAL ENGINEERING PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	30
Program Level:	Masters
CIP Code:	14.1901
Dept. Code:	EGR
Program (Major/College):	EME EN
Approved:	1981

CONTACT INFORMATION

College:	Engineering
Department:	Mechanical Engineering
Contact Information:	www.grad.usf.edu

PROGRAM INFORMATION

The Department offers graduate programs leading to the M.S. and Ph.D. in Mechanical Engineering.

Research opportunities are available in the following areas: Mechanism Design, Kinematics, System Dynamics and Vibrations, Mechanical Controls, Tribology, Mechanical Design, Robotics, Rehabilitation Engineering, Composite Materials, Solid Mechanics, Fluid Dynamics, Thermal Energy Systems, Microelectronic Device Thermal Management, Clean and Renewable Energy Systems, Micro and Nano scale materials and systems, MEMS, Biosensors, Biofluids, Biomedical Engineering, and Engineering Education.

Department facilities include the following laboratories: Computational Fluid Dynamics, Computational Solid Mechanics, Computer-Aided Design, Dynamic Systems, Hydraulics, Rehabilitation Engineering, Robotics, Biofuel cells and Biomimetics, Nanomaterials and Thin Films, Advanced Materials Processing and Characterization, Biofluids and Biosensors, Microelectronic Thermal Management and Heat Transfer, and Compliant Mechanisms.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- As a rule, only students with a B.S. in Mechanical Engineering or a closely related field from an accredited engineering program will be considered for admission.
- All applicants must take the GRE.
- GRE required, with minimum percentile rank of 50% on the quantitative portion and a minimum average percentile rank of 50% in verbal and quantitative **OR** the student must have a grade point average (GPA) of 3.00/4.00 for the last two years of coursework from an ABET accredited engineering program for admission to the Master's Program.
- International students must score a minimum of 550 on the TOEFL paper-based examination, 79 on the internet-based test, or 213 on the computer-based test.
- A one-page Statement of Purpose/Research Interest must also be included in the application package.

DEGREE PROGRAM REQUIREMENTS

Total Minimum Program Hours:

30 credit hours

All Master's Program students must complete a total of 12 core credit hours from two categories. Students should choose 6 credit hours of course work from the following category:

Fluid and Thermal Science **6 credit hours**

- EML 6105: Advanced Thermodynamics and Statistical Mechanics
- EML 6154: Advanced Conduction Analysis
- EML 6713: Advanced Fluid Mechanics
- EML 6930: Convection Heat Transfer

Students should choose 6 credit hours of course work from the following category:

Mechanics and Systems **6 credit hours**

- EML 6223: Synthesis of Vibrating Systems
- EML 6273: Advanced Dynamics of Machinery
- EML 6653: Applied Elasticity
- EML 6930: Failure Mechanisms in Materials
- EML 6930: Advanced Materials
- EML 6570: Fracture Mechanics
- EML 6930: Engineering Design Principles and Practices

EML 6931: Advanced Mathematics or EML 6930: Advanced Mathematics II may be taken in lieu of one of the classes named above in order to satisfy a core requirement.

Additional Coursework **12 credit hours**

In addition to these 12 credit hours, the MSME degree requires a minimum of 12 credit hours of approved coursework and a minimum of 6 thesis hours for a total of 30 semester hours. MSME students must present a typed final draft to the Supervisory Committee and Graduate Advisor one week before the final oral examination.

Comprehensive Exam

A student must pass the final Oral Comprehensive Examination after the student has presented his/her thesis to the Supervisory Committee.

Thesis **6 credit hours**

EML 6971 Thesis: Master's

The Department of Mechanical Engineering has available, on request, the Mechanical Engineering Graduate Program Handbook, which delineates the Department's entrance requirements, programs of study, supervisory committee formation, and program completion requirements. The M.M.E. is a non-thesis program and the M.S.M.E. is a thesis program.

COURSES

See <http://ugs.usf.edu/course-inventory>

MECHANICAL ENGINEERING PROGRAM

Doctor of Philosophy (Ph.D.) Degree

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	72
Program Level:	Doctoral
CIP Code:	14.1901
Dept. Code:	EGR
Program (Major/College):	EME EN
Approved:	1982

Concentrations:

Manufacturing (MFG)

CONTACT INFORMATION

College:	Engineering
Department:	Mechanical Engineering
Contact Information:	www.grad.usf.edu

PROGRAM INFORMATION

The Department offers graduate programs leading to the M.S. and Ph.D. in Mechanical Engineering.

Research opportunities are available in the following areas: Mechanism Design, Kinematics, System Dynamics and Vibrations, Mechanical Controls, Tribology, Mechanical Design, Robotics, Rehabilitation Engineering, Composite Materials, Solid Mechanics, Fluid Dynamics, Thermal Energy Systems, Microelectronic Device Thermal Management, Clean and Renewable Energy Systems, Micro and Nano scale materials and systems, MEMS, Biosensors, Biofluids, Biomedical Engineering, and Engineering Education.

Department facilities include the following laboratories: Computational Fluid Dynamics, Computational Solid Mechanics, Computer-Aided Design, Dynamic Systems, Hydraulics, Rehabilitation Engineering, Robotics, Biofuel cells and Biomimetics, Nanomaterials and Thin Films, Advanced Materials Processing and Characterization, Biofluids and Biosensors, Microelectronic Thermal Management and Heat Transfer, and Compliant Mechanisms.

Accreditation:

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

ADMISSION INFORMATION

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

Program Admission Requirements

- As a rule only students with an M.S. in Mechanical Engineering or a closely related field will be admitted into the Ph.D. Program.
- Students without an M.S. in Mechanical Engineering may also be admitted but will be required to take
 - a minimum of 6 credit hours from the Fluid and Thermal Sciences area and
 - a minimum of 6 credit hours from the Mechanics and Systems area.
- GRE required, with minimum percentile rank of 60% on the quantitative portion and a minimum average percentile rank of 60% in verbal and quantitative **OR** the student must have a grade point average (GPA) of 3.00/4.00 for the last two years of coursework from an ABET accredited engineering program for admission to the PhD Program.

- International students must score a minimum of 550 on the TOEFL paper-based examination, 79 on the internet-based test, or 213 on the computer-based test.
- A one-page Statement of Purpose/Research Interest must also be included in the application package.

DEGREE PROGRAM REQUIREMENTS

Total Minimum Program Hours:

72 credit hours (post-bacc)

Core – 12 credit hours

Math req – 6 credit hours

Coursework – 18 credit hours

Dissertation – 20 credit hours

Additional coursework or dissertation – 16 credit hours

A minimum of 72 credit hours beyond the baccalaureate degree, of which there must be a minimum of 36 hours of coursework at the 6000 level without counting Independent Study or Special Topics courses and a minimum of 20 hours of dissertation. A minimum of 18 hours of coursework is required in the student's area of specialization and there must be at least 6 hours of mathematics or statistics and 6 hours of coursework outside the major area of specialization. All students are required to fulfill the 12 credit hours of core course requirements as outlined below. Courses completed for a Master's degree from another institution may count towards a maximum of 24 credit hours of coursework for the Ph.D. degree only if the transcript shows that the degree requirements were similar to USF and the student did not already get credit for the identical courses at USF. A qualifying examination must be passed before admission to doctoral candidacy.

Core Requirements

12 credit hours

All Ph.D. Program students must complete a total of 12 core credit hours from two categories.

Fluid and Thermal Science

6 credit hours

EML 6105: Advanced Thermodynamics and Statistical Mechanics

EML 6154: Advanced Conduction Analysis

EML 6713: Advanced Fluid Mechanics

EML 6930: Convection Heat Transfer

Mechanics and Systems

6 credit hours

EML 6223: Synthesis of Vibrating Systems

EML 6273: Advanced Dynamics of Machinery

EML 6653: Applied Elasticity

EML 6930: Failure Mechanisms in Materials

EML 6930: Advanced Materials

EML 6570: Fracture Mechanics

EML 6930: Engineering Design Principles and Practices

Mathematics Requirement

6 credit hours

EML 6931: Advanced Mathematics

EML 6930: Advanced Mathematics II

Additional Coursework

18 credit hours minimum

Qualifying Examination

The purpose of the Qualifying Examination is to determine if the student has acquired sufficient mastery of the subject matter in all relevant fields on his/her program of study to warrant admission to candidacy for the Ph. D. degree. It should be taken as soon as a student has completed a major portion of the coursework requirements. Students must apply to take the qualifying examination no later than the fourth semester after admission into the doctoral program.

In order to take the qualifying examination a doctoral student must satisfy the following requirements:

1. Satisfactorily complete (C or better) in departmental coursework on Mathematics and two other areas of specialization (1 major and 1 minor) as described below.
 - a) Mathematics:
 - a. Graduate courses - Advanced Mathematics, Advanced Mathematics II
 - b) Heat Transfer:
 - a. Undergraduate courses - Heat Transfer
 - b. Graduate courses - Conduction Heat Transfer, Convection Heat Transfer
 - c) Fluid Mechanics:
 - a. Undergraduate courses – Fluid Systems
 - b. Graduate courses - Advanced Fluids
 - d) Thermodynamics:
 - a. Undergraduate courses – Thermo I, Thermal Systems
 - b. Graduate courses - Advanced Thermodynamics
 - e) Dynamics:
 - a. Undergraduate courses – Dynamics, Vibrations, Kinematics and Dynamics of Machinery
 - b. Graduate courses - Advanced Dynamics of Machinery, Synthesis of Vibrating Systems
 - f) Solid Mechanics:
 - a. Undergraduate courses – Mechanics of Solids, Machine Design
 - b. Graduate Courses - Applied Elasticity
 - g) Materials:
 - a. Undergraduate courses – Materials I
 - b. Graduate courses - Advanced Materials
2. Apply in writing to the Graduate Coordinator for permission to take the examination. The application must include a detailed statement of the courses taken, major and minor areas of specialization and must be submitted before October 15th.
3. Students may request an exemption from any required coursework if they have satisfactorily completed (B or better) equivalent coursework at an accredited institution other than USF.

No student will be allowed to take the examination if the cumulative GPA of all courses taken at USF is below 3.0, have not chosen a major professor and formed a supervisory committee, or is holding conditional or provisional admission status in the program.

The examination will be administered by a Departmental Qualifying Examination Committee once a year (in the first two weeks of February), as needed.

1. Written Examination
 - a. Examinations will be given on Mathematics, and student's chosen major and minor areas of specialization. Examinations will be prepared by the qualifying examination committee and will be administered by the graduate coordinator. Composition of the committee will be rotated among all faculty members and determined by the exam areas to be offered. If at all possible, a Ph.D. advisor will not be involved in the evaluation of her/his students. The length of each examination will be approximately three hours of duration.
 - b. The type of written examination, i.e., open book etc., is at the discretion of the assessor.
2. Passing and Advancement to Candidacy
 - a. A student is required to pass the written examination in all 3 areas (Mathematics, major area of specialization, minor area of specialization) for advancement to candidacy.
 - b. In case a student passes in 2 areas and fails in 1 area, a make-up written or oral examination may be requested by the student. The make-up examination will be given during the last two weeks of March.
 - c. In case a student fails the written examination in more than one area or fails the written or oral make-up examination, he or she will need to re-take the entire qualifying examination in the following year.
 - d. Students will be given a maximum of two attempts to pass the qualifying examination. Failure in the second year will result in being dropped from the doctoral program.

Dissertation

20 credit hours minimum

Additional Coursework or Dissertation

16 credit hours

Students will select additional coursework or Dissertation hours to complete the remaining 16 credit hours.

The Department of Mechanical Engineering has available, on request, the Mechanical Engineering Graduate Program Handbook, which delineates the Department's entrance requirements, programs of study, supervisory committee formation, and program completion requirements.

COURSES

See <http://ugs.usf.edu/course-inventory>