COLLEGE OF ENGINEERING

Changes to Note

The follow curricular changes for the College of Engineering were approved by the USF-Tampa Graduate Council on the date noted.

College Requirements

Engineering (Ph.D.)	change in college requirements from 90 to 72 hours	2/21/11

New Program

Environmental Engineering (Ph.D.)		4/21/11
In process for BOT/BOG approval – pending final approval		

Program changes

Civil/Environ Engineering (M.C.E., M.S.C.E., M.E.V.E., M.S.E.V.)	Add alternative to GRE req	6/6/11
Civil Engineering (Ph.D.)	change curr; add new conc: Environ Engin	4/18/11
Computer Science and Engineering (Ph.D.)	change curriculum	6/6/11

New Courses

EIN 6353	Risk and Decision Analysis	4/18/11
EIN 5452	Engineering a Lean Enterprise	8/18/10
EIN 6392	New Product Development	2/21/11
ESI 6420	Non-Linear Programming	7/5/11
ESI 6447	Large-scale and Computational Optimization	7/5/11

Course change:

EIN 6179	Adv. TQM Methods: Six Sigma	title change	6/6/11

Courses Withdrawn:

ESI 6638	Data Mining - new course; withdrawn by dept.	10/18/10

University of South Florida
College of Engineering
4202 E. Fowler Ave ENB118
Tampa, FL 33620

Web address: http://www2.eng.usf.edu/

Phone: 813-974-3780
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College Dean: John Wiencek
Associate Dean: Rafael Perez

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 Chemical Engineering (M.Ch.E.)
Chemical Engineering (ECH)
Biomedical & Biotechnology (BEB)

Master of Civil Engineering (M.C.E.)
Civil Engineering (ECE)
Geotechnical (GTL)
Interdisciplinary Transportation (ITP)
Materials (MTL)
Structures (STR)
Transportation (TPT)
Water Resources (WRS)

Master of Engineering (M.E.)
Chemical Engineering (ECH)
Biomedical & Biotechnology (BEB)
Electrical Engineering (EEL)
Mechanical Engineering (EME)

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

Master of Industrial Engineering (M.I.E.)
Industrial Engineering (EIE)
Quantitative Analysis (QAS)
Engineering Management (IMA)

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

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

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)
Geotechnical (GTL)
Interdisciplinary Transportation (ITP)
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.)
- Biomedical Engineering (EBI)
- Chemical Engineering (ECH)
  - Biomedical & Biotechnology (BEB)
- Civil Engineering (ECE)
  - Geotechnical (GTL)
  - Interdisciplinary Transportation (ITP)
  - Materials (MTL)
  - Structures (STR)
  - Transportation (TPT)
  - Water Resources (WRS)
- Electrical Engineering (EEL)
- Engineering Science (EGC)
- Environmental Engineering (EVE)
- Mechanical Engineering (EME)

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

Master of Science in Industrial Engineering (M.S.I.E.)
- Industrial Engineering (EIE)
  - Quantitative Analysis (QAS)
  - Engineering Management (IMA)

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)
  - Interdisciplinary Transportation (ITP)
  - Materials (MTL)
  - Structures (STR)

Transportation (TPT)
Water Resources (WRS)

Computer Science and Engineering (CSE)
Electrical Engineering (EEL)
Engineering Science (EGC)
Physics (ENP)
Industrial Engineering (EIE)
Engineering Management (IMA)
Manufacturing Systems (MFS)
Quantitative Analysis (QAS)
Mechanical Engineering (EGR)
Manufacturing (MFG)

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 Graduate School 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 Science in Engineering - This degree is normally awarded to a Master's graduate who has a Bachelor's degree from a non-engineering program and has completed a prescribed series of undergraduate engineering courses. 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.

Manufacturing Option - In addition, the departments of Chemical & Biomedical Engineering, Computer Science and Engineering, Electrical Engineering and Mechanical Engineering, offer a Master of Science in Engineering with a Manufacturing Systems Option (consisting of an 18 hour core and 18 hours of electives). The degree is administered by the Industrial Engineering Department and is a true interdisciplinary degree with areas of Robotics, Automation, Computer Aided Design, Computer Integrated Manufacturing, Control Systems, Software Systems, Hardware Systems, and Production Systems available for emphasis. The student, upon completion of the core courses, may choose electives and concentrate within one of the above departments or may choose to acquire an in-depth knowledge in one of the above emphasis areas by making elective course choices from several departments.

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 and Master's Degrees

Students who, at the end of the junior year, clearly are interested in graduate study are invited to pursue a five-year program leading simultaneously to the Bachelor of Science in Engineering or Engineering Science and Master Degrees. This program offers the opportunity to take graduate courses during the fourth year and deferring senior courses to the fifth year. Students in the Five-Year Program may apply 6 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, 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 Graduate School 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.

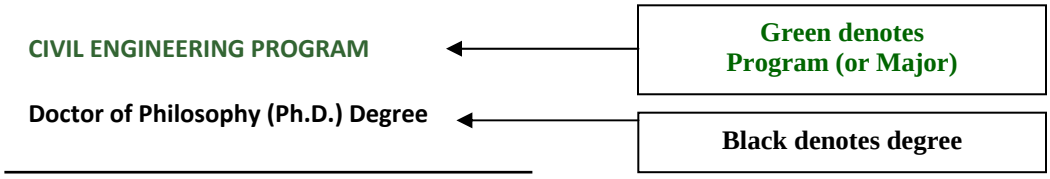
Collaboration with Other Colleges and Departments

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
Summer:	February 15

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

CONTACT INFORMATION

College: Engineering
Department: Chemical & Biomedical Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.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, Shriners Orthopedic Hospital for Children, 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: Neuroengineering 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.
- Minimum GRE, Quantitative >620; Analytical written score of 4 or >;
- An undergraduate Bachelor's degree or equivalent in Engineering or Science;
- TOEFL 550 (paper-based total) for international students or 213 (computer-based total);
- Three (3) letters of recommendation;
- A statement of purpose.

Note: Exceptionally qualified students with undergraduate degrees in the Life and Physical Sciences may be admitted into the BME M.S. Program. Such students will typically have to complete a series of remedial courses before formal admission into the program. Any remedial courses will normally not count towards the degree requirements. The BME Program Advisor should be consulted for details.

DEGREE PROGRAM REQUIREMENTS

Both the thesis and non-thesis options are available at the M.S. level. A total of 30 credit hours are required for either option.

Core Requirements

Currently there are three (3) required courses:

GMS 6440	Basic Medical Physiology	3
GMS 6605	Basic Medical Anatomy	3
PHC 6051	Biostatistics II	3

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 1 or 2 courses in relevant areas such as chemistry or physics. Thesis option students can count up to 6 hours of thesis research towards the requirements.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

BIOMEDICAL ENGINEERING PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:
Currently closed for admission

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

CONTACT INFORMATION

College: Engineering
Department: Chemical & Biomedical Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.usf.edu

This program is inactive and not accepting applications for admission.

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 limaging, tissue engineering, sensors, telehealth, cellular-level drug delivery, and rehabilitation engineering. Participating institutions include the James Haley Veterans Administration Hospital, Shriners Orthopedic Hospital for Children, Florida Orthopedics Institute, and Tampa General Hospital. Dr. William Lee (Lee@eng.usf.edu) is the Program Director

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 of 3.00 or higher.
- Minimum GRE, Quantitative >620; Analytical written score of 4 or >;
- An undergraduate Bachelor's degree or equivalent in Engineering or Science;
- 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

The thesis option consists of 30 hours of coursework, including 6 hours of thesis. Students with non-engineering undergraduate degrees can apply; remedial courses may be required that will not count towards the degree.

Currently there are three required classes:

GMS 6xxx	Anatomy and Physiology for Engineers	3
PHC 6051	Biostatistics	3
BME 6xxx	Foundations of Biomedical Engineering	3
BME 5740	Theory and Design of Bioprocesses	3
BME 5742	Pharmaceutical Engineering	2
BME 5746	Introduction to Biomedical Engineering	3
BME 5748	Selected Topics in Biomedical Engineering	1-3
BME 5910	Directed Research in Bioengineering	1-3

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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

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. 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, the Shriners Orthopedic Hospital 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
- Tissue 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 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 scores (V and Q) > 75 %tile and an AW > 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 including a Master's thesis.
- Evidence of sustained interest in biomedical engineering
- A statement of purpose
- Three 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

1) Core Courses:

A minimum of 15 credits including:

GMS 6440 Basic Medical Physiology	3
GMS 6605 Basic Medical Anatomy	3
PHC 6051 Biostatistics II	3

Plus one additional approved course in Biostatistics and one approved course in the Medical Sciences.

2) Specialization Courses:

A minimum of 18 credit hours selected from one of the four 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
A limited number of financially competitive teaching and research graduate assistantships will be offered to incoming students. The College of Engineering is also home to several national graduate student support programs including NSF sponsored IGERT, GK-12 and Bridge to the Doctorate programs, the latter particularly emphasizing support for underrepresented minorities. 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 and the Shiners' 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 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://www.ugs.usf.edu/sab/sabs.cfm

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
Other Resources:	www.usf4you.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 hrs required**
BME 6000 Biomedical Engineering I	3	
BMD 6931 Biomedical Engineering II	3	
GMS 6440 Basic Medical Physiology	3	
GMS 6605 Basic Medical Anatomy	3	
PHC 6051 Biostatistics II	3	
Additional approved BME courses (can include up to 6 thesis hours for thesis option)	12	

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 hrs 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	

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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 fells 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, 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 Graduate School; Students apply separate for the MD 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 applciation

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 Engineeering 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 (7^{th}) year, students complete the fourth (4^{th}) 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://www.ugs.usf.edu/sab/sabs.cfm

CHEMICAL ENGINEERING PROGRAM

Master of Chemical Engineering (M.Ch.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: 14.0701
Dept Code: ECH
Program (Major/College): ECH EN

Concentrations:
Biomedical and Biotechnology (BEB)

CONTACT INFORMATION

College: Engineering
Department: Chemical & Biomedical Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.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, Applicants must score >720 (Q), >350 (V) and Analytical of 3.0 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);
- Two (2) letters of reference;
- Statement of Purpose.

DEGREE PROGRAM REQUIREMENTS

This is a non-thesis option degree and requires an undergraduate degree in Chemical Engineering.

Complete Background courses in Chemical Engineering as needed. Students in this program are also required to complete the FE (Fundamentals of Engineering Examination) offered by the Society of Professional Engineers.

Course requirements:

ECH 6105 Advanced Thermodynamics	3
ECH 6285 Advanced Transport	3 **or**
BME 6634 Biotransport Phenomenon	3
ECH 6515 Advanced Reaction Engineering	3
ECH 6840 Math Methods	3 **or**
ECH 6412 Processes Analysis and Modeling	3
6 hours in other 6000 course **or**	
ECH 6907 Ind. Study	3 hrs each
9 hours in other 5000 or 6000 course **or**	
ECH 6907 Ind. Study	3 hrs each
Other 5000 or 6000 courses	3
Total 30	

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

CHEMICAL ENGINEERING PROGRAM

Master of Engineering (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: 14.0701
Dept Code: ECH
Program (Major/College): ECH EN

Concentrations:
Biomedical and Biotechnology (BEB)

CONTACT INFORMATION

College: Engineering
Department: Chemical & Biomedical Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.usf.edu

PROGRAM INFORMATION

This degree is normally awarded to a Master's graduate who has an undergraduate degree in engineering or who has completed a prescribed series of undergraduate engineering courses, and completes an all coursework program.

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. Applicants must score >720 (Q), >350 (V) and Analytical of 3.0 or greater.
- An undergraduate Bachelor's degree or equivalent in Engineering or Science;
- TOEFL 550 (paper-based total) for international students or 213 (computer-based total);
- Two (2) letters of reference;
- Statement of Purpose.

DEGREE PROGRAM REQUIREMENTS

This is a non-thesis degree normally awarded to a Masters' Candidate who has an undergraduate degree in any engineering or related science field. Complete Background courses in Chemical Engineering as needed. Students in this program are also required to complete the FE (Fundamentals of Engineering Examination) offered by the Society of Professional Engineers.

Core Requirements (6):

Take two Courses from the list below:

ECH 6105 Advanced Thermodynamics	3
ECH 6285 Advanced Transport	3
ECH 6840 Math Methods	3
ECH 6515 Advanced Reaction Engineering	3
ECH 6412 Processes Analysis and Modeling	3

Electives (24):

One ECH 6000 Level Course	3
Remaining electives are taken from other 5/6000 level courses	21

Total 30

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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

Concentrations:
Biomedical and Biotechnology (BEB)

CONTACT INFORMATION

College: Engineering
Department: Chemical & Biomedical Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.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 interesst 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. Applicants must score >720 (Q), >350 (V) and Analytical of 3.0 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);
- Two (2) letters of reference;
- Statement of research interests.

DEGREE PROGRAM REQUIREMENTS

This is a thesis option degree that requires an undergraduate degree in Chemical Engineering. A background with undergraduate chemical engineering courses is needed.

Course Requirements:

ECH 6105 Advanced Thermodynamics	3
ECH 6285 Advanced Transport **or**	3
BME 6634 Biotransport Phenomenon	3
ECH 6515 Advanced Reaction Engineering	3
ECH 6840 Math Methods **or**	3
ECH 6412 Processes Analysis and Modeling	3
ECH 6971 Masters Thesis	6
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
Other 5000 or 6000 course or ECH 6907 Individual Study	3
Total 30	

- (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)

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. 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 Graduate School.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

CHEMICAL ENGINEERING 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: 14.0701
Dept Code: ECH
Program (Major/College): ECH EN

Concentrations:
Biomedical and Biotechnology (BEB)

CONTACT INFORMATION

College: Engineering
Department: Chemical & Biomedical Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.usf.edu

PROGRAM INFORMATION

This degree is normally awarded to a Master's graduate who has an undergraduate degree in engineering or who has completed a prescribed series of undergraduate engineering courses, and completes an all coursework program.

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. Applicants must score >720 (Q), >350 (V) and Analytical of 3.0 or greater.
- An undergraduate Bachelor's degree or equivalent in Engineering or Science;
- TOEFL 550 (paper-based total) for international students or 213 (computer-based total);
- Two (2) letters of reference;
- Statement of research interests.

DEGREE PROGRAM REQUIREMENTS

Requires an undergraduate degree in engineering or science. This is an interdisciplinary program that involves a combination of engineering and science courses. It requires a thesis. Complete Background courses in Chemical Engineering as needed.

Course Requirements:

*6000 level ECH course 1	3
*6000 level ECH course 2	3
Independent study 3 hours Max	3
Other formal course work 5000 or 6000	15
ECH 6971 Masters Thesis	6
Total 30	

- (must have a minimum of 16 hours at the 6000 level)
- (must have a minimum of 6 hours of ECH 6000 level)

***Require 2 courses out of**

ECH 6105 Advanced Thermodynamics	3
ECH 6285 Advanced Transport	3
ECH 6840 Math Methods	3
ECH 6515 Advanced Reaction Engineering	3
ECH 6412 Processes Analysis and Modeling	3
ECH 5324 Auto Control II	3

(may include a maximum of 4 hours of independent study)

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. The Thesis must be on file at the USF library prior to scheduling of the oral examination.

Students in this program are also required to pass the FE (Fundamentals of Engineering Examination) offered by the Society of Professional Engineers. 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 Graduate School.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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

Concentrations:
Manufacturing (MFT)
Biomedical and Biotechnology (BEB)

CONTACT INFORMATION

College: Engineering
Department: Chemical & Biomedical Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.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. Applicants must score >720 (Q), >500 (V), and Analytical 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 1st 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://www.ugs.usf.edu/sab/sabs.cfm

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

Concentrations:
Geotechnical Engineering (GTL)
Interdisciplinary Transportation (ITP)
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
Other Resources: www.usf4you.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.

College computer facilities are available to all departmental students. In addition, the department has a variety of microcomputers available for student use. The department also 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 unit, 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. These degrees are recommended for part-time students who find it difficult to do thesis research because of their work commitment or 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

- Overall GPA 2.75; GPA in major 3.00
- GRE 650Q, 350V and 3.0 AW or valid fundamentals of engineering (FE) certificate preferred. 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 6.5 (IELTS).
- Two (2) Letters of Reference
- Statement of Purpose
- Exceptions made on a case-by-case basis where warranted.

DEGREE PROGRAM REQUIREMENTS

Total Minimum Hours: **30**

The minimum coursework requirement is 30 credit hours for students with an undergraduate Engineering degree. Students without an engineering BS will be required to complete undergraduate engineering pre-requisite courses as determined by the Department. Please consult the graduate program coordinator for the list of required courses.

Core 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 4000 level courses may be applied to meet the degree requirements.
- A maximum of 6 credits of independent study may be applied to meet the degree requirements.

Portfolio

These degrees are coursework only degrees and do not require a thesis; however, a portfolio providing examples of the following is required at the end of the program: (1) design of complex systems, (2) written and oral communication skills, (3) solution of ill defined or open ended problems.

The Department supports MCE concentration areas in Geotechnical Engineering (GTL), Interdisciplinary Transportation (ITP), Materials Engineering and Science (MTL), Structural Engineering (STR), Transportation Engineering (TPT) and Water Resources (WRS). Students work with a member of the graduate program committee to map out their graduate coursework.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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: 33
Program Level: Masters
CIP Code: 14.0801
Dept Code: EGX
Program (Major/College): ECE EN

Concentrations:
Geotechnical Engineering (GTL)
Interdisciplinary Transportation (ITP)
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
Other Resources: www.usf4you.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.

College computer facilities are available to all departmental students. In addition, the department has a variety of microcomputers available for student use. The department also 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 unit, 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 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

- Overall GPA 2.75; GPA in major 3.00
- GRE 650Q, 350V and, 3.0AW or valid fundamentals of engineering (FE) certificate preferred. 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 6.5 (IELTS).
- Two (2) letters of reference.
- Statement of Purpose.
- Exceptions made on a case-by-case basis where warranted.

DEGREE PROGRAM REQUIREMENTS

Total Minimum Hours: 30

These degrees are for students doing a Master's thesis. The program consists of a minimum of 24 credit hours of coursework and 6 credit hours of thesis for students with an undergraduate degree in Civil Engineering; students without an Engineering BS will be required to complete undergraduate engineering pre-requisite courses as determined by the Department. Please consult the graduate program coordinator for the list of required courses.

Core Requirements (24 hours)

- A maximum of 9 credits taken outside the CEE department may be applied to meet the degree requirements.
- A maximum of 6 credits of 4000 level courses may be applied to meet the degree requirements.
- A maximum of 6 credits of independent study may be applied to meet the degree requirements.

Thesis Requirements (6 hours)

The Department supports M.S.C.E. concentration areas in Geotechnical Engineering (GTL), Interdisciplinary Transportation (ITP), Materials Engineering and Science (MTL), Structural Engineering (STR), Transportation Engineering (TPT) and Water Resources (WRS). Students work with a Major Professor and thesis committee to map out their graduate programs.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

CIVIL ENGINEERING 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: 33
Program Level: Masters
CIP Code: 14.0801
Dept Code: EGX
Program (Major/College): ECE EN

Concentrations:
Geotechnical Engineering (GTL)
Interdisciplinary Transportation (ITP)
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
Other Resources: www.usf4you.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. College computer facilities are available to all departmental students. In addition, the department has a variety of microcomputers available for student use. The Department also 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 unit, environmental chamber, constant rate of stress consolidometer, triaxial units and superpave testing equipment.

The M.S.E.S. is a research oriented degree for students without an undergraduate degree in engineering. As a major part of the degree requirement, the student is expected to write a thesis that defines, examines, and reports in depth on a subject area relevant to 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

- Overall GPA 2.75; GPA in major 3.00
- GRE 650Q, 350V, 3.0AW.
- TOEFL (International applicants only) 79 (550 paper based exam) or 6.5 (IELTS).

- Two (2) letters of reference.
- Statement of Purpose.

Exceptions made on a case-by-case basis where warranted

DEGREE PROGRAM REQUIREMENTS

Total Minimuim Hours: **30**

These degrees are for students without an undergraduate engineering degree who wish to pursue a Master's degree in CEE. This program consists of a minimum of 24 credit hours of coursework and 6 credit hours of thesis:

Pre-Requisites

Students will be required to complete undergraduate engineering pre-requisite courses required for specific courses or as determined by their major professor.

Core Requirements (24 hours)

- A maximum of 9 credits taken outside the CEE department may be applied to meet the degree requirements.
- A maximum of 6 credits of 4000 level courses may be applied to meet the degree requirements.
- A maximum of 6 credits of independent study may be applied to meet the degree requirements.

The Department supports M.S.E.S. concentration areas in Geotechnical Engineering (GTL), Interdisciplinary Transportation (ITP), Materials Engineering and Science (MTL), Structural Engineering (STR), Transportation Engineering (TPT) and Water Resources (WRS). Students work with a Major Professor and thesis committee to map out their graduate programs.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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: 48/78
Program Level: Doctoral
CIP Code: 14.0801
Dept Code: EGX
Program (Major/College): ECE EN

Concentrations:
Environmental Engineering (ENV)
Geotechnical Engineering (GTL)
Interdisciplinary Transportation (ITP)
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, including sustainable development, has been included in the Civil Engineering domain. Graduates of the programs are prepared for careers in academia and with public agencies or private industry and firms involved in planning, design, research and development, or regulation.

College computer facilities are available to all departmental students. In addition, the department has a variety of microcomputers available for student use. The department also 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.

The Ph.D. degree is awarded in recognition of demonstrated scholarly competence and ability to conduct and report original and significant research. Ph.D. students may work in all of the areas of Civil Engineering: Engineering Mechanics, Environmental Engineering, Geotechnical Engineering, Pavement Engineering, Materials Engineering and Science, Structural Engineering, Transportation Engineering and Planning, and Water Resources 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

- GRE 700Q, 450V, 4.0AW.
- TOEFL (International applicants only) 550 or 213 (CBT).
- Resume
- Three (3) letters of reference.
- Statement of Purpose.

DEGREE PROGRAM REQUIREMENTS

Total Program Hours:

For students with an approved master's degree	48 hours minimum
For students without a master's degree	78 hours minimum

Core Requirements **3 hours minimum**

[c1]

- A maximum of 3 credits (9 credits for students entering without a master's degree) of independent study may be applied to meet the coursework requirement
- Students entering without a master's degree are required to complete an additional 30 graduate hours.
- Students work with a Major Professor and a Ph.D. committee to determine their course of study
- No credits of directed research or graduate instruction methods can be applied to meet the coursework requirement.
- Up to 30 credits of coursework from an approved master's degree may be applied to meet the coursework requirements.

Concentration Requirements **15 hours minimum**

Students select from the following Concentrations and work with a Major Professor and a Ph.D. committee to determine their course of study.

ENVIRONMENTAL ENGINEERING (ENV)

- ENV 6002 Physical Chemical Principles 3
- EES 6107 Biological Principles 3
- ENV 6666 Aquatic Chemistry 3
- CGN 6933 Green Engineering for Sustainability ***or*** 3
  CGN 6933 Green Infrastructure for Sustainable Communities ***o*** 3
  CGN 6933 Sustainable Development Engineering 3
- 3 additional credits of coursework in Environmental Engineering

GEOTECHNICAL ENGINEERING GTL

- Foundation Engineering 3
- Finite Element Analysis 3
- 9 additional credits of coursework in Geotechnical Engineering

Interdisciplinary Transportation (ITP)

MATERIALS ENGINEERING AND SCIENCE (MTL)

- CGN 6933 Concrete Construction Materials 1-4
- CGN 6720 Electrochemical Diagnostic Techniques 3
- CGN 6933 Structural Life Prediction 1-4
- CGN 6933 Corrosion of Materials 1-4

- ECH 6931 Characterization of Materials (2011) 1-3
- 3 additional credits of coursework in Materials Engineering and Science or related areas

STRUCTURAL ENGINEERING (STR)

- See department website

TRANSPORTATION ENGINEERING (TPT)

- TTE 5205 Traffic Systems Engineering 3
- TTE 5501 Transportation Planning and Economics 3
- TTE 6507 Travel Demand Modelling 3
- 6 additional credits of coursework in Transportation Engineering or related areas

WATER RESOURCES (WRS)

- a minimum of 4 courses (12 credits from the following list:

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

- 3 additional credits in WR engineering or related areas

Dissertation Requirements **20 hours minimum**

- CGN 7980 Dissertation (20 hrs minimum)

Additional Requirements **10 hours minimum**

- 10 credits of additional coursework, graduate instruction methods, dissertation, or directed research are required.

COURSES

http://www.ugs.usf.edu/sab/sabs.cfm 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:	June 1
Spring:	October 15
Summer:	no admit

International Students in the U.S.:

Fall:	June 1
Spring:	October 15
Summer:	no admit

International Students Outside the U.S.

Fall:	May 1
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

CONTACT INFORMATION

College:	Engineering
Department:	Computer Science and Engineering
Contact Information:	www.grad.usf.edu
Other Resources:	www.usf4you.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, bioinformatics, computer architecture, graphics, networks, computer vision, distributed systems, expert systems, formal verification, human-computer interface, image processing, pattern recognition, robotics, software engineering, software security, 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 may be waived for M.S.-degree applicants with an undergraduate degree from an ABET-accredited United States university.

- The GRE is required for all Ph.D. and M.S. applicants who apply for TA, RA, GA, or Fellowships. The median GRE scores of recently admitted students include 770 on the Quantitative portion and a Quantitative + Verbal Total of 1220. 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.
- Minimum grade point average (GPA) of B or equivalent for all coursework completed during the last two years of undergraduate program
- Minimum TOEFL score for international students is 550 (paper-based total) or 213 (computer-based total) or 79 (internet-based total).
- 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.

For teaching assistantship consideration, applicants from non-English speaking countries must take and pass the speaking component of the internet-based TOEFL with a score of 26 or above.

DEGREE PROGRAM REQUIREMENTS

Total Minimum Hours: **30**

Core Requirements: **9 hrs**
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 should pick 15 hours from the following and non-thesis option should pick 21 hours from the following: .

CAP 5400	Digital Image Processing	3
CAP 5625	Introduction to Artificial Intelligence	3
CAP 5682	Expert and Intelligent Systems	3
CAP 5771	Data Mining	3
CAP 6100	Human Computer Interface	3
CAP 6415	Computer Vision	3
CAP 6455	Advanced Robotic Systems	3
CAP 6615	Neural Networks	3

CAP 6672	Robot Intelligence and Computer Vision	3
CAP 6736	Geometric Modeling	3
CDA 5416	Introduction to Computer-Aided Verification	3
CIS 6900	Independent Study	1-19
CIS 6930	Special Topics	1-5
CIS 6940	Graduate Instruction Methods	1-4
CIS 6971	Thesis: Masters	2-19
CNT 6215	Computer Networks	3
COP 6621	Programming Languages and Translation	3
EEL 5771	Introduction to Computer Graphics I	3
EEL 6706	Testing and Fault Tolerance in Digital Systems	3
EEL 6766	Advanced Computer Architecture	3

Thesis Option:
The thesis option requires completion of 24 credit hours of CSE graduate-level courses (9 credit hrs core and 15 hrs of electives) and 6 credit hours of thesis. At least 16 credit hours must be at the 6000 level. Maximum of 3 hours of Independent Study and maximum of 3 hours of one-hour seminar courses may be applied.

Non-Thesis Option:
The non-thesis option requires 30 credit hours, with 9 credit hours core, 21 hours of electives. At least 16 credit hours must be at the 6000 level. Maximum of 3 hours of Independent Study and maximum of 3 hours of one-hour seminar courses may be applied. Students must make a grade of "B" or higher in the core courses.

Additional Requirements:
For the thesis option, 6 hours of the thesis (CIS 6971 Thesis: Masters) should be in computer engineering related problems, as determined by the Major Professor and documented in the Plan of Work.

For Non-Thesis Option, 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.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

COMPUTER SCIENCE PROGRAM

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

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	June 1
Spring:	October 15
Summer:	No admit

International Students in the U.S.:

Fall:	June 1
Spring:	October 15
Summer:	no admit

International Students Outside the U.S.:

Fall:	May 1
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): ECC EN

CONTACT INFORMATION

College: Engineering
Department: Computer Science and Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.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, bioinformatics, computer architecture, graphics, networks, computer vision, distributed systems, expert systems, formal verification, human-computer interface, image processing, pattern recognition, robotics, software engineering, software security, 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 will be waived for M.S.-degree applicants with an undergraduate degree from an ABET-accredited United States university.

- The GRE is required for all Ph.D. and M.S. applicants who apply for TA, RA, GA, or Fellowships. The median GRE scores of recently admitted students include 770 on the Quantitative portion and a Quantitative + Verbal Total of 1220. 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. Minimum grade point average (GPA) of "B" (or equivalent) for all coursework completed during the last two years of undergraduate program
- Minimum TOEFL score for international students is 550 (paper-based total) or 213 (computer-based total) or 79 (internet-based total)
- 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.
- For teaching assistantship consideration, applicants from non-English speaking countries must take and pass the speaking component of the internet-based TOEFL with a score of 26 or above.

DEGREE PROGRAM REQUIREMENTS

Total Minimum hours: **30**

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 should pick 15 hours from the following and non-thesis option should pick 21 hours from the following:

CAP 5400	Digital Image Processing	3
CAP 5625	Introduction to Artificial Intelligence	3
CAP 5682	Expert and Intelligent Systems	3
CAP 5771	Data Mining	3
CAP 6100	Human Computer Interface	3
CAP 6415	Computer Vision	3
CAP 6455	Advanced Robotic Systems	3
CAP 6615	Neural Networks	3
CAP 6672	Robot Intelligence and Computer Vision	3
CAP 6736	Geometric Modeling	3
CDA 5416	Introduction to Computer-Aided Verification	3
CIS 6900	Independent Study	1-19
CIS 6930	Special Topics	1-5
CIS 6940	Graduate Instruction Methods	1-4
CIS 6971	Thesis: Master's	2-19
CNT 6215	Computer Networks	3
COP 6621	Programming Languages and Translation	3
EEL 5771	Introduction to Computer Graphics I	3

EEL 6706	Testing and Fault Tolerance in Digital Systems	3
EEL 6766	Advanced Computer Architecture	3

Thesis Option:
The thesis option requires the completion of 24 credit hours of CSE graduate-level courses (9 credit hrs core and 15 hrs of electives) and 6 credit hours of thesis. At least 16 credit hours must be at the 6000 level. Maximum of 3 hours of Independent Study and maximum of 3 hours of one-hour seminar courses may be applied.

Non-Thesis Option:
The non-thesis option requires 30 credit hours, with 9 credit hrs core, 21 hrs of electives. At least 16 credit hours must be at the 6000 level. Maximum of 3 hours of Independent Study and maximum of 3 hours of one-hour seminar courses may be applied.

Additional Requirements:
For the thesis option, 6 hours of the thesis (CIS 6971 Thesis: Masters) should be in computer science related problems, as determined by the Major Professor and documented in the Plan of Work.

For Non-Thesis Option, at least 6 hrs of electives should be in the following topic areas: advanced algorithms, compilers, databases, parallel computing and distributed systems, security, programming languages, or software engineering, as determined by the Graduate Program Director and documented in the Plan of Work.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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:

Fall:	January 2
Spring:	July 1
Summer:	No admit

Minimum Total Hours: 72/33
Program Level: Doctoral
CIP Code: 14.0901
Dept Code: ESB
Program (Major/College): CSE EN

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, bioinformatics, computer architecture, graphics, networks, computer vision, distributed systems, expert systems, formal verification, human-computer interface, image processing, pattern recognition, robotics, software engineering, software security, 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. applicants. If a candidate is admitted to the M.S. program without GRE and later decides to join the Ph.D. program then the GRE will be required. For reference, the median GRE scores of recently admitted students were Quantitative of 770 and Verbal of 430 or higher.
- Minimum grade point average (GPA) of B average (or equivalent) for all coursework completed during the last two years of undergraduate program
- Minimum TOEFL score for international students is 550 (paper-based total) or 213 (computer-based total) or 79 (internet-based total).
- 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 skillsThe 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.
- For teaching assistantship consideration, applicants from non-English speaking countries must take and pass the speaking component of the internet-based TOEFL with a score of 26 or above.

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 math/Algorithms, and the student's specialty area.
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.

Coursework

Total Program hours **72 minimum (post-bacc)**
A minimum of 72 semester hours including dissertation hours beyond the baccalaureate degree are required of all Ph.D. students

Core Requirements **48 hours minimum**
The distribution of these hours is as follows:

- At least 33 semester 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. An additional 4 hours is required, either through completion of additional courses or through additional dissertation hours.
- Up to 15 semester hours of independent study/directed research.
- Students select the specific courses in conjunction with the advisor and committee.

Departmental Course Options (examples)

COP 6611	Operating System	3
EEL 6764	Principles of Computer Architecture	3
COT 6405	Introduction to the Theory of Algorithms	3
CAP 5400	Digital Image Processing	3
CAP 5625	Introduction to Artificial Intelligence	3
CAP 5682	Expert and Intelligent Systems	3
CAP 5771	Data Mining	3
CAP 6100	Human Computer Interface	3
CAP 6415	Computer Vision	3
CAP 6455	Advanced Robotic Systems	3
CAP 6615	Neural Networks	3
CAP 6672	Robot Intelligence and Computer Vision	3
CAP 6736	Geometric Modeling	3
CDA 5416	Introduction to Computer-Aided Verification	3
CIS 6900	Independent Study	1-19
CIS 6930	Special Topics	1-5
CIS 6940	Graduate Instruction Methods	1-4
CIS 6971	Thesis: Master's	2-19
CIS 7910	Directed Research	1-19
CIS 7980	Dissertation: Doctoral	2-19
CNT 6215	Computer Networks	3
COP 6621	Programming Languages and Translation	3
EEL 5771	Introduction to Computer Graphics I	3
EEL 6706	Testing and Fault Tolerance in Digital Systems	3
EEL 6766	Advanced Computer Architecture	3

Doctoral Screening/Qualifying Examination

Students must pass the Ph.D. Qualifying examinations in Computer Architecture, Operating Systems, and Math/Algorithms.

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 four 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://www.ugs.usf.edu/sab/sabs.cfm

ELECTRICAL ENGINEERING PROGRAM

Master of Engineering (M.E.) Degree

DEGREE INFORMATION

Program Admission Deadlines:

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

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

Also offered as:

Dual M.S. Degree in Physics/Engineering;
Joint degree with the Industrial Engineering (this permits simultaneous specialization in an Electrical Engineering discipline with an MSEM minor.)

CONTACT INFORMATION

College: Engineering
Department: Electrical Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.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. The M.E. degree is an option for students whose B.S. Degree is in an engineering discipline other than Electrical engineering. Both thesis and course work only master's options are available.

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 GPA of 3.0
- GRE Required (Q>700, V+Q>1100)
- Three Letters of Recommendation
- TOEFL score of 550; 213 on computerized test; 79 internet based exam

DEGREE PROGRAM REQUIREMENTS

Thesis Option

Required Courses	24
Thesis hours	6
Total hours	30

Course Work Only Option

Required courses	30

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 6545 Random Processes	3

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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

Also offered as:

Dual M.S. Degree in Physics/Engineering;
Joint degree with the Industrial Engineering (this permits simultaneous specialization in an Electrical Engineering discipline)

CONTACT INFORMATION

College: Engineering
Department: Electrical Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.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 Required (Q>700, V+Q>1100)
- Three Letters of Recommendation
- Educational experience required
- TOEFL score of 550; 213 on computerized test; 79 on internet based exam

DEGREE PROGRAM REQUIREMENTS

Thesis Option

Required Courses	24 hours
Required Thesis Hours	6 hours
Total hours:	30 hours

Course work only

Required Courses	30 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 6545 Random Processes	3
PHC 6050 Bio-Statistics	3

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

EEL-6426	RF/MW Ckts I and EEL-6427 RF/MW Ckts II
EEL-6486	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 Ckts and EEL-6936 Adv Monolithic MW Ckts
EEL-6534	Digital Communication Systems and EEL-6509 Satellite Comm. or EEL-6593 Mobile and Personal Comm
BME 6000	Intro to Biomedical Eng and GM-7930 Anatomy for Bio Engineers or EEL-6936 Bio Image Processing
EEL-6935	Bioelectricity and EEE-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 EEE-6936 VHDL or EEE-6936 Low Power VLSI Design
EEE-5382	Physical Basis of Microelectronics and EEE-6353 Semiconductor Device Theory I
EEE-6353	Semi Conductor Device Theory I and EEE-6358 Semi Conductor Device Theory II
EEE 5356	Integrated Circuit Technology and EEE-6936 Adv Integrated Circuit Technology
EEE-6355	Compound Semiconductor Technology and EEE-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

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

ELECTRICAL ENGINEERING 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: 14.1001
Dept Code: EGE
Program (Major/College): EEL EN

Also offered as:
Dual M.S. Degree in Physics/Engineering;
Joint degree with the Industrial Engineering (this permits simultaneous specialization in an Electrical Engineering discipline with an MSEM minor.)

CONTACT INFORMATION

College: Engineering
Department: Electrical Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.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. Non-thesis master's studies, comprising 30 credit hours of coursework without a thesis are possible. The M.S.E.S. Degree is an option for students whose B.S. Degree is in a discipline other than 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.

- Minimum 3.00 GPA
- GRE Required (Q>700, V+Q>1100)

- Three Letters of Recommendation
- TOEFL score of 550; 213 on computerized test; 79 internet based exam.

DEGREE PROGRAM REQUIREMENTS

Thesis Option

Required Courses	24 hours
Required Thesis Hours	6 hours
Total hours:	30 hours

Course work only

Required Courses	30 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 6545 Random Processes	3
PHC 6050 Bio-Statistics	3

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

EEL-6426	RF/MW Ckts I and EEL-6427 RF/MW Ckts II
EEL-6486	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 Ckts and EEL-6936 Adv Monolithic MW Ckts
EEL-6534	Digital Communication Systems and EEL-6509 Satellite Comm. or EEL-6593 Mobile and Personal Comm
BME 6000	Intro to Biomedical Eng and GM-7930 Anatomy for Bio Engineers or EEL-6936 Bio Image Processing
EEL-6935	Bioelectricity and EEE-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.
EELE-5344	Digital CMOS VLSI Design and EEE-6936 VHDL or EEE-6936 Low Power VLSI Design
EEE-5382	Physical Basis of Microelectronics and EEE-6353 Semiconductor Device Theory I
EEE-6353	Semi Conductor Device Theory I and EEE-6358 Semi Conductor Device Theory II
EEE 5356	Integrated Circuit Technology and EEE-6936 Adv Integrated Circuit Technology
EEE-6355	Compound Semiconductor Technology and EEE-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

COURSES

See **http://www.ugs.usf.edu/sab/sabs.cfm**

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: 90/60
Program Level: Doctoral

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

CONTACT INFORMATION

College: Engineering
Department: Electrical Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.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 (Q> 700, Q+V>1100)
- TOEFL score of 550; 213 on computerized test; 79 internet based exam...
- Three (3) Letters of Reference
- Statement of Purpose

DEGREE PROGRAM REQUIREMENTS

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

Concentration Coursework Minimum 27 hours formal regularly scheduled graduate course work in the engineering area of concentration (not necessarily electrical engineering courses); at least 20 of these hours at the 6000 level.	**27 hours**
Mathematics and Statistics Minimum 8 hours in mathematics or statistics courses (not necessarily math department courses).	**8 hours**
Electives Minimum 8 hours outside the major area of concentration (these could be other courses in the Department).	**8 hours**
Courses Minimum 60 hours total course work (including i-iii above) beyond B.S. degree (EEL 6908-002 forward), directed research (EEL 6910-001 forward), seminars (EEL 6932-5). **Each professor will have his/her own section for independent study and directed research section.**	
Dissertation Minimum 20 hours dissertation (EEL 7980). **Each Professor will have his/her own section for dissertation hours.**	**20 hours**
Total hours:	Minimum 90 hours total beyond B.S. degree

Please contact Electrical Engineering for information

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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: 14.3502
Dept Code: EGS
Program (Major/College): EMA EN

CONTACT INFORMATION

College: Engineering
Department: **Industrial & Management Systems Engineering**

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.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.

EIN 6179 Advanced TQM Methods: Six Sigma
EIN 6936 Benchmarking
ESI 5522 Computer Simulation
EIN 6217 Construction Safety Engineering
EIN 6xxxCreativity 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://www.ugs.usf.edu/sab/sabs.cfm

ENGINEERING SCIENCE (5-YEAR) 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: ESB
Program (Major/College): EGC EN

Also offered as:
5 year M.S.E.S. program -available in each department

CONTACT INFORMATION

College: Engineering
Department: Chemical & Biomedical Engineering, Civil & Environmental Engineering, Electrical Engineering, Industrial & Management Systems Engineering, Mechanical Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.usf.edu

PROGRAM INFORMATION

This program is designed to meet the needs of students who wish to pursue studies in interdisciplinary engineering areas. A strong foundation in rigorous scientific and engineering principles and practice is expected. It is normally awarded for completion of a thesis 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
Check the admission requirements of the host department; student's interest of study.

DEGREE PROGRAM REQUIREMENTS

Each department in the College is authorized to offer the Master of Science in Engineering Science and the Master of Science in Engineering. These degrees are individually tailored to student needs. Please check with the individual department for requirements.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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: 90
Program Level: Doctoral
CIP Code: 14.0101
Dept Code: DEA
Program (Major/College): EGC EN

Concentrations:
Physics (ENP)

CONTACT INFORMATION

College: Engineering
Department:

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.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

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://www.ugs.usf.edu/sab/sabs.cfm

ENGINEERING SCIENCE / PHYSICS PROGRAM

Joint Degree Program
Master of Science (M.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:	ESB
Program (Major/College):	EGC EN

Also offered as:
Interdisciplinary - Ph.D. in Engineering Science

CONTACT INFORMATION

Colleges:	Engineering and Arts and Sciences
Departments:	Engineering / Physics
Contact Information:	www.grad.usf.edu
Other Resources:	www.usf4you.usf.edu

PROGRAM INFORMATION

Contact the program for information. Under an interdisciplinary arrangement with the College of Arts and Sciences and the College of Engineering, the physics graduate students may obtain a Ph.D. in Engineering under the dissertation direction of a Physics Director of Graduate Studies.

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
See listings for Physics and Engineering Science.

DEGREE PROGRAM REQUIREMENTS

Contact the program for information.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

ENGINEERING SCIENCE / PHYSICS PROGRAM

Joint Degree 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: 14.0101
Dept Code: DEA
Program (Major/College): EGC EN
Concentration:
Physics (ENP)

CONTACT INFORMATION

Colleges: Engineering and Arts and Sciences
Department: Engineering / Physics

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.usf.edu

PROGRAM INFORMATION

Contact the program for information. Under an interdisciplinary arrangement with the College of Arts and Sciences and the College of Engineering, the physics graduate students may obtain a Ph.D. in Engineering under the dissertation direction of a Physics Director of Graduate Studies

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
See listings for Physics and Engineering Science.

DEGREE PROGRAM REQUIREMENTS

Contact the program for information.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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

CONTACT INFORMATION

College:	Engineering
Department:	Civil and Environmental Engineering
Contact Information:	www.grad.usf.edu
Other Resources:	www.usf4you.usf.edu

PROGRAM INFORMATION

The M.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. Many of the department's graduate courses are offered on weekday evenings, which permits part-time and FEEDS (Florida Engineering Education Delivery System online) students the opportunity to seek a graduate degree.

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; and groundwater hydrology. Other focus areas include water reuse, green engineering, renewable energy, fate of emerging contaminants, and humanitarian engineering that has a developing world focus. Graduates of the programs are prepared for careers with 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 equipment for chemical and biological research. Equipment includes an ion chromatograph, atomic absorption spectrophotometer, several gas chromatrographs, HPLC, ICPs, 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

- Overall GPA 2.75; GPA in major 3.00

- GRE 650Q; 350V with3.0 AW or valid fundamentals of engineering (FE) certificate preferred. 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) 550 or 213 (CBT).
- Exceptions made on a case-by-case basis where warranted.

DEGREE PROGRAM REQUIREMENTS

The minimum coursework requirement for the Master of Engineering degrees is 30 credit hours. No research thesis is required. All students must take four principles courses in physical/chemical principles; biological principles; aquatic chemistry, and sustainability and two environmental engineering process elective courses. An international capstone design course is available that includes a field experience in the developing world.

Core Courses (required)

ENV 6002 Physical Chemical Principles	3
EES 6107 Biological Principles of Environmental Engineering	3
ENV 6666 Aquatic Chemistry	3
CGN 6933 Green Engineering for Sustainability ***or***	3
CGN 6933 Green Infrastructure for Sustainable Communities) ***or***	3
CGN 6933 Sustainable Development Engineering	3

Elective Courses (12 additional courses required, two courses must be from this list)

ENV 6519 Physical/Chemical Processes	3
CGN 6933 Environmental Biotechnology	3
ENV 6105 Air Pollution	3

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

ENVIRONMENTAL ENGINEERING 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:	14.1401
Dept Code:	EGX
Program (Major/College):	EVE EN

CONTACT INFORMATION

College:	Engineering
Department:	Civil and Environmental Engineering
Contact Information:	www.grad.usf.edu
Other Resources:	www.usf4you.usf.edu

PROGRAM INFORMATION

The M.S.E.S. degree provides a student with the opportunity to earn the advanced degree by combining coursework and a research thesis. This program is typically open to students who have a first degree in science or mathematics but do not have an accredited first degree in engineering and are not completing makeup coursework that would be requireed for the M.S. or M.E. degrees. A Master's International Program in Civil & Environmental Engineering allows students to combine their graduate education and research with engineering service in the Peace Corps. Many of the department's graduate courses are offered on weekday evenings, which permits part-time and FEEDS (Florida Engineering Education Delivery System online) students the opportunity to seek a graduate degree.

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; and groundwater hydrology. Other focus areas include water reuse, green engineering, renewable energy, fate of emerging contaminants, and humanitarian engineering that has a developing world focus. Graduates of the programs are prepared for careers with 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 equipment for chemical and biological research. Equipment includes an ion chromatograph, atomic absorption spectrophotometer, several gas chromatrographs, HPLC, ICPs, 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

- Overall GPA 2.75; GPA in major 3.00
- GRE 650Q; 350V with 3.0 AW
- TOEFL (international applicants only) 550 or 213 (CBT).
- Exceptions made on a case-by-case basis where warranted.

DEGREE PROGRAM REQUIREMENTS

The programs consist of a minimum of 24 credit hours of coursework and 6 credit hours of thesis. All students must take four principles courses in physical/chemical principles; biological principles; aquatic chemistry, and sustainability and two environmental engineering process courses. An international capstone design course is available that includes a field experience in the developing world.

Core Courses (required)

ENV 6002 Physical Chemical Principles	3
EES 6107 Biological Principles of Environmental Engineering	3
ENV 6666 Aquatic Chemistry	3
CGN 6933 Green Engineering for Sustainability ***or***	3
CGN 6933 Green Infrastructure for Sustainable Communities ***or***	3
CGN 6933 Sustainable Development Engineering	3

Elective Courses (12 additional courses required based on approval of graduate committee)

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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

CONTACT INFORMATION

College:	Engineering
Department:	Civil and Environmental Engineering
Contact Information:	www.grad.usf.edu
Other Resources:	www.usf4you.usf.edu

PROGRAM INFORMATION

The M.S. 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. A Master's International Program in Civil & Environmental Engineering allows students to combine their graduate education and research with engineering service in the Peace Corps. Many of the department's graduate courses are offered on weekday evenings, which permits part-time and FEEDS (Florida Engineering Education Delivery System online) students the opportunity to seek a graduate degree.

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; and groundwater hydrology. Other focus areas include water reuse, green engineering, renewable energy, fate of emerging contaminants, and humanitarian engineering that has a developing world focus. Graduates of the programs are prepared for careers with 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 chromatrographs, HPLC, ICPs, 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

- Overall GPA 2.75; GPA in major 3.00

- GRE 650Q; 350V with 3.0AW or valid fundamentals of engineering (FE) certificate preferred. 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) 550 or 213 (CBT).
- Exceptions made on a case-bay-case basis where warranted.

DEGREE PROGRAM REQUIREMENTS:

The programs consist of a minimum of 24 credit hours of coursework and 6 credit hours of thesis. All students must take four principles courses in physical/chemical principles; biological principles; aquatic chemistry, and sustainability and two environmental engineering process courses. An international capstone design course is available that includes a field experience in the developing world.

Core Courses (required)

ENV 6002 Physical Chemical Principles	3
EES 6107 Biological Principles of Environmental Engineering	3
ENV 6666 Aquatic Chemistry	3
CGN 6933 Green Engineering for Sustainability ***or***	3
CGN 6933 Green Infrastructure for Sustainable Communities) ***or***	3
CGN 6933 Sustainable Development Engineering	3

Elective Courses (12 additional courses required based on approval of graduate committee)

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

INDUSTRIAL ENGINEERING PROGRAM

Master of Industrial Engineering (M.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: EGS
Program (Major/College): EIE EN

Concentrations:
Engineering Management (IMA)
Quantitative Analysis (QAS)

CONTACT INFORMATION

College: Engineering
Department: Industrial and Management Systems Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.usf.edu

PROGRAM INFORMATION

The Department participates in the College's M.S.E. and M.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 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 with a 3.0/4.0 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

DEGREE PROGRAM REQUIREMENTS

Total of 30 approved credit hours, including the following 4 core courses:

Required Core Courses:

ESI 6213	Stochastic Decision Making	3
ESI 5470	Manufacturing Systems Analysis	3
ESI 6247	Statistical Design Models	3
ESI 6491	Linear Programming and Network Optimization	3

Elective Courses:

ESI 5522	Computer Stimulation	3
EIN 6119	Decision Support Systems	3
ESI 6605	Engineering Data Mining	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	Internationall 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
ESI 6353	Risk and Decision Analysis	

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

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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: 14.1401
Dept Code: EGX
Program (Major/College): EVE EN

Concentrations:
Engineering Management (IMA)
Quantitative Analysis (QAS)

CONTACT INFORMATION

College: Engineering
Department: Industrial and Management Systems Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.usf.edu

PROGRAM INFORMATION

The department participates in the College's M.S.E. and M.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 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 with a 3.0/4.0 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

Minimum of 24 credit hours of approved course work and six credit hours of thesis including the following 4 core courses:

Required Core Courses:

ESI 6213	Stochastic Decision Making	3
ESI 5470	Manufacturing Systems Analysis	3
ESI 6247	Statistical Design Models	3
ESI 6491	Linear Programming and Network Optimization	3

Elective Courses:

ESI 5522	Computer Stimulation	3
EIN 6119	Decision Support Systems	3
ESI 6605	Engineering Data Mining	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
ESI 6353	Risk and Decision Analysis	

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

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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

Concentrations:

Engineering Management (IMA)
Manufacturing Systems (MFS)
Quantitative Analysis (QAS)

CONTACT INFORMATION

College: Engineering
Department: Industrial and Management Systems Engineering

Contact Information: www.grad.usf.edu
Other Resources: www.usf4you.usf.edu

PROGRAM INFORMATION

Contact the department for information.

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

Minimum of 90 credit hours beyond BS degree. Minimum of 60 credit hours of approved course work and 20 credit hours of research. Contact the department for information.

Must have 2 (at least one accepted, the other submitted) referred journal publication before graduation.
Must take the following 4 core courses:

Required Core Courses: **12 hours minimum**

ESI 6213	Stochastic Decision Making	3
ESI 5470	Manufacturing Systems Analysis	3
ESI 6247	Statistical Design Models	3
ESI 6491	Linear Programming and Network Optimization	3

Elective Courses:

ESI 5522	Computer Stimulation	3
EIN 6119	Decision Support Systems	3
ESI 6605	Engineering Data Mining	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	Internationall 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
ESI 6353	Risk and Decision Analysis	3
ESI 6353	Risk and Decision Analysis	

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://www.ugs.usf.edu/sab/sabs.cfm

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:	PHY/All Engineering Depts. except Computer Science and Engineering
Program (Major/College):	MSE AS or MSE EN

CONTACT INFORMATION

Colleges:	Arts and Sciences Engineering
Departments:	Physics Chemical & Biomedical Eng Civil Engineering Electrical Engineering Industrial Engineering Mechanical Engineering
Contact Information:	www.grad.usf.edu
Other Resources:	www.usf4you.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. 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

- Applicants should have a Bachelor's degree in Engineering (Chemical, Mechanical, Industrial, Electrical, Civil, Materials Science, Ceramic, Metallurgy, Manufacturing, Polymer and related disciplines) or Natural Sciences (Physics, Chemistry or Biology) from an accredited institution.
- An applicant must have a cumulative GPA of 3.0 or higher during undergraduate studies.
- For specific GRE requirements all applicants should contact the admitting department
- At least 2 letters of reference
- Statement of objectives/purpose must be included with the application.

DEGREE PROGRAM REQUIREMENTS

Students will require a minimum of 30 total credit hours to qualify for the M.S. degree in MSE. The degree may be completed within 12 months by taking 12 credit hours in each of the fall and spring semesters followed by 6 credit hours during the summer. Students must take 15 credit hours of core courses (including a maximum of 3 credit hours for an interdisciplinary Graduate Materials Seminar), 9 hours of elective courses for the thesis option which requires an additional 6 hours of thesis research. For the non-thesis option, 6 additional hours of elective courses would be required in lieu of thesis hours. Courses taken for this program cannot be used to fulfill requirements of another Master's degree program.

Core Requirements (6 credit hours)

EML/ECH 6931 /PHY 6938	Materials Characterization	3
PHY/ENG 6932	Graduate Seminar Series in MSE	Min 2, Max 3

And three of the following five courses (9 credit hours):

EML/ECH 6930	Advanced Materials	3
PHY 6938	Materials Physics I	3
PHY 6938	Materials Physics 2	3
ECH 6930	Diffusion, Transport and Kinetics in Solid Materials	3
PHZ 5405	Introduction to Solid State Physics	3

Elective Courses (9 credit hours)

Thesis Hours (6 credit hours)
For Non-thesis Option six additional credit hours of elective courses is required in lieu of thesis hours.

Elective Courses:

EEE 6318	Characterization of Semiconductors	3
EEE 6353, 6358	Semiconductor Device Theory I and II	3, 3
EEL 6355	Compound Semiconductor Technology	3
PHY 6446	Lasers and Applications	3
PHY 6447	Physics of Lightwave Devices and Applications	3
EEL 6935	Principles of Semiconductor Device Modeling I, II	3, 3
EEE 6226	Microsystems and MEMS Technology	3
PHZ 5156C	Computational Physics I	3
EEE 6273	Chemical/Biological Sensors and Microfabrication	3
ECH 6749	Biomaterials and Biocompatibility	3
PHZ 6426	Solid State Physics II	3
CGN 6933	Corrosion of Engineering Materials	3
CGN 6933	Durability Issues in Cementitious Materials	3
EML 6930	Failure Mechanisms in Material	3
PHZ 6136	Physical Applications of Group Theory	3
EEE 6425	Introduction to Nanotechnology	3
ECH 6930/EEL 6935	Wide Band Gap Semiconductor Technology I	3
ECH 6931/EEL 6935	Wide Band Gap Semiconductor Technology II	3
CES 6107C	Advanced Mechanics of Materials II	3
EEL 6935	Characterization of Defects in Electronic Materials	3
EIN 6935	Statistical Quality Control	3
ESI 6247	Statistical Design Models	3
EML 6232	Composite Laminated Materials	3
EML 6653	Applied Elasticity	3
EEE 5382	Physical Basis of Microelectronics	3
ECH 6230	Advanced Mass Transfer	3
EEE 5356	Integrated Circuit Technology	3
EEL 6935	Advanced I.C. Technology	3
EEL 6936	Bioelectricity	3
EML 6930	Cellular Engineering	3
EIN 6934	Introduction to Haptic Interfaces for Virtual Environments	3

EML 6930	Micro and Nano Manufacturing	3
EEL 6935	Materials for Energy Applications	3
EEL 6936	SiC Technology	3

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

MECHANICAL ENGINEERING PROGRAM

Master of Engineering (M.E.) Degree

DEGREE INFORMATION

Program Admission Deadlines:

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

Minimum Total Hours: 33
Program Level: Masters
CIP Code: 14.1901
Dept Code: EGR
Program (Major/College): EME EN

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

- All applicants must take the GRE.
- A minimum score of 350V, 700Q must be obtained **or** the student must have a grade point average (GPA) of 3.0/4.0 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 examination.

DEGREE PROGRAM REQUIREMENTS

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 or design project program.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

MECHANICAL ENGINEERING PROGRAM

Master of Mechanical Engineering (M.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

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

- All applicants must take the GRE.
- A minmum score of 350V, 700Q must be obtained **OR** the student must have a grade point average (GPA) of 3.0/4.0 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 examination.

DEGREE PROGRAM REQUIREMENTS

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 or design project program.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

MECHANICAL ENGINEERING 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: 14.1901
Dept Code: EGR
Program (Major/College): EME EN

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
All applicants must take the GRE. A minmum score of 350V, 700Q must be obtained or the student must have a grade point average (GPA) of 3.0/4.0 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 examination.

DEGREE PROGRAM REQUIREMENTS

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 or design project program.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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

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

- All applicants must take the GRE.
- A minmum score of 350V, 700Q must be obtained or the student must have a grade point average (GPA) of 3.0/4.0 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 examination.

DEGREE PROGRAM REQUIREMENTS

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 or design project program.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm

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

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 minmum of 6 credit hours from the Mechanics and Systems area.
- Minimum requirements for admission are 400V, 750Q on the GRE .

DEGREE PROGRAM REQUIREMENTS

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 or design project program.

COURSES

See http://www.ugs.usf.edu/sab/sabs.cfm