Accelerated B.S. in Biomedical Sciences and M.A.T. in Science Education

Description

This program intends for students to complete a B.S. in Biomedical Sciences (College of Arts and Sciences) and M.A.T. in Science Education (College of Education) over the span of five years. Students completing this program will be eligible for high school and/or middle school science teacher certification. Completion of this program requires students to complete 12 credit hours toward the M.A.T. in Science Education during their senior year in the Biomedical Sciences major.

This accelerated program shares 12 credit hours between already existing degrees:
- B.S. in Biomedical Sciences
- M.A.T. in Science Education

Target Students and Expected Outcomes

The accelerated B.S. in Biomedical Sciences to M.A.T. in Science Education program is a collaborative effort between the College of Arts and Sciences and the College of Education. This program is an attractive and viable career path for students majoring in Biomedical Sciences that results in secondary science teacher certification. Students who complete this program receive the necessary science content and pedagogy coursework to be highly qualified science teachers at the secondary level.

Admission Requirements

For admission to the program, a student must:
1. Have completed 15 hours in the B.S. in Biomedical Sciences major upon applying and thirty (30) semester hours in science (includes twenty-one (21) credit hours in a science concentration (e.g., chemistry, biology, physics) plus 9 credit hours in minor science content area) with associated laboratory experiences to be fully admitted as a graduate student in the M.A.T. Science Education Program. Evidence of successfully completing all sections of the General Knowledge Test (GKT) is also required for full admission to the graduate program
2. Have a minimum 3.0 GPA overall; and
3. Have a minimum undergraduate 3.25 GPA in the major.

Timeline and Benchmarks:

1. To be considered for acceptance into the Accelerated B.S. Biomedical Sciences/M.A.T. Science Education program, students must have completed a minimum of 15 credit hours in the Biomedical Science undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.0 overall, and a minimum GPA of 3.25 in the major and passing scores on all sections of the General Knowledge Test (GKT) to be eligible for the accelerated degree program. You can find information on the General Knowledge Test on the Florida Teacher Certification section of the following webpage: http://www.fl.nesinc.com/.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S. and M.A.T. programs will review the applications and approve the nominations. All applications require the approval of USF’s Graduate School, the College of Education’s Graduate Program, and the Department of Chemistry’s Undergraduate Program.
4. To be promoted to graduate status, students must meet all admission requirements of the M.A.T. in Science Education in the College of Education. Specifically, the following materials must be submitted:
   - Undergraduate transcripts; and evidence of possessing a degree in a science discipline (biology, chemistry, physics, geology, etc.) that is taught in a middle or high school, or comparable coursework in a science teaching field acceptable to the program faculty.
   - A minimum of 21 hours in a major science content area of concentration (e.g., chemistry, biology, physics) plus 9 hours in minor science content area are required to teach secondary school.
     - Note, to teach secondary science in a specialty area (e.g., chemistry, biology, physics) the State of Florida requires: A bachelor’s or higher degree with thirty (30) semester hours in science to include twenty-one (21) semester hours in that specialty area with associated laboratory experiences.
   - Documentation of GKT scores.
5. Students must earn a minimum of a “B” (3.00) in all graduate courses. Failure to earn at least a “B” in a graduate course will result in academic review by the graduate program. Failure to maintain a minimum 3.0 GPA will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
Shared Courses (12 credit hours)
The following courses will satisfy 12 credit hours of upper-level coursework:
SCE 5325 Methods of Middle Grades Science Education
SCE 5337 Methods of Secondary Science Education
SCE 6456 Teaching Secondary School Physical and Earth Science
SCE 6938 Topics in Science Education: Field Practicum

Undergraduate Degree Requirements for the B.S. in Biomedical Sciences (61-62 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (Tier 1) (40 credit hours)
Required Biology Courses (8 credit hours):
- BSC 2010 Cellular Processes
- BSC 2010L Cellular Processes Laboratory
- BSC 2011 Biodiversity
- BSC 2011L Biodiversity Laboratory

Required Chemistry Courses (18 credit hours):
- CHM 2045 General Chemistry I
- CHM 2045L General Chemistry I Laboratory
- CHM 2046 General Chemistry II
- CHM 2046L General Chemistry II Laboratory
- CHM 2210 Organic Chemistry I
- CHM 2210L Organic Chemistry I Laboratory
- CHM 2211 Organic Chemistry II
- CHM 2211L Organic Chemistry II Laboratory

Required Mathematics Courses (6 credit hours):*
- MAC 2241 Life Sciences Calculus I
- MAC 2311 and MAC 2281 are also acceptable for the major.
- MAC 2242 Life Sciences Calculus II or STA 2023 Introductory Statistics
- MAC 2312 and MAC 2282 are also acceptable for the major.

Required Physics Courses (8 credit hours):*
- PHY 2053 General Physics I
- PHY 2053L General Physics I Laboratory
- PHY 2054 General Physics II
- PHY 2054L General Physics II Laboratory
- PHY 2048, PHY 2048L General Physics I and Lab and PHY 2049, PHY 2049L General Physics II and Lab are also acceptable for the major.
- Students may substitute Human Anatomy or Physiology I and II (BSC 2093C & BSC 2094C or BSC 2085, BSC 2085L & BSC 2086, BSC 2086L) for Physics I & II.

Major Electives (Tier 2) (21-22 credit hours)
Required Biomedical Courses (7-8 credit hours):
- BCH 3053 General Biochemistry
- MCB 3020 and MCB 3020L General Microbiology and Laboratory
  or choose one lecture: PCB 3063 or PCB 3023 and one lab: PCB 3063L or PCB 3023L or BCH 3023L

Minimum of 14 additional Biomedical credits to include:
- Upper-level Biology course (choose one)
- Upper-level Chemistry course (choose one)
- Upper-level Chemistry or Biology course (choose one)
- Upper-level Chemistry or Biology laboratory course (choose one)
- Additional Biomedical elective (choose one)

Biology Courses:
- BOT 3850 Medical Botany
- MCB 4115 Determinative Bacteriology
- MCB 4115L Determinative Bacteriology Lab
- MCB 4404 Microbial Physiology and Genetics
- MCB 4404L Microbial Physiology and Genetics Laboratory
- MCB 4503 Virology
- MCB 3410 Cell Metabolism
- PCB 3023 Cell Biology
- PCB 3023L Cell Biology Laboratory
- PCB 3063 General Genetics
PCB 3063L Genetics Laboratory  
PCB 3712 General Physiology  
PCB 3713L General Physiology Laboratory  
PCB 4234 Principles of Immunology**  
PCB 4522C Experimental Genetics and Cell Biology  
PCB 4723 Animal Physiology  
PCB 4723L Animal Physiology Laboratory  
PCB 4744 Biomedical Physiology  
PCB 4843 Principles of Neuroscience  
ZOO 3713C Comparative Vertebrate Anatomy  
ZOO 4753 Human Histology & Molecular Pathology of Disease  
ZOO 4753L Human Histology & Molecular Pathology of Disease Lab

**Chemistry Courses:**
- BCH 3023L Basic Biochemistry Laboratory*  
- BCH 4033 Advanced Biochemistry I  
- BCH 4034 Advanced Biochemistry II  
- CHM 3120C Elementary Analytical Chemistry  
- CHM 3610 Intermediate Inorganic Chemistry  
- CHM 3610L Intermediate Inorganic Chemistry Laboratory  
- CHM 3941 Peer Leading in Chemistry  
- CHM 4410 Physical Chemistry I  
- CHM 4410L Physical Chemistry Laboratory  
- CHM 4411 Physical Chemistry II  
- CHM 4413 Biophysical Chemistry  
- CHM 4300 Biomolecules I  
- CHM 4230 Spectroscopic Analysis of Organic Compounds  
- CHM 4274 Introduction to Drug Discovery  
- CHM 4292 Introduction to Medicinal Chemistry  
- CHM 4307 BioOrganic Chemistry  
- CHM 4455 Chemistry of High Polymers  
- CHM 4932 Selected Topics in Chemistry**  
- CHS 4300 Fundamentals of Clinical Chemistry  
- CHS 4301L Clinical Laboratory  

*BCH 3023L Satisfies Lab or Additional Biomedical Elective Only  
**Contact Advisor for approval of CHM 4932 Courses

**Other Courses:**
- CHM 4060 Use of Chemical Literature  
- HSC 4504 Foundations of Public Health Immunology**  
- PHZ 4702 Applications of Physics to Biology & Medicine I  
- PHZ 4703 Applications of Physics to Biology & Medicine II  

**Students may not use both HSC 4504 and PCB 4234 to meet Tier 2 required Biomedical Electives requirements.

**Shared Courses (12 credit hours)**

The following courses will satisfy 12 credit hours of upper-level coursework:
- SCE 5325 Methods of Middle Grades Science Education  
- SCE 5337 Methods of Secondary Science Education  
- SCE 6456 Teaching Secondary School Physical and Earth Science  
- SCE 6938 Topics in Science Education: Field Practicum

**Graduate Degree Requirements for the M.A.T. in Science Education (39 credit hours)**

*Please see Graduate Catalog for major-specific requirements

All M.A.T. programs include as an admission requirement the passing of all sections of the General Knowledge Test (GKT). Applicants who can document they lived outside the state or country and did not have access to take the GKT before the application deadline may submit passing Praxis scores or GRE scores to be considered for admission. Whether admitted with passing Praxis scores or acceptable GRE scores, the applicant must submit passing scores on the GKT before the last day of classes of the semester of first enrollment, or admission to the College of Education will be revoked.
Core Courses (39 credit hours)
- EDF 6432 Foundations of Measurement
- ESE 5342 Teaching the Adolescent Learner
- ESE 5344 Classroom Management for a Diverse School and Society
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 5564 Reading and Communication in Science Education
- SCE 6416 Teaching Secondary School Biology
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6634 Current Trends in Secondary Science Education
- SCE 6938 Topics in Science Education: Field Practicum
- SCE 6947 Internship (PR: CI and passing scores of FTCE exam)
- TSL 5325 ESOL Strategies for Content Area Teachers

Comprehensive Exam
Student’s participation in the internship experience in classes that correspond to the specific area in which he or she will be certified.
Passing score on the appropriate subject area exam.
Student’s content degree or equivalent (an admission’s requirement).

Comprehensive Examination
A written narrative exam tailored to the individual student. Exam needs to be completed by two weeks before final exam week of the student’s graduating semester. Exams will only be accepted during fall or spring semester, unless previous contract is established with the student’s advisor.

Specialization Requirements for Certification in Separate Areas of Science (Grades 6-12):
In order to be eligible for certification in a separate area of science, students must complete a minimum of thirty (30) semester hours in science to include twenty-one (21) semester hours in the area of desired specialization (chemistry, biology, physics, earth-space science).
Accelerated B.S. in Cell and Molecular Biology and M.S. in Biology with a concentration in Cell and Molecular Biology (Non-Thesis)

Description
This program allows Cell and Molecular Biology majors to take graduate courses for the elective part of the major and apply them to a non-thesis M.S. degree in Biology with a concentration in Cell and Molecular Biology. Successful students will be able to earn the M.S. degree in two additional semesters beyond the completion of the B.S. degree.

This accelerated program shares 12 credit hours between already existing degrees/concentrations:
- B.S. in Cell and Molecular Biology
- M.S. in Biology with a concentration in Cell and Molecular Biology (Non-Thesis)

Target Students and Expected Outcomes
This program will appeal to the more competitive Cell and Molecular Biology majors who would benefit professionally from having the M.S. when they enter the job market, but do not want to commit to the longer time a thesis M.S. or a Ph.D. program takes to complete. Professions that do not require bench laboratory experience, but desire the broadened knowledge base are targeted. Graduates from this program would be ideally suited for health professions, technology-based industry, education, and government. We also expect that some students will be interested in doctoral education in the biological or biomedical areas.

Admission Requirements
Cell and Molecular Biology majors who have completed the following courses may apply to this program:
- PCB 3023 Cell Biology
- PCB 3063 General Genetics
- MCB 3410 Cell Metabolism
- PCB 4024 Molecular Biology of the Cell or PCB 4026 Molecular Biology of the Gene

Students who have been admitted to the program but subsequently fail to achieve a 3.0 GPA in the last 60 hours of their undergraduate major, or who do not complete at least 30 of their last 60 hours at USF, will be dismissed from the program.

Once accepted, students must meet with BioAdvise (the advising office for biological sciences within the College of Arts and Sciences) to prepare an action plan to complete the B.S./M.S. accelerated program. This requires them to take all the courses required for the B.S. in Cell and Molecular Biology. Students may take up to 12 credits of graduate courses as electives in Cell Biology, Microbiology and Molecular Biology and apply those courses to both the B.S. and M.S. degrees. They will not be admitted as graduate students until they have completed their B.S. degree and met all the requirements for admission to Cell Biology, Microbiology and Molecular Biology as graduate students.

The action plan should include a schedule of coursework to complete their undergraduate major and a date in their last year in the undergraduate major to take the GRE.

Application materials are the same as the M.S. in Biology:
1. Two official transcripts of undergraduate work from other institutions. Applicants need not supply USF transcripts.
2. Three letters of recommendation
3. A brief essay stating your professional goals
4. GRE scores must be sent to USF directly from the testing agency (USF institution code is 5828)

Timeline and Benchmarks:
1. Completion of prerequisite upper division courses and application to the accelerated program. Typically, students will be in their junior year.
2. Acceptance into the program and an action plan within a semester of application.
3. Students will take up to 12 credits of graduate credit in Cell Biology, Microbiology and Molecular Biology courses following acceptance into the program. Typically, these courses will be taken in the latter half of the junior year and in the senior year. BioAdvise will monitor the progress of the students and ensure they follow their action plan. Students who do not complete at least 9 hours of graduate work by graduation will be dropped from the accelerated M.S. program.
4. GRE exams will be taken in a timely manner so scores will be available for admission to the M.S. portion of the program. Students who do not complete the GRE in time will not be admitted to the accelerated M.S. program.
5. Students admitted to the accelerated program must form a committee prior to the beginning of their first semester in the M.S. portion of the program and must continue to follow the action plan which will be monitored by BioAdvise.
6. Students admitted to the accelerated M.S. program must complete the requirements within three semesters or will be dismissed from the program.

Undergraduate Degree Requirements for the B.S. in Cell and Molecular Biology (40 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Required Supporting Courses for the Major (32-34 credit hours)
The following courses are prerequisite and supporting courses for this major. They are required for the major, but are not counted in the total hours for this major. The degree will not be awarded if these courses have not been taken by the end of the student's final semester.

- CHM 2045 General Chemistry I
- CHM 2045L General Chemistry I Laboratory
- CHM 2046 General Chemistry II
- CHM 2046L General Chemistry II Laboratory
- CHM 2210 Organic Chemistry I
- CHM 2210L Organic Chemistry I Laboratory
- CHM 2211 Organic Chemistry II
- CHM 2211L Organic Chemistry II Laboratory
- MAC 2241 Life Sciences Calculus I and MAC 2242 Life Sciences Calculus II
  or MAC 2281 Engineering Calculus I and MAC 2282 Engineering Calculus II
  or MAC 2311 Calculus I and MAC 2312 Calculus II
- STA 2023 Introductory Statistics I may be substituted for any Calculus II
- PHY 2048/2048L General Physics I and PHY 2049/2049L General Physics II
  or PHY 2053/2053L General Physics I and PHY 2054/2054L General Physics II

Major Core (25 credit hours)
- BSC 2010 Cellular Processes
- BSC 2010L Cellular Processes Laboratory
- BSC 2011 Biodiversity
- BSC 2011L Biodiversity Laboratory
- MCB 3410 Cell Metabolism
- PCB 3063 General Genetics
- PCB 3023 Cell Biology
- PCB 3023L Cell Biology Laboratory and PCB 3063L General Genetics Laboratory or PCB 3186L Laboratory in Molecular Biology
  Choose two of the following courses:
  - PCB 4024 Molecular Biology of Cell
  - PCB 4026 Molecular Biology of Gene
  - PCB 4109 Cancer Biology

Major Electives (15 credit hours)
Students choose a minimum of 15 credit hours from the following list of courses:
- BCH 3053 General Biochemistry
- BOT 4434C Mycology
- BSC 4434 Bioinformatics
- BSC 4905 Independent Study (1 credit maximum)
- BSC 4910 Undergraduate Research (1 or 2 credit hours/semester, no more than 4 credits total)
- BSC 4933 Selected Topics in Biology*
- BSC 5425 Genetic Engineering and Recombinant DNA Technology
- BSC 5931 Selected Topics in Biology (for the accelerated program only)
- MCB 3020 General Microbiology
- MCB 3020L General Microbiology Lab
- MCB 4503 Virology
- PCB 3043 Principles of Ecology
- PCB 3043L Principles of Ecology Laboratory
- PCB 3712 General Physiology
- PCB 3713L General Physiology Lab
- PCB 4024 Molecular Biology of Cell (if not used as a core course)
- PCB 4026 Molecular Biology of Gene (if not used as a core course)
- PCB 4109 Cancer Biology (if not used as a core course)
PCB 4234 Principles of Immunology
PCB 4522C Experimental Genetics and Cell Biology
PCB 4663 Human Genetics
PCB 4671 Molecular Evolution
PCB 4744 Biomedical Physiology
PCB 4843 Principles of Neuroscience
PCB 4744 Biomedical Physiology
ZOO 4753 Human Histology and Molecular Pathology of Disease
ZOO 4694 Developmental Biology
*Selected topics approved for the major by the Department of Cell Biology, Microbiology and Molecular Biology

Graduate Degree Requirements for the M.S. in Biology with a concentration in Cell and Molecular Biology (30 credit hours)

Three (3) credit hours of graduate structured elective coursework (5000-level)
Nine (9) credit hours of graduate elective coursework (5000- or 6000-level)
Eighteen (18) credit hours of graduate coursework, of which nine (9) credit hours must be from the following list:
BSC 5425 Genetic Engineering
BSC 6932 Bioinformatics
BSC 6932 Prokaryotic Molecular Genetics
BSC 6932 Virology
PCB 6236 Advanced Immunology
PCB 6525 Molecular Genetics

Students admitted into the M.S. portion of the program must complete all the requirements for the M.S. degree (non-thesis) within three semesters of admission. The requirement is 30 credit hours of graduate work with at least 16 of these credit hours completed at the 6000-level; 26 credit hours must be formally structured courses; and at least 15 credit hours must be in Cell Biology, Microbiology and Molecular Biology courses. Students will be required to take three (3) core courses from the list below as part of these 26 credit hours. Of the required 26 credit hours, nine (9) credit hours will be derived from the core-Cell Biology, Microbiology and Molecular Biology graduate courses listed below (see associated curriculum). These requirements can be partially met by up to 12 credit hours of graduate courses taken as undergraduates. Any graduate class taken outside of Cell Biology, Microbiology and Molecular Biology must be approved by the Cell Biology, Microbiology and Molecular Biology Graduate Director. Students should be aware that a B grade or better is required for every graduate class applied to the MS portion of their degree. In addition, students will be required to pass an oral qualifying exam based on a review paper submitted in their final semester. Students must form a committee as part of their action plan to complete their graduate work. This committee will be comprised of at least three Cell Biology, Microbiology and Molecular Biology faculty, and will serve as the examination committee for the review paper required as part of the MS portion of their degree. Upon approval of that paper, students must successfully complete a comprehensive oral exam by their committee.

Comprehensive Oral Qualifying Examination

A final comprehensive oral examination is required for all master's students. This examination is open to all departmental faculty. Students must take their comprehensive exam within two years of matriculation and the exam is normally taken after the completion of all formal course work. Thesis students must take the examination at least one semester before the thesis is presented. Any graduate work counted toward the requirement for the M.S. degree must be completed within five (5) years after matriculation.
Accelerated B.A. in Chemistry and M.A.T. in Science Education

Description
This program intends for students to complete a B.A. in Chemistry (College of Arts and Sciences) and M.A.T. in Science Education (College of Education) over the span of five years. Students completing this program will be eligible for high school and/or middle school science teacher certification. Completion of this program requires students to complete 12 credit hours toward the M.A.T. in Science Education during their senior year in the Chemistry (B.A.) major.

This accelerated program shares 12 credit hours between already existing degrees:
- B.A. in Chemistry
- M.A.T. in Science Education

Target Students and Expected Outcomes
The accelerated B.A. in Chemistry to M.A.T. in Science Education program is a collaborative effort between the College of Arts and Sciences and the College of Education. This program is an attractive and viable career path for students majoring in Chemistry that results in secondary science teacher certification. Students who complete this program receive the necessary science content and pedagogy coursework to be highly qualified chemistry teachers at the secondary level.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the Chemistry major upon applying and thirty (30) semester hours in science (includes twenty-one (21) semester hours in chemistry plus 9 hours in minor science content area) with associated laboratory experiences to be fully admitted as a graduate student in the M.A.T. Science Education Program. Evidence of successfully completing all sections of the General Knowledge Test (GKT) is also required for full admission to the graduate program
2. Have a minimum 3.0 GPA overall; and
3. Have a minimum undergraduate 3.25 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.A. Chemistry/M.A.T. Science Education program, students must have completed a minimum of 15 credit hours in the Chemistry undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.0 overall, and a minimum GPA of 3.25 in the major and passing scores on all sections of the General Knowledge Test (GKT) to be eligible for the accelerated degree program. You can find information on the General Knowledge Test on the Florida Teacher Certification section of the following webpage: http://www.fl.nesinc.com/.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.A. and M.A.T. programs will review the applications and approve the nominations. All applications require the approval of USF’s Graduate School, the College of Education’s Graduate Program, and the Department of Chemistry’s Undergraduate Program.
4. To be promoted to graduate status, students must meet all admission requirements of the M.A.T. in Science Education in the College of Education. Specifically, the following materials must be submitted:
   - Undergraduate transcripts; and evidence of possessing a degree in a science discipline (biology, chemistry, physics, geology, etc.) that is taught in a middle or high school, or comparable coursework in a science teaching field acceptable to the program faculty.
   - A minimum of 21 hours in major science content area of concentration (plus 9 hours in minor science content area) are required to teach secondary school. Note, to teach secondary chemistry the state of Florida requires: A bachelor’s or higher degree with thirty (30) semester hours in science to include twenty-one (21) semester hours in chemistry with associated laboratory experiences.
   - Documentation of GKT scores.
5. Students must earn a minimum of a “B” (3.00) in all graduate courses. Failure to earn at least a “B” in a graduate course will result in academic review by the graduate program. Failure to maintain a minimum 3.0 GPA will result in academic probation, according to the procedures of the USF Office of Graduate Studies.

Shared Courses (12 credit hours)
The following courses will satisfy 12 credit hours of upper-level coursework:
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
Undergraduate Degree Requirements for the B.A. in Chemistry (39 credit hours)

*Please see Undergraduate Catalog for major-specific requirements

Required Supporting Courses for the Major (24 credit hours)
The following courses are prerequisite and supporting courses for this major. They are required for the major, but are not counted in the total hours for this major. The degree will not be awarded if these courses have not been taken by the end of the student’s final semester.

MAC 2311 Calculus I and MAC 2312 Calculus II
**MAC 2281 Engineering Calculus I and MAC 2282 Engineering Calculus II are also accepted for this major
PHY 2053 General Physics I and PHY 2053L General Physics I Laboratory and PHY 2054 General Physics II and PHY 2054L General Physics II Laboratory or PHY 2048 General Physics I-Calculus Based and PHY 2048L General Physics I-Calculus Based Laboratory and PHY 2049L General Physics II-Calculus Based Laboratory

Students must choose eight (8) hours of required natural science or engineering electives from the following suggested list of courses:

- BSC 2010 Cellular Processes and BSC 2010L Cellular Processes Laboratory
- BSC 2011 Biodiversity and BSC 2011L Biodiversity Laboratory
- GLY 2010 Dynamic Earth: Introduction to Physical Geology and GLY 2000L Essentials of Geology Laboratory
- GLY 2100 History of Life and GLY 2100L History of Life Laboratory
- EVR 2001 Introduction to Environmental Science and EVR 2001L Environmental Science Laboratory
- CGS 2060 Introduction to Computers and Computer Programming
- STA 2023 Introductory Statistics I

Major Core (33 credit hours)

CHM 2045 General Chemistry I
CHM 2045L General Chemistry I Lab
CHM 2046 General Chemistry II
CHM 2046L General Chemistry II Lab
CHM 2210 Organic Chemistry I
CHM 2210L Organic Chemistry I Lab
CHM 2211 Organic Chemistry II
CHM 2211L Organic Chemistry II Lab
CHM 3120C Elementary Analytical Chemistry I
CHM 3610 Intermediate Inorganic Chemistry I
CHM 3610L Intermediate Inorganic Chemistry I Lab
CHM 4410 Physical Chemistry I
CHM 4413 Biophysical Chemistry

Major Electives (6 credit hours)
Students must choose six (6) credit hours of coursework at 3000-level or above; may not include more than 1 hour of CHM 4970.

BCH 3023L Basic Biochemistry Laboratory
BCH 4033 Advanced Biochemistry I
BCH 4034 Advanced Biochemistry II
CHM 4060 Use of Chemical Literature
CHM 4070 Historical Perspectives in Chemistry
CHM 4130C Methods of Instrument Analysis
CHM 4131C Methods of Chemical Investigation II
CHM 4300 Biomolecules
CHM 4410L Physical Chemistry Laboratory
CHM 4411 Physical Chemistry II
CHM 4611 Advanced Inorganic Chemistry
CHM 4970 Undergraduate Research
CHM 4932 Selected Topics in Chemistry*
CHS 4300 Fundamentals of Clinical Chemistry
CHS 4301L Clinical Laboratory
*Contact Advisor for approval of CHM 4932 Courses
Shared Courses (12 credit hours)
The following courses will satisfy 12 credit hours of upper-level coursework:
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6938 Topics in Science Education: Field Practicum

Graduate Degree Requirements for the M.A.T. in Science Education (39 credit hours)
*Please see Graduate Catalog for major-specific requirements*

All M.A.T. programs include as an admission requirement the passing of all sections of the General Knowledge Test (GKT). Applicants who can document they lived outside the state or country and did not have access to take the GKT before the application deadline may submit passing Praxis scores or GRE scores to be considered for admission. Whether admitted with passing Praxis scores or acceptable GRE scores, the applicant must submit passing scores on the GKT before the last day of classes of the semester of first enrollment, or admission to the College of Education will be revoked.

Core Courses (39 credit hours)
- EDF 6432 Foundations of Measurement
- ESE 5342 Teaching the Adolescent Learner
- ESE 5344 Classroom Management for a Diverse School and Society
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 5564 Reading and Communication in Science Education
- SCE 6416 Teaching Secondary School Biology
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6634 Current Trends in Secondary Science Education
- SCE 6938 Topics in Science Education: Field Practicum
- SCE 6947 Internship (PR: CI and passing scores of FTCE exam)
- TSL 5325 ESOL Strategies for Content Area Teachers

Comprehensive Exam
- Student’s participation in the internship experience in classes that correspond to the specific area in which he or she will be certified.
- Passing score on the appropriate subject area exam.
- Student’s content degree or equivalent (an admission's requirement).

Comprehensive Examination
A written narrative exam tailored to the individual student. Exam needs to be completed by two weeks before final exam week of the student’s graduating semester. Exams will only be accepted during fall or spring semester, unless previous contract is established with the student’s advisor.

Specialization Requirements for Certification in Separate Areas of Science (Grades 6-12):
In order to be eligible for certification in a separate area of science, students must complete a minimum of thirty (30) semester hours in science to include twenty-one (21) semester hours in the area of desired specialization (chemistry, biology, physics, earth-space science).
Accelerated B.S. in Chemistry and M.S.B.E. in Biomedical Engineering

Description
This program intends for students to complete a B.S. in Chemistry and M.S.B.E. in Biomedical Engineering over the span of five years. Completion of this program allows students to complete nine (9) credit hours toward the M.S.B.E. during their junior or senior year in the Chemistry (B.S.) major.
This accelerated program shares 9 credit hours between already existing degrees:
- B.S. in Chemistry
- M.S.B.E. in Biomedical Engineering

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

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

Shared Courses (9 credit hours)
Students choose three (3) of the following five (5) courses to be shared between the two degrees:
- BME 6000 Biomedical Engineering I
- BME 6931 Biomedical Engineering II
- GMS 6440 Basic Medical Physiology or BME 6410 Engineering Physiology
- GMS 6605 Basic Medical Anatomy
- PHC 6051 Biostatistics II

Undergraduate Degree Requirements for the B.S. in Chemistry (54 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Required Supporting Courses for the Major (22 credit hours)
The following courses are prerequisite and supporting courses for this major. They are required for the major, but are not counted in the total hours for this major. The degree will not be awarded if these courses have not been taken by the end of the student’s final semester.
- MAC 2311 Calculus I and MAC 2312 Calculus II or MAC 2281 Engineering Calculus I and MAC 2282 Engineering Calculus II
- PHY 2048 General Physics I-Calculus Based and PHY 2048L General Physics I-Calculus Based Laboratory
- PHY 2049 General Physics II-Calculus Based and PHY 2049L General Physics II-Calculus Based Laboratory
- BSC 2010 Cellular Processes
- One 3000-level Natural Science or Engineering course (PHY 3101 suggested) or
- One 2000-level Natural Science course (BSC 2111, GLY 2010, GLY 2100, EVR 2001)

Major Core (54 credit hours)
- CHM 2045 General Chemistry I
- CHM 2045L General Chemistry I Laboratory
- CHM 2046 General Chemistry II
- CHM 2046L General Chemistry II Laboratory
- CHM 2210 Organic Chemistry I
- CHM 2210L Organic Chemistry I Laboratory
- CHM 2211 Organic Chemistry II
- CHM 2211L Organic Chemistry II Laboratory
- BCH 4033 Advanced Biochemistry I
- CHM 3120C Elementary Analytical Chemistry
CHM 3415C Physical Chemistry Methods
CHM 3610 Intermediate Inorganic Chemistry
CHM 3610L Intermediate Inorganic Chemistry Laboratory
CHM 4060 Use of Chemical Literature
CHM 4130C Methods of Instrument Analysis
CHM 4131C Methods of Chemical Investigation II
CHM 4410 Physical Chemistry I
CHM 4410L Physical Chemistry Laboratory
CHM 4411 Physical Chemistry II
CHM 4611 Advanced Inorganic Chemistry

Shared Courses (9 credit hours)
Students choose three (3) of the following five (5) courses to be shared between the two degrees:
  BME 6000 Biomedical Engineering I
  BME 6931 Biomedical Engineering II
  GMS 6440 Basic Medical Physiology or BME 6410 Engineering Physiology
  GMS 6605 Basic Medical Anatomy
  PHC 6051 Biostatistics II

Graduate Degree Requirements for the M.S.B.E. in Biomedical Engineering (30 credit hours)
*Please see Graduate Catalog for major-specific requirements

Students must take the following five (5) courses in Engineering:
  EGN 3433 Modeling and analysis of engineering systems
Students must complete 12 credit hours from the following courses:
  ECH 3702 Instrument Systems I
  EGN 3311 Statics*
  EGN 3321 Dynamics
  EGN 3331 Mechanics of Materials
  EGN 3343 Thermodynamics*
  EGN 3365 Materials Engineering I
  EGN 3373 Electrical Systems I*
  EML 3701 Fluid Systems
*Indicates most highly recommended courses

Major Core (15 credit hours)
  BME 6000 Biomedical Engineering I
  BME 6931 Biomedical Engineering II
  GMS 6440 Basic Medical Physiology or BME 6410 Engineering Physiology
  GMS 6605 Basic Medical Anatomy
  PHC 6051 Biostatistics II

Major Electives (15 credit hours)
Students select from additional approved courses to complete the 30 credit hour requirement. A minimum of 16 credit hours must be at the 6000-level. In addition, all of the elective courses must consist of engineering-prefix courses, although the Thesis Committee (thesis option) or the BME Program Advisor (non-thesis option) may approve courses in relevant areas such as chemistry, physics, pharmacy, communication sciences and disorders, public health, or medicine, in their place.

Thesis Option
Thesis option students can count up to six (6) credit hours of thesis research towards the elective requirements.

Comprehensive Exam
Students in the non-thesis track will complete a comprehensive exam. For students in the thesis track, the thesis and oral defense serve as the comprehensive exam.
Accelerated B.A. in Economics and M.A. in Economics

Description
This program allows superior students with strong analytical skills and the ability to handle a fast paced, challenging program the opportunity to complete both the Bachelor's and Master's degrees in Economics in five years.

This accelerated program shares nine (9) credit hours between already existing degrees:
- B.A. in Economics
- M.A. in Economics (Non-Thesis)

Target Students and Expected Outcomes
The program requires students to take two graduate-level courses required for the M.A. major during the last year in the undergraduate Economics major. These six (6) credit hours are counted as general electives (not major electives) in the undergraduate program and are also used to satisfy the requirements for the M.A. in Economics. After completing the 120-hour Bachelor's program, five-year students take 24 credit hours at the graduate-level.

Admission Requirements
To be eligible for the program, a student must have:
- Completed at least 6 hours of 3000-level or above Economics courses at USF (not including statistics),
- Have an overall grade point average of 3.00 or above, and have a minimum of 3.25 cumulative grade point average in all economics courses (including statistics).

To apply for admission, send a letter to the Undergraduate Program Director in the Department of Economics stating your qualifications and desire to enter the program. To plan your program, or for additional information, see the Undergraduate Advisor in Economics.

Timeline and Benchmarks
The B.A. in Economics will be conferred once the student has completed all requirements for the degree, including having completed the graduate coursework that comprises part of the Accelerated Degree Program. The M.A. in Economics will be conferred once the student has completed all remaining requirements for the M.A. degree. At the time that the BA degree is conferred, students in the Accelerated Degree Program will have completed at least two of the four required courses and at most one of the six elective courses needed for the M.A. degree. The remaining one or two required courses for the M.A. degree will be completed after the B.A. degree has been conferred.

Shared Courses (9 credit hours)
Students take nine (9) credit hours of coursework that satisfies requirements for both degrees:
- ECO 6405 Mathematical Economics I (satisfies ECO 4401 Introduction to Mathematical Economics)
- ECO 6115 Microeconomics I (does not satisfy an undergraduate course requirement)
- Choose one of the following courses:
  - ECO 6206 Macroeconomics I (does not satisfy an undergraduate course requirement)
  - ECO 6424 Econometrics I (satisfies ECO 4421 Introduction to Econometrics)
  - ECO 6505 Public Finance (satisfies ECO 4504 Public Finance)
  - ECP 6408 Economics of Organization (satisfies ECP 3403 Economics of Organization)
  - ECP 6415 Issues in Regulation and Antitrust (satisfies ECP 3413 Economics of Regulation and Antitrust)
  - ECP 6456 Law and Economics (satisfies ECP 4451 Law and Economics)
  - ECP 6614 Urban Economics (satisfies ECP 3613 Urban Economics)

Undergraduate Degree Requirements for the B.A. in Economics (33 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (18 credit hours)
- ECO 2013 Economic Principles: Macroeconomics
- ECO 2023 Economic Principles: Microeconomics
- ECO 3101 Intermediate Price Theory
- ECO 3203 Intermediate Macroeconomics
- ECO 2052 Analytical Tools for Economists
- STA 2023 Introductory Statistics I

Major Electives (15 credit hours)
Fifteen (15) credit hours of Economics electives numbered 3000 or higher.
Shared Courses (9 credit hours)
Students take nine (9) credit hours of coursework that satisfies requirements for both degrees:

- ECO 6405 Mathematical Economics I (satisfies ECO 4401 Introduction to Mathematical Economics)
- ECO 6115 Microeconomics I (does not satisfy an undergraduate course requirement)

Choose one of the following courses:

- ECO 6206 Macroeconomics I (does not satisfy an undergraduate course requirement)
- ECO 6424 Econometrics I (satisfies ECO 4421 Introduction to Econometrics)
- ECO 6505 Public Finance (satisfies ECO 4504 Public Finance)
- ECP 6408 Economics of Organization (satisfies ECP 3403 Economics of Organization)
- ECP 6415 Issues in Regulation and Antitrust (satisfies ECP 3413 Economics of Regulation and Antitrust)
- ECP 6456 Law and Economics (satisfies ECP 4451 Law and Economics)
- ECP 6614 Urban Economics (satisfies ECP 3613 Urban Economics)

Graduate Degree Requirements for the M.A. in Economics (30 credit hours)
*Please see Graduate Catalog for major-specific requirements

Major Core (12 credit hours)
- ECO 6115 Microeconomics I
- ECO 6206 Macroeconomics I
- ECO 6405 Mathematical Economics I
- ECO 6424 Econometrics I

Major Electives (18 credit hours)
Twelve (12) credit hours of coursework from the following list:

- ECO 6120 Economic Policy Analysis
- ECO 6305 History of Economic Thought
- ECO 6425 Econometrics II
- ECO 6505 Public Finance
- ECO 6525 Public Sector Economics
- ECO 6706 International Trade: Theory and Policy
- ECO 7116 Microeconomics II
- ECO 7207 Macroeconomics II
- ECO 7406 Mathematical Economics II
- ECO 7426 Econometrics III
- ECP 6405 Industrial Organization I
- ECP 6408 Economics of Organization
- ECP 6415 Issues in Regulation and Antitrust
- ECP 6456 Law and Economics
- ECP 6536 Economics of Health Care I
- ECP 6614 Urban Economics
- ECP 6624 Regional Economics
- ECP 7406 Industrial Organization II
- ECP 7537 Economics of Health Care II
- ECS 6015 Economic Development

Six (6) credit hours of graduate coursework outside of Economics
With the approval of the Graduate Director, unrestricted elective courses may be satisfied either by graduate-level courses offered by any department within the University or by certain MBA courses taught within the Department of Economics.

Specific Course Requirements for the Accelerated Degree Program
Students in the Accelerated Degree Program will be permitted to take nine (9) credit hours of graduate coursework prior to the B.A. in Economics being conferred. Of these 9 credit hours, six (6) will be mandatory (ECO 6405 and ECO 6115) and three (3) credit hours will be chosen from ECO 6206, ECO 6424, ECO 6505, ECP 6408, ECP 6415, ECP 6456, and ECP 6614. With the exceptions of ECO 6115 and ECO 6206 which do not satisfy any specific undergraduate course (ECO 3101 and ECO 3203 constitute six (6) credit hours of the 15 credit hours in the major that are required to be admitted to the Accelerated Degree Program), all other graduate courses taken prior to the awarding of the B.A. in Economics satisfy the following undergraduate elective courses:

- ECO 4401 satisfied by ECO 6405
- ECO 4421 satisfied by ECO 6424
- ECO 4504 satisfied by ECO 6505
- ECP 3403 satisfied by ECP 6408
Elective Requirements

Of the six (6) elective courses that comprise the M.A. in Economics, students in the Accelerated Degree Program are permitted to take at most one such course before the B.A. in Economics is conferred.

Following the awarding of the B.A. in Economics, students in the Accelerated Degree Program will be able to choose their remaining graduate elective courses from the list of economics elective courses given above.

In addition to completing the 30 hours of coursework with overall and major GPAs of at least 3.0, a student must pass an oral examination conducted by a panel of three faculty members who have taught courses in the student’s program. At least one faculty member must be drawn from those who teach the core courses. The oral examination provides a forum for the student to provide evidence that s/he has sufficient knowledge and breadth of fundamental economic concepts so as to be able to undertake rigorous economic analysis, both theoretical and empirical in nature.

Completion Requirements

All students are required to take courses in advanced economic theory and econometrics. Undergraduate economics majors at USF may complete the program in one year beyond the B.A. in the 5-Year B.A./M.A. Program. Students preparing for doctoral studies select from these and additional courses in economic theory, mathematics, and quantitative methods. Where appropriate students may select courses in other departments within the University. Students must satisfy all University requirements for the M.A. degree. To graduate, a student must have at least an overall 3.0 GPA and at least a 3.0 GPA for all economics courses, and pass an oral examination.
Accelerated B.A. in English with a concentration in Literary Studies and M.A. in English with a concentration in Literature

Description
This program allows English majors who are concentrating in Literary Studies to take graduate courses toward the M.A. in English with a concentration in Literature during their senior year. These shared credits will be applicable to the M.A. degree, thus accelerating the time to completion, with successful students able to earn the M.A. degree in two additional semesters beyond the completion of the B.A. degree.

This accelerated program shares 12 credit hours between already existing degrees/concentrations:
- B.A. in English with a concentration in Literary Studies
- M.A. in English with a concentration in Literature

Target Students and Expected Outcomes
This program builds on the department’s B.A. and M.A. degrees. It will give talented English majors the opportunity to take graduate courses and apply them to an M.A. in English with a concentration in Literature. If successful, students will be able to complete an M.A. two semesters after the B.A. requirements have been met. This will allow them to more expeditiously pursue career opportunities requiring a graduate degree in Literary Studies or pursue Ph.D. studies.

Admission Requirements
For admission to the program, a student must:
1. have completed at least 15 hours in the English major, with a concentration in Literary Studies, including ENG 3014.
2. have a minimum undergraduate 3.33 GPA overall; and
3. have a minimum undergraduate 3.5 GPA in the major.

Application to the program may be made by any student who has satisfied the minimum requirements. Applications should be addressed to the Department Undergraduate and Graduate Directors and should include a statement by the student affirming satisfaction of minimum requirements (with supporting documentation) and a letter of recommendation from a Literary Studies faculty member familiar with the student’s academic performance.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.A./M.A. in English with concentrations in Literary Studies and Literature, students must have completed a minimum of 15 credits in the undergraduate English major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the major to be eligible for the accelerated degree program.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program.
4. Applications should be addressed to the Department Undergraduate and Graduate Directors and should include:
   a. a statement by the student affirming satisfaction of minimum requirements (with supporting documentation)
   b. a letter of recommendation from a Literary Studies faculty member familiar with the student’s academic performance.
5. Students must earn a minimum of a “B” (3.00) in all graduate courses. Failure to earn at least a “B” in a graduate course will result in academic review by the graduate program. Failure to maintain a minimum 3.0 GPA will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
6. A comprehensive plan of study to complete the integrated B.A./M.A. program will be developed with the guidance of an advisor and a faculty member. A possible plan of study could be as follows. Summer sessions may also be included in the study plan.

Shared Courses (12 credit hours)
Twelve (12) credit hours of graduate credit may be shared as follows:
- ENG 4013 or ENG 4950 can be satisfied by either ENG 6018 or ENG 6019
- Nine (9) credit hours at the 4000-level are satisfied by nine (9) credit hours at the 6000-level from comparable categories II-IV

Undergraduate Degree Requirements for the B.A. in English with a concentration in Literary Studies (36 credit hours)
*Please see Undergraduate Catalog for major-specific requirements
**Concentration Core (21 credit hours)**

**I. Required Course (3 credit hours):**
- ENG 3014 Introduction to Literary Methodology (recommended during first 2 semesters of the major)

**II. Additional Requirements (18 credit hours):**

**Capstone (3 credit hours)**
- Students must choose one course from the following list (Note: These courses are approved only for the department's capstone requirement, not for the University's EXIT Capstone requirement.):
  - ENG 4013 Literary Criticism
  - ENG 4950 Senior Capstone

**Literary Histories (9 credit hours)**
- Students must choose one course from three of the four pre-1900 categories:
  - **Medieval/Renaissance**
    - ENL 3015 British Literature to 1616
    - ENL 3331 Early Shakespeare
    - ENL 3332 Late Shakespeare
    - ENL 4203 Introduction to Old English
    - ENL 4311 Chaucer
    - ENL 4338 Advanced Studies in Shakespeare
    - ENL 4501 Studies in Medieval & Early Modern Literature
    - LIT 3101 Literature of the Western World through the Renaissance
  - **17th/18th Century British**
    - ENL 3016 Studies in 17th and 18th Century British Literature
    - ENL 3230 British Literature 1616-1780
    - ENL 4112 Eighteenth-Century British Novel
    - ENL 4341 Milton
  - **19th Century British**
    - ENL 3017 Studies in 19th Century British Literature
    - ENL 3251 British Literature 1780-1900
    - ENL 4122 19th Century British Novel
  - **American Before 1900**
    - AML 3031 American Literature from the Beginnings to 1860
    - AML 3032 American Literature from 1860 to 1912
    - AML 4111 Nineteenth-Century American Novel

**Cultural-Critical Studies (3 credit hours)**
- Students must choose one course from the following list:
  - AML 3604 African American Literature
  - AML 3630 U.S. Latino/Latina Literature in English
  - AML 3641 Native American Literature and Film
  - AML 3674 Asian American Literature and Film
  - AML 4933 Studies in American Literature and Culture
  - LIT 3353 Literature, Race, and Ethnicity
  - LIT 3410 Religious and Philosophical Themes in Literature
  - LIT 3513 Literature, Gender, and Sexuality
  - LIT 4233 Postcolonial Literature
  - LIT 4386 British and American Literature by Women
  - LIT 4931 Studies in World Literature and Culture

**Language and Genre (3 credit hours)**
- Students must choose one course from the following list:
  - AML 4111 Nineteenth-Century American Novel
  - AML 4121 Twentieth-Century American Novel
  - AML 4931 American Literary Movements and Genre
  - ENG 3113 Film as Narrative Art
  - ENG 4060 History of the English Language
  - ENG 4674 Film and Culture
  - ENL 4112 Eighteenth-Century British Novel
  - ENL 4122 Nineteenth-Century British Novel
  - ENL 4132 British Novel: Conrad to the Present
  - ENL 4930 Selected Topics
  - LIN 4671 Traditional English Grammar
  - LIN 4680 Structure of American English
  - LIT 3022 Modern Short Prose
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<tr>
<td>LIT 3031</td>
<td>Survey of Poetry</td>
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<tr>
<td>LIT 3043</td>
<td>Modern Drama</td>
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<tr>
<td>LIT 3144</td>
<td>Modern European Novel</td>
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**Concentration Electives (15 credit hours)**

Students may count one course from the following list:
- Any one LIT 2000-level course may count as an elective:
  - LIT 2000 Introduction to Literature
  - LIT 2010 Introduction to Fiction
  - LIT 2020 Introduction to the Short Story
  - LIT 2030 Introduction to Poetry
  - LIT 2040 Introduction to Drama

Students may select four additional courses (12 credit hours) from the following list:
- AML 3051 American Literature from 1912 to 1945
- AML 3243 American Literature from 1945 to the present
- AML 4261 Literature of the South
- AML 4300 Selected American Authors
- ENG 4013 Literary Criticism (recommended for those planning to attend graduate school)
- ENL 3026 Studies in the 20th Century Literature
- ENL 3273 British Literature 1900-1945
- ENL 4303 Selected British Authors
- LIT 3093 Contemporary Literature
- LIT 3102 Literature of the Western World since the Renaissance
- LIT 3374 The Bible as Literature
- LIT 3930 Selected Topics in Literature
- LIT 4930 Selected Topics in English Studies
- Any additional LTS major course listed above
- Any major CRW course listed under the Creative Writing concentration
- Any major ENC course listed under the Professional Writing, Rhetoric and Technology concentration

**Shared Courses (12 credit hours)**

Twelve (12) credit hours of graduate credit may be shared as follows:
- ENG 4013 or ENG 4950 can be satisfied by either ENG 6018 or ENG 6019
- Nine (9) credit hours at the 4000-level are satisfied by nine (9) credit hours at the 6000-level from comparable categories II-IV

**Graduate Degree Requirements for the M.A. in English with a concentration in Literature (33 credit hours)**

*Please see Graduate Catalog for major-specific requirements*

**Major Core (3 credit hours)**

ENG 6009 Introduction to Graduate Studies

**Concentration Core (21 credit hours)**

ENG 6018 Criticism and Theory I or ENG 6019 Criticism and Theory II

**Historical Distribution - 12 credit hours**

Four courses chosen from the following (one (1) course from each of the following groups):
- Medieval or Renaissance (including 17th Century):
  - ENL 6206 Studies in Old English
  - ENL 6216 Studies in Middle English
  - ENL 6226 Studies in Sixteenth-Century British Literature
  - ENL 6228 Studies in Seventeenth-Century British Literature
- 18th Century (Either British tradition or Literature of the Americas):
  - AML 6017 Studies in American Literature to 1860
  - ENL 6236 Studies in Restoration and Eighteenth-Century British Literature
- 19th Century (Either British tradition or Literature of the Americas):
  - AML 6018 Studies in American Literature to 1860
  - AML 6019 Studies in American Literature to 1860 to 1920
  - ENL 6246 Studies of the English Romantic Period
  - ENL 6256 Studies in Victorian Literature
- 20th Century (Either British traditions or Literature of the Americas):
  - AML 6027 Studies in Modern American Literature
  - ENL 6276 Studies in Modern British Literature
COLLEGE OF ARTS & SCIENCES

LIT 6096 Studies in Contemporary Literature

Cultural & Critical Studies - 6 credit hours
Two courses in ethnic literature (including African-American, Latino/a, post-colonial), world literature, women’s literature or gender studies, critical theory, film, or genre
AML 6608 Studies in African American Literature
ENG 6018 Studies in Criticism and Theory I
ENG 6019 Studies in Criticism and Theory II
ENG 6067 History of the English Language
LIT 6934 Selected Topics in English Studies
Or other courses as approved by the Graduate Director

Concentration Electives (6 credit hours)
Students taking ENC 6745 Teaching Practicum must use this as an elective if they count it toward the 33 credits in the degree. No CRW courses will be allowed in the literature track. Only one practicum will be allowed to satisfy degree requirements (including ENC 6745) in Option I. One Directed Study may be used to substitute for degree requirement with the approval of the Graduate Director.

Portfolio and Defense (3 credit hours)
Three directed study hours to prepare portfolio. In their fourth and final semester (excluding summer terms), MA students will submit a portfolio for review to a three-member faculty committee six weeks prior to the Office of Graduate Studies deadline for thesis/dissertation submission. Upon submission, the student and chair of the committee will establish a defense date with the Graduate Program Specialist.
The portfolio will contain the following:

- An introductory first-person essay in which the student offers a self-evaluation of the contents of the portfolio and how it reflects his or her own process of revision, intellectual growth, plans for publication/dissemination, and professional development (minimum five pages, not to exceed fifteen).
- Three revised seminar papers 15-20 pages in length, including appropriate MLA or Chicago Style documentation.
  - Papers should represent three distinct literary periods, including at least one prior to 1800 and one after 1800. In addition, the contents of the portfolio should represent diversity on a national level, with at least one paper focusing on literature of the Americas and the other on literature from Britain (broadly construed) or its colonies.
  - Papers should be developed under the direction of three different faculty members from the English Department, who then will form the committee for the defense. One member of the committee will serve as the chair, who will coordinate the circulation of the portfolio, the scheduling of the defense, and the submission of evaluation forms to the graduate director within specified deadlines.

The portfolio will be reviewed and evaluated by this three-member faculty committee using the published assessment rubric. Members of the portfolio committee will be asked to work with the student to revise the papers she/he wrote for class. The goal is to get the papers into a form that might reasonably be published. Because this option is not a thesis, it does not have to be submitted to the Office of Graduate Studies, and so it does not need to adhere to the Office of Graduate Studies deadlines. Defenses should be concluded two weeks before the end of classes. The whole portfolio, along with the revised papers and the introductory essay, should be circulated two weeks prior to the defense, to give committee members an opportunity to read it through. Each portfolio paper will also be scored on a scale from 1 to 4 on content using the rubric at the end of the handbook. To pass, a portfolio requires a minimum score of 9 in content.

- Pass with Distinction: portfolios scoring between 11 and 12 will merit distinction; this will be noted in the student’s file and can be referenced on a student’s CV.
- Deficiency: portfolios scoring between 7 and 8 or with one paper earning a 1 will be deficient. Any paper scoring less than 3 will require revision. Individual faculty need to specify in writing what the essay requires for revision in order to pass. Students will have the opportunity to revise during the remaining time of the semester; revised paper(s) need to be submitted to all committee members for approval no later than the last day of class for the semester. No second defense is required. Students who fail to revise appropriately before the end of the semester will be put on academic probation and will be required to finalize their papers the following semester (excluding summer unless faculty agree to serve during the summer).
- Failure: portfolios that score a 6 or less or portfolios that score less than 9 in overall content fail. Students who fail automatically be put on academic probation and given the opportunity to revise papers so that the portfolio reaches a minimum score of 9 the following semester (excluding summer unless faculty agree to serve during the summer). A failed portfolio requires a second defense after revision, and the committee will determine if it passes or fails (no deficiencies or distinctions may be awarded). If the portfolio fails after the second defense the student will be academically dismissed from the program.
Graduate Assistants on probation in the initial term maintain eligibility for an assistantship. If probationary status is not removed, the student can be removed from assistantship and academically dismissed from the program. The committee will also evaluate the introductory essay using the appropriate rubric; this grade will be recorded for purposes of program assessment.

**Oral Defense**

The committee chair convenes a meeting with the committee and student for 30 minutes; this oral examination provides the opportunity for faculty to question the student on various aspects of the portfolio, and it gives the student the opportunity to expand upon and refine ideas represented in writing. The defense also provides an opportunity for further suggestions on publication and revision. After 30 minutes, the committee will convene without the student to discuss a final assessment for the portfolio using the published rubric.

No grade lower than a B will be accepted in a graduate course in the B.A./M.A. program. Students earning less than a B in a graduate course must retake the course and earn a B or higher to apply it to their graduate degree.
Accelerated B.S. in Environmental Biology and M.A.T. in Science Education

Description
This program intends for students to complete a B.S. in Environmental Biology (College of Arts and Sciences) and M.A.T. in Science Education (College of Education) over the span of five years. Students completing this program will be eligible for high school and/or middle school science teacher certification. Completion of this program requires students to complete 12 credit hours toward the M.A.T. in Science Education during their senior year in the Environmental Biology major.

This accelerated program shares 12 credit hours between already existing degrees:
- B.S. in Environmental Biology
- M.A.T. in Science Education

Target Students and Expected Outcomes
The accelerated B.S. in Environmental Biology to M.A.T. in Science Education program is a collaborative effort between the College of Arts and Sciences and the College of Education. This program is an attractive and viable career path for students majoring in Environmental Biology that results in secondary science teacher certification. Students who complete this program receive the necessary science content and pedagogy coursework to be highly qualified biology teachers at the secondary level.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the B.S. Environmental Biology major upon applying and thirty (30) semester hours in science (includes twenty-five (25) semester hours in biology plus 5 hours of upper-level work in math or supporting science content area) with associated laboratory experiences to be fully admitted as a graduate student in the M.A.T. Science Education program. Evidence of successfully completing all sections of the General Knowledge Test (GKT) is also required for full admission to the graduate program.
2. Have a minimum 3.0 GPA overall; and
3. Have a minimum undergraduate 3.25 GPA in the major.

Timeline and Benchmarks
1. To be considered for acceptance into the Accelerated B.S. Environmental Biology/M.A.T. Science Education program, students must have completed a minimum of 15 credit hours in the Environmental Biology undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.0 overall, and a minimum GPA of 3.25 in the major and passing scores on all sections of the General Knowledge Test (GKT) to be eligible for the accelerated degree program. Information on the General Knowledge Test on the Florida Teacher Certification section may be found on the webpage: http://www.fl.nesinc.com/.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S. and M.A.T. programs will review the applications and approve the nominations. All applications require the approval of the College of Education Graduate Program, the College of Arts and Sciences, and the USF Graduate School.
4. To be promoted to graduate status, students must meet all admission requirements of the M.A.T. in Science Education in the College of Education. Specifically, the following materials must be submitted:
   a. Undergraduate transcripts;
   b. Evidence of possessing a degree in a science discipline (Biology, Chemistry, Physics, Geology, etc.) that is taught in a middle or high school, or comparable coursework in a science teaching field acceptable to the program faculty;
   c. A bachelor's or higher degree in biology or a bachelor's or higher degree with thirty (30) semester hours in science to include twenty-one (21) semester hours in biology with associated laboratory experiences.
   d. Documentation of GKT scores.
5. Students must earn a minimum of a “B” (3.00) in all graduate courses. Failure to earn at least a “B” in a graduate course will result in academic review by the graduate program. Failure to maintain a minimum 3.0 GPA will result in academic probation, according to the procedures of the USF Office of Graduate Studies.

Shared Courses (12 credit hours)
The following courses will satisfy 12 credit hours of Environmental Biology elective coursework:
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
Undergraduate Degree Requirements for the B.S. in Environmental Biology (40-41 credit hours)

*Please see Undergraduate Catalog for major-specific requirements

Required Supporting Courses for the Major (32-34 credit hours)
The following courses are prerequisite and supporting courses for this major. They are required for the major, but are not counted in the total hours for this major. The degree will not be awarded if these courses have not been taken by the end of the student’s final semester. Students must receive a C- or better to meet requirements for degree (for progression in Math and Chemistry, a minimum grade of C is required).

- CHM 2045 and CHM 2045L General Chemistry I and Laboratory
- CHM 2046 and CHM 2046L General Chemistry II and Laboratory
- CHM 2210 and CHM 2210L Organic Chemistry I and Laboratory
- CHM 2211 and CHM 2211L Organic Chemistry II and Laboratory
- Calculus I: MAC 2241 or MAC 2311 or MAC 2281
- Statistics or Calculus II: STA 2023 or MAC 2242 or MAC 2312 or MAC 2282

One of the General Physics sequences:
- PHY 2053/2053L General Physics I
- PHY 2048/2048L General Physics I - Calculus Based
- PHY 2054/2054L General Physics II
- PHY 2049/2049L General Physics II - Calculus Based

Major Core (25-26 credit hours)

Biology Core Curriculum (25-26 credit hours)
- BSC 2010 and BSC 2010L Cellular Processes and Laboratory
- BSC 2011 and BSC 2011L Biodiversity and Laboratory
- PCB 3043 and PCB 3043L Principles of Ecology and Laboratory
- PCB 3063 and PCB 3063L General Genetics and Laboratory
- BSC 4052 Conservation Biology
- PCB 4674 Organic Evolution

Choose one of the following courses:
- BOT 4601 Plant Ecology
- BSC 4933 Selected Topics in Biology*

*Selected topics as approved for the major by the Department of Integrative Biology

Major Electives (15 credit hours)
Select a minimum of 15 credit hours from the following list:
- BCH 4033 Advanced Biochemistry I
- BSC 2093C Human Anatomy and Physiology I
- BSC 2094C Human Anatomy and Physiology II
- Any upper-level course with a BOT, BSC, ENY, MCB, PCB, or ZOO prefix, with the exception of those intended for non-majors*

*Note: BSC 4933 cannot be taken as elective credit without prior approval.

Shared Courses (12 credit hours)
The following courses will satisfy 12 credit hours of Environmental Biology elective coursework:
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6938 Topics in Science Education: Field Practicum

Graduate Degree Requirements for the M.A.T. in Science Education (39 credit hours)

*Please see Graduate Catalog for major-specific requirements

All M.A.T. programs include as an admission requirement the passing of all sections of the General Knowledge Test (GKT). Applicants who can document they lived outside the state or country and did not have access to take the GKT before the application deadline may submit passing Praxis scores or GRE scores to be considered for admission. Whether admitted with passing Praxis scores or acceptable GRE scores, the applicant must submit passing scores on the GKT before the last day of classes of the semester of first enrollment, or admission to the College of Education will be revoked.
Core Courses (39 credit hours)

- EDF 6432 Foundations of Measurement
- ESE 5342 Teaching the Adolescent Learner
- ESE 5344 Classroom Management for a Diverse School and Society
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 5564 Reading and Communication in Science Education
- SCE 6416 Teaching Secondary School Biology
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6634 Current Trends in Secondary Science Education
- SCE 6938 Topics in Science Education: Field Practicum
- SCE 6947 Internship (PR: CI and passing scores of FTCE exam)
- TSL 5325 ESOL Strategies for Content Area Teachers

Comprehensive Exam

Student’s participation in the internship experience in classes that correspond to the specific area in which he or she will be certified.
Passing score on the appropriate subject area exam.
Student’s content degree or equivalent (an admission’s requirement).

Comprehensive Examination

A written narrative exam tailored to the individual student. Exam needs to be completed by two weeks before final exam week of the student’s graduating semester. Exams will only be accepted during fall or spring semester, unless previous contract is established with the student’s advisor.

Specialization Requirements for Certification in Separate Areas of Science (Grades 6-12):

In order to be eligible for certification in a separate area of science, students must complete a minimum of thirty (30) semester hours in science to include twenty-one (21) semester hours in the area of desired specialization (chemistry, biology, physics, earth-space science).
Accelerated B.S. in Environmental Microbiology and M.A.T. in Science Education

Description
This program intends for students to complete a B.S. in Environmental Microbiology (College of Arts and Sciences) and M.A.T. in Science Education (College of Education) over the span of five years. Students completing this program will be eligible for high school and/or middle school science teacher certification. Completion of this program requires students to complete 12 credit hours toward the M.A.T. in Science Education during their senior year in the Environmental Microbiology major.

This accelerated program shares 12 credit hours between already existing degrees:
- B.S. in Environmental Microbiology
- M.A.T. in Science Education

Target Students and Expected Outcomes
The accelerated B.S. in Environmental Microbiology to M.A.T. in Science Education program is a collaborative effort between the College of Arts and Sciences and the College of Education. This program is an attractive and viable career path for students majoring in Environmental Microbiology that results in secondary science teacher certification. Students who complete this program receive the necessary science content and pedagogy coursework to be highly qualified biology teachers at the secondary level.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the Environmental Microbiology major upon applying and thirty (30) semester hours in science (includes twenty-five (25) semester hours in biology plus 5 hours of upper-level work in math or supporting science content area) with associated laboratory experiences to be fully admitted as a graduate student in the M.A.T. Science Education program. Evidence of successfully completing all sections of the General Knowledge Test (GKT) is also required for full admission to the graduate program.
2. Have a minimum 3.0 GPA overall; and
3. Have a minimum undergraduate 3.25 GPA in the major.

Timeline and Benchmarks
1. To be considered for acceptance into the Accelerated B.S. Environmental Microbiology/M.A.T. Science Education program, students must have completed a minimum of 15 credit hours in the Environmental Microbiology undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.0 overall, and a minimum GPA of 3.25 in the major and passing scores on all sections of the General Knowledge Test (GKT) to be eligible for the accelerated degree program. Information on the General Knowledge Test on the Florida Teacher Certification section may be found on the webpage: http://www.fl.nesinc.com/.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S. and M.A.T. programs will review the applications and approve the nominations. All applications require the approval of the College of Education Graduate Program, the College of Arts and Sciences, and the USF Graduate School.
4. To be promoted to graduate status, students must meet all admission requirements of the M.A.T. in Science Education in the College of Education. Specifically, the following materials must be submitted:
   a. Undergraduate transcripts;
   b. Evidence of possessing a degree in a science discipline (Biology, Chemistry, Physics, Geology, etc.) that is taught in a middle or high school, or comparable coursework in a science teaching field acceptable to the program faculty;
   c. A bachelor's or higher degree in biology or a bachelor's or higher degree with thirty (30) semester hours in science to include twenty-one (21) semester hours in biology with associated laboratory experiences.
   d. Documentation of GKT scores.
5. Students must earn a minimum of a "B" (3.00) in all graduate courses. Failure to earn at least a "B" in a graduate course will result in academic review by the graduate program. Failure to maintain a minimum 3.0 GPA will result in academic probation, according to the procedures of the USF Office of Graduate Studies.

Shared Courses (12 credit hours)
The following courses will satisfy 12 credit hours of Environmental Microbiology elective coursework:
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
Undergraduate Degree Requirements for the B.S. in Environmental Microbiology (40 credit hours)

*Please see Undergraduate Catalog for major-specific requirements

Required Supporting Courses for the Major (32-34 credit hours)
The following courses are prerequisite and supporting courses for this major. They are required for the major, but are not counted in the total hours for this major. The degree will not be awarded if these courses have not been taken by the end of the student’s final semester. Students must receive a C- or better to meet requirements for degree (for progression in Math and Chemistry, a minimum grade of C is required)

- CHM 2045 and CHM 2045L General Chemistry I and Laboratory
- CHM 2046 and CHM 2046L General Chemistry II and Laboratory
- CHM 2210 and CHM 2210L Organic Chemistry I and Laboratory
- CHM 2211 and CHM 2211L Organic Chemistry II and Laboratory
- Calculus I: MAC 2241 or MAC 2311 or MAC 2281
- Statistics or Calculus II: STA 2023 or MAC 2242 or MAC 2312 or MAC 2282
- One of the General Physics sequences:
  - PHY 2053/2053L General Physics I and PHY 2054/2054L General Physics II
  - PHY 2048/2048L General Physics I - Calculus Based and PHY 2049/2049L General Physics II - Calculus Based

Major Core (30 credit hours)

- Biology Core: 16 credit hours
  - BSC 2010 and BSC 2010L Cellular Processes and Laboratory
  - BSC 2011 and BSC 2011L Biodiversity and Laboratory
  - PCB 3043 and PCB 3043L Principles of Ecology and Laboratory
  - PCB 3063 and PCB 3063L General Genetics and Laboratory

- Environmental Microbiology Core: 24 credit hours
  - MCB 3020 and MCB 3020L General Microbiology and Laboratory
  - MCB 4404 and MCB 4404L Microbial Physiology and Genetics and Laboratory
  - Choose two of the following courses:
    - BSC 4933 Selected Topics in Biology*
    - BSC 4444 Genomics
    - MCB 4202 Ecology of Infectious Diseases
    - ZOO 4233 Parasitology

*Selected topics as approved for the major by the Department of Integrative Biology

Major Electives (10 credit hours)
Select a minimum of 10 credit hours from the following list:

- BCH 4033 Advanced Biochemistry I
- BSC 2093C Human Anatomy and Physiology I
- BSC 2094C Human Anatomy and Physiology II
- Any upper-level course with a BOT, BSC, ENY, MCB, PCB, or ZOO prefix, with the exception of those intended for non-majors*

*Note: BSC 4933 cannot be taken as elective credit without prior approval.

Shared Courses (12 credit hours)
The following courses will satisfy 12 credit hours of Environmental Microbiology elective coursework:

- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6938 Topics in Science Education: Field Practicum

Graduate Degree Requirements for the M.A.T. in Science Education (39 credit hours)

*Please see Graduate Catalog for major-specific requirements

All M.A.T. programs include as an admission requirement the passing of all sections of the General Knowledge Test (GKT). Applicants who can document they lived outside the state or country and did not have access to take the GKT before the application deadline may submit passing Praxis scores or GRE scores to be considered for admission. Whether admitted with passing Praxis scores or acceptable GRE scores, the applicant must submit
passing scores on the GKT before the last day of classes of the semester of first enrollment, or admission to the College of Education will be revoked.

Core Courses (39 credit hours)
- EDF 6432 Foundations of Measurement
- ESE 5342 Teaching the Adolescent Learner
- ESE 5344 Classroom Management for a Diverse School and Society
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 5564 Reading and Communication in Science Education
- SCE 6416 Teaching Secondary School Biology
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6634 Current Trends in Secondary Science Education
- SCE 6938 Topics in Science Education: Field Practicum
- SCE 6947 Internship (PR: CI and passing scores of FTCE exam)
- TSL 5325 ESOL Strategies for Content Area Teachers

Comprehensive Exam
- Student's participation in the internship experience in classes that correspond to the specific area in which he or she will be certified.
- Passing score on the appropriate subject area exam.
- Student's content degree or equivalent (an admission's requirement).

Comprehensive Examination
- A written narrative exam tailored to the individual student. Exam needs to be completed by two weeks before final exam week of the student's graduating semester. Exams will only be accepted during fall or spring semester, unless previous contract is established with the student's advisor.

Specialization Requirements for Certification in Separate Areas of Science (Grades 6-12):
- In order to be eligible for certification in a separate area of science, students must complete a minimum of thirty (30) semester hours in science to include twenty-one (21) semester hours in the area of desired specialization (chemistry, biology, physics, earth-space science).
Accelerated B.A. in Humanities and Cultural Studies with a concentration in Film and New Media Studies and M.A. in Liberal Arts with a concentration in Film Studies

Description
This program intends for students to complete a B.A. in Humanities and Cultural Studies with a concentration in Film and New Media Studies and M.A. in Liberal Arts with a concentration in Film Studies over the span of five years. Completion of this program allows students to complete 12 credit hours toward the M.A. in during their junior or senior year in the Humanities and Cultural Studies major. Students who decide not to pursue the M.A. but who complete the B.A. requirements will receive the B.A. degree.

This accelerated program shares 12 credit hours between already existing degrees/concentrations:
- B.A. in Humanities and Cultural Studies with a concentration in Film and New Media Studies
- M.A. in Liberal Arts with a concentration in Film Studies

Target Students and Expected Outcomes
The accelerated program is an attractive and viable path for students seeking to expedite their entry to the workforce or to Ph.D. studies. Students who complete this program will maximize department resources and opportunities for research.

Admission Requirements
For consideration of admission to the program, a student must:
1. Have completed 15 credit hours in the B.A. Humanities and Cultural Studies major, Film and New Media Studies concentration upon applying;
2. Have a minimum 3.33 GPA overall;
3. Have a minimum undergraduate 3.5 GPA in the major;
4. Have completed FIL 1002 with a B or higher; and
5. Have met with the Graduate Director and/or Graduate Advisor to discuss a plan of study

Shared Courses (12 credit hours)
The following 12 credit hours of coursework will be shared between the two degrees:
- FIL 3052 Foundations of Film & New Media
  Satisfied by HUM 6583 Global Cinema and New Media to 1960
- FIL 3077 Contemporary Film & New Media
  Satisfied by HUM 6584 Global Cinema and New Media since 1960
- Three (3) credit hours of upper-level, undergraduate AMS, FIL, or HUM coursework
  Satisfied by HUM 6586 Film Theory
- An additional three (3) credit hours may be earned by taking any 6000-level AMS or HUM course

Undergraduate Degree Requirements for the B. A. in Humanities and Cultural Studies with a concentration in Film and New Media Studies (36 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (9 credit hours)
- HUM 3804 Introduction to Cultural Studies
- HUM 4331 Humanities Pro-Seminar
- HUM 4931 Seminar in Humanities

Concentration Core (12 credit hours)
- FIL 1002 Introduction to Film Studies
- FIL 3052 Foundations of Film & New Media
- FIL 3077 Contemporary Film & New Media
Students select one course from the following list:
- AMS 2270 Twentieth-Century American Culture
- HUM 2250 Studies in Culture: The Twentieth Century

Concentration Electives (15 credit hours)
Students take an additional 15 credit hours of upper-level coursework from Humanities and Cultural Studies with an AMS, FIL, or HUM prefix.

Shared Courses (12 credit hours)
The following 12 credit hours of coursework will be shared between the two degrees:
- FIL 3052 Foundations of Film & New Media
Graduate Degree Requirements for the M.A. in Liberal Arts with a concentration in Film Studies (33 credit hours)
*Please see Graduate Catalog for major-specific requirements

Major Core (3 credit hours)
HUM 6815 Research Seminar

Concentration Core (12 credit hours)
HUM 6814 Introduction to Graduate Study
HUM 6853 Global Cinema and New Media to 1960
HUM 6854 Global Cinema and New Media since 1960
HUM 6586 Film Theory

Concentration Electives (12 credit hours)
Twelve (12) credit hours of additional coursework selected in consultation with the Graduate Director

Thesis (6 credit hours)
HUM 6971 Thesis

After the completion of coursework, each student will select a thesis topic; constitute a thesis committee; and write and orally defend a thesis proposal. Each student will then write and orally defend a 40-80 page thesis. During the proposal and thesis writing stage, students are required to enroll for 6 thesis hours.

Students pursuing the M.A. in Liberal Arts with a concentration in Film Studies through the Accelerated B.A./M.A. program, may choose either a thesis or an exam, with the approval of the Graduate Advisor. Required coursework for the accelerated degree is tailored to the choice of the thesis or exam path as noted below.

Thesis Path
In addition to the above, students pursuing the thesis option must take:
HUM 6814 Introduction to Graduate Study
HUM 6815 Research Seminar
HUM 6971 Thesis
Three electives (nine credit hours), chosen in consultation with the Graduate Advisor

Exam Path (Non-Thesis)
In addition to the above requirements for both thesis and exam paths, students pursuing the exam option, must take:
HUM 6814 Introduction to Graduate Study
Five electives (15 credit hours), chosen in consultation with the Graduate Advisor
Three credit hours of Directed Reading in preparation for the MA exam
An exam, administered and graded by a committee, comprising the student’s major professor and two other members of the graduate faculty. If a student fails the exam, she/he may retake it once, no later than one month after the graded exam is returned to the student.

Comprehensive Exam
The submission and oral defense of the thesis proposal equates to the comprehensive exam.
Accelerated B.S. in Integrative Animal Biology and M.A.T. in Science Education

Description
This program intends for students to complete a B.S. in Integrative Animal Biology (College of Arts and Sciences) and M.A.T. in Science Education (College of Education) over the span of five years. Students completing this program will be eligible for high school and/or middle school science teacher certification. Completion of this program requires students to complete 12 credit hours toward the M.A.T. in Science Education during their senior year in the Integrative Animal Biology major.

This accelerated program shares 12 credits between already existing degrees:
- B.S. in Integrative Animal Biology
- M.A.T. in Science Education

Target Students and Expected Outcomes
The accelerated B.S. in Integrative Animal Biology to M.A.T. in Science Education program is a collaborative effort between the College of Arts and Sciences and the College of Education. This program is an attractive and viable career path for students majoring in Integrative Animal Biology that results in secondary science teacher certification. Students who complete this program receive the necessary science content and pedagogy coursework to be highly qualified biology teachers at the secondary level.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the B.S. Integrative Animal Biology major upon applying and thirty (30) semester hours in science (includes twenty-five (25) semester hours in biology plus 5 hours of upper-level work in math or supporting science content area) with associated laboratory experiences to be fully admitted as a graduate student in the M.A.T. Science Education program. Evidence of successfully completing all sections of the General Knowledge Test (GKT) is also required for full admission to the graduate program.
2. Have a minimum 3.0 GPA overall; and
3. Have a minimum undergraduate 3.25 GPA in the major.

Timeline and Benchmarks
1. To be considered for acceptance into the Accelerated B.S. Integrative Animal Biology/M.A.T. Science Education program, students must have completed a minimum of 15 credit hours in the Integrative Animal Biology undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.0 overall, and a minimum GPA of 3.25 in the major and passing scores on all sections of the General Knowledge Test (GKT) to be eligible for the accelerated degree program. Information on the General Knowledge Test on the Florida Teacher Certification section may be found on the webpage: http://www.fl.nesinc.com/.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S. and M.A.T. programs will review the applications and approve the nominations. All applications require the approval of the College of Education Graduate Program, the College of Arts and Sciences, and the USF Graduate School.
4. To be promoted to graduate status, students must meet all admission requirements of the M.A.T. in Science Education in the College of Education. Specifically, the following materials must be submitted:
   1. Undergraduate transcripts;
   2. Evidence of possessing a degree in a science discipline (Biology, Chemistry, Physics, Geology, etc.) that is taught in a middle or high school, or comparable coursework in a science teaching field acceptable to the program faculty;
   3. A bachelor's or higher degree in biology or a bachelor's or higher degree with thirty (30) semester hours in science to include twenty-one (21) semester hours in biology with associated laboratory experiences.
   4. Documentation of GKT scores.
5. Students must earn a minimum of a “B” (3.00) in all graduate courses. Failure to earn at least a “B” in a graduate course will result in academic review by the graduate program. Failure to maintain a minimum 3.0 GPA will result in academic probation, according to the procedures of the USF Office of Graduate Studies.

Shared Courses (12 credit hours)
The following courses will satisfy 12 credit hours of Integrative Animal Biology elective coursework:
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
SCE 6456 Teaching Secondary School Physical and Earth Science
SCE 6938 Topics in Science Education: Field Practicum

Undergraduate Degree Requirements for the B.S. in Integrative Animal Biology (40 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Required Supporting Courses for the Major (32-34 credit hours)
The following courses are prerequisite and supporting courses for this major. They are required for the major, but are not counted in the total hours for this major. The degree will not be awarded if these courses have not been taken by the end of the student’s final semester. Students must receive a C- or better to meet requirements for degree (for progression in Math and Chemistry, a minimum grade of C is required)

- CHM 2045 and CHM 2045L General Chemistry I and Laboratory
- CHM 2046 and CHM 2046L General Chemistry II and Laboratory
- CHM 2210 and CHM 2210L Organic Chemistry I and Laboratory
- CHM 2211 and CHM 2211L Organic Chemistry II and Laboratory
- Calculus I: MAC 2241 or MAC 2311 or MAC 2281
- Statistics or Calculus II: STA 2023 or MAC 2242 or MAC 2312 or MAC 2282
- One of the General Physics sequences:
  - PHY 2053/2053L General Physics I and PHY 2054/2054L General Physics II
  - PHY 2048/2048L General Physics I - Calculus Based and PHY 2049/2049L General Physics II - Calculus Based

Major Core (24 credit hours)
Biology Core (16 credit hours)
- BSC 2010 Cellular Processes
- BSC 2010L Cellular Processes Laboratory
- BSC 2011 Biodiversity
- BSC 2011L Biodiversity Laboratory
- PCB 3043 Principles of Ecology
- PCB 3043L Principles of Ecology Laboratory
- PCB 3063 General Genetics
- PCB 3063L General Genetics Laboratory

Structure and Function Courses: 8 credit hours
Choose one Structure & Function Pairing from the following list:

- Invertebrate Biology
  - ZOO 3205C Advanced Invertebrate Zoology AND PCB 3712/3713L General Physiology and Lab
- Vertebrate Biology
  - BSC 4933 Selected Topics in Biology: Vertebrate Natural History and Lab OR ZOO 3713C Comparative Vertebrate Anatomy OR BSC 4933 Selected Topics in Biology: Mammalogy and Lab AND PCB 3712/PCB 3713L General Physiology and Lab
- Human Biology
  - BSC 2093C Human Anatomy & Physiology I AND BSC 2094C Human Anatomy & Physiology II

Major Electives (16 credit hours)
Choose 16 additional hours of Integrative Animal Biology Major courses (8 of the 16 hours must be 4000+ level Biology Major Courses), from Tampa Campus IB Department or CMMB Department course offerings (prefix of BOT, BSC, MCB, PCB, or ZOO), with the exception of BSC 4905 and courses labeled as "not for major credit."

Shared Courses (12 credit hours)
The following courses will satisfy 12 credit hours of Integrative Animal Biology elective coursework:
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6938 Topics in Science Education: Field Practicum

Graduate Degree Requirements for the M.A.T. in Science Education (39 credit hours)
*Please see Graduate Catalog for major-specific requirements

All M.A.T. programs include as an admission requirement the passing of all sections of the General Knowledge Test (GKT). Applicants who can document they lived outside the state or country and did not have access to take the GKT before the application deadline may submit passing Praxis scores or GRE scores to be considered for admission. Whether admitted with passing Praxis scores or acceptable GRE scores, the applicant must submit
passing scores on the GKT before the last day of classes of the semester of first enrollment, or admission to the College of Education will be revoked.

Core Courses (39 credit hours)
- EDF 6432 Foundations of Measurement
- ESE 5342 Teaching the Adolescent Learner
- ESE 5344 Classroom Management for a Diverse School and Society
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 5564 Reading and Communication in Science Education
- SCE 6416 Teaching Secondary School Biology
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6634 Current Trends in Secondary Science Education
- SCE 6938 Topics in Science Education: Field Practicum
- SCE 6947 Internship (PR: CI and passing scores of FTCE exam)
- TSL 5325 ESOL Strategies for Content Area Teachers

Comprehensive Exam
- Student’s participation in the internship experience in classes that correspond to the specific area in which he or she will be certified.
- Passing score on the appropriate subject area exam.
- Student’s content degree or equivalent (an admission’s requirement).

Comprehensive Examination
- A written narrative exam tailored to the individual student. Exam needs to be completed by two weeks before final exam week of the student’s graduating semester. Exams will only be accepted during fall or spring semester, unless previous contract is established with the student’s advisor.

Specialization Requirements for Certification in Separate Areas of Science (Grades 6-12):
- In order to be eligible for certification in a separate area of science, students must complete a minimum of thirty (30) semester hours in science to include twenty-one (21) semester hours in the area of desired specialization (chemistry, biology, physics, earth-space science).
Accelerated B.S. in Interdisciplinary Natural Sciences and M.A.T. in Science Education

Description
This program intends for students to complete a B.S. in Interdisciplinary Natural Sciences (College of Arts and Sciences) and M.A.T. in Science Education (College of Education) over the span of five years. Students completing this program will be eligible for high school and/or middle school science teacher certification. Completion of this program requires students to complete 12 credit hours toward the M.A.T. in Science Education during their senior year in the Interdisciplinary Natural Sciences major.

This accelerated program shares 12 credits between already existing degrees:
B.S. in Interdisciplinary Natural Sciences
M.A.T. in Science Education

Target Students and Expected Outcomes
The accelerated B.S. in Interdisciplinary Natural Sciences to M.A.T. in Science Education program is a collaborative effort between the College of Arts and Sciences and the College of Education. This program is an attractive and viable career path for students majoring in Interdisciplinary Natural Sciences that results in secondary science teacher certification. Students who complete this program receive the necessary science content and pedagogy coursework to be highly qualified science teachers at the secondary level.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the B.S. in Interdisciplinary Natural Sciences major upon applying and thirty (30) semester hours in science (includes twenty-one (21) semester hours in a science concentration (e.g. chemistry, biology, physics) plus 9 hours in minor science content area) with associated laboratory experiences to be fully admitted as a graduate student in the M.A.T. Science Education Program. Evidence of successfully completing all sections of the General Knowledge Test (GKT) is also required for full admission to the graduate program
2. Have a minimum 3.0 GPA overall; and
3. Have a minimum undergraduate 3.25 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S. Interdisciplinary Natural Sciences/M.A.T. Science Education program, students must have completed a minimum of 15 credit hours in the Interdisciplinary Natural Sciences undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.0 overall, and a minimum GPA of 3.25 in the major and passing scores on all sections of the General Knowledge Test (GKT) to be eligible for the accelerated degree program. You can find information on the General Knowledge Test on the Florida Teacher Certification section of the following webpage: http://www.fl.nesinc.com/.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S. and M.A.T. programs will review the applications and approve the nominations. All applications require the approval of USF’s Graduate School, the College of Education’s Graduate Program, and the Department of Chemistry’s Undergraduate Program.
4. To be promoted to graduate status, students must meet all admission requirements of the M.A.T. in Science Education in the College of Education. Specifically, the following materials must be submitted:
   - Undergraduate transcripts; and evidence of possessing a degree in a science discipline (biology, chemistry, physics, geology, etc.) that is taught in a middle or high school, or comparable coursework in a science teaching field acceptable to the program faculty.
   - A minimum of 21 hours in a major science content area of concentration (e.g., chemistry, biology, physics) plus 9 hours in minor science content area are required to teach secondary school.
     - Note, to teach secondary science in a specialty area (e.g. chemistry, biology, physics) the State of Florida requires: A bachelor's or higher degree with thirty (30) semester hours in science to include twenty-one (21) semester hours in that specialty area with associated laboratory experiences.
   - Documentation of GKT scores.
5. Students must earn a minimum of a “B” (3.00) in all graduate courses. Failure to earn at least a “B” in a graduate course will result in academic review by the graduate program. Failure to maintain a minimum 3.0 GPA will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
Shared Courses (12 credit hours)
The following courses will satisfy 12 credit hours of Interdisciplinary Natural Sciences elective coursework:
1. SCE 5325 Methods of Middle Grades Science Education
2. SCE 5337 Methods of Secondary Science Education
3. SCE 6456 Teaching Secondary School Physical and Earth Science
4. SCE 6938 Topics in Science Education: Field Practicum

Undergraduate Degree Requirements for the B.S. in Interdisciplinary Natural Sciences (62-64 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (Tier 1) (38-40 credit hours)
Two introductory courses in each of the five (5) natural sciences areas: Mathematics, Biology, Chemistry, Geology, Physics:

Mathematics Courses:
- MAC 2241 Life Sciences Calculus I
  *MAC 2311 and MAC 2312 are also acceptable for the major.
- MAC 2242 Life Sciences Calculus II
  *MAC 2281 and MAC 2282 are also acceptable for the major.

Biology Courses:
- BSC 2010 Cellular Processes
- BSC 2010L Cellular Processes Laboratory
- BSC 2011 Biodiversity
- BSC 2011L Biodiversity Laboratory

Chemistry Courses:
- CHM 2045 General Chemistry I
- CHM 2045L General Chemistry I Lab
- CHM 2046 General Chemistry II
- CHM 2046L General Chemistry II Lab

Geology Courses:
- GLY 2010 Dynamic Earth: Introduction to Physical Geology
- GLY 2000L Essentials of Geology Laboratory
- GLY 2100 History of Life
- GLY 2100L History of Life Laboratory

Physics:
- PHY 2053 General Physics I and PHY 2053L General Physics I Laboratory
- PHY 2054 General Physics II and PHY 2054L General Physics II Laboratory
- PHY 2048 General Physics I - Calculus Based and PHY 2048L General Physics I - Calculus Based Laboratory and PHY 2049 General Physics II - Calculus Based and PHY 2049L General Physics II - Calculus Based Laboratory are also accepted for this major.

Major Electives (Tier 2) (24 credit hours)
Students are required to complete a minimum total of 24 credit hours. A minimum of 6 credit hours of structured, upper-level (3000-level or higher) courses in three of the five natural sciences areas is required. The remaining six credits of upper-level courses can be taken in any of the three Tier 2 Natural Science areas that the student has selected. All Tier 2 courses in the sciences will be selected by the individual student, but must be chosen from the list of courses approved for department major credit.

Shared Courses (12 credit hours)
The following courses will satisfy 12 credit hours of Interdisciplinary Natural Sciences elective coursework:
1. SCE 5325 Methods of Middle Grades Science Education
2. SCE 5337 Methods of Secondary Science Education
3. SCE 6456 Teaching Secondary School Physical and Earth Science
4. SCE 6938 Topics in Science Education: Field Practicum

Graduate Degree Requirements for the M.A.T. in Science Education (39 credit hours)
*Please see Graduate Catalog for major-specific requirements

All M.A.T. programs include as an admission requirement the passing of all sections of the General Knowledge Test (GKT). Applicants who can document they lived outside the state or country and did not have access to take the GKT before the application deadline may submit passing Praxis scores or GRE scores to be considered for
admission. Whether admitted with passing Praxis scores or acceptable GRE scores, the applicant must submit passing scores on the GKT before the last day of classes of the semester of first enrollment, or admission to the College of Education will be revoked.

Core Courses (39 credit hours)
- EDF 6432 Foundations of Measurement
- ESE 5342 Teaching the Adolescent Learner
- ESE 5344 Classroom Management for a Diverse School and Society
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 5564 Reading and Communication in Science Education
- SCE 6416 Teaching Secondary School Biology
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6634 Current Trends in Secondary Science Education
- SCE 6938 Topics in Science Education: Field Practicum
- SCE 6947 Internship (PR: CI and passing scores of FTCE exam)
- TSL 5325 ESOL Strategies for Content Area Teachers

Comprehensive Exam
  - Student’s participation in the internship experience in classes that correspond to the specific area in which he or she will be certified.
  - Passing score on the appropriate subject area exam.
  - Student’s content degree or equivalent (an admission’s requirement).

Comprehensive Examination
  - A written narrative exam tailored to the individual student. Exam needs to be completed by two weeks before final exam week of the student’s graduating semester. Exams will only be accepted during fall or spring semester, unless previous contract is established with the student’s advisor.

Specialization Requirements for Certification in Separate Areas of Science (Grades 6-12):
  - In order to be eligible for certification in a separate area of science, students must complete a minimum of thirty (30) semester hours in science to include twenty-one (21) semester hours in the area of desired specialization (chemistry, biology, physics, earth-space science).
Accelerated B.S. in Marine Biology and M.A.T. in Science Education

Description

This program intends for students to complete a B.S. in Marine Biology (College of Arts and Sciences) and M.A.T. in Science Education (College of Education) over the span of five years. Students completing this program will be eligible for high school and/or middle school science teacher certification. Completion of this program requires students to complete 12 credit hours toward the M.A.T. in Science Education during their senior year in the Marine Biology major.

This accelerated program shares 12 credits between already existing degrees:

B.S. in Marine Biology
M.A.T. in Science Education

Target Students and Expected Outcomes

The accelerated B.S. in Marine Biology to M.A.T. in Science Education program is a collaborative effort between the College of Arts and Sciences and the College of Education. This program is an attractive and viable career path for students majoring in Marine Biology that results in secondary science teacher certification. Students who complete this program receive the necessary science content and pedagogy coursework to be highly qualified biology teachers at the secondary level.

Admission Requirements

For admission to the program, a student must:

1. Have completed 15 hours in the B.S. Marine Biology major upon applying and thirty (30) semester hours in science (includes twenty-five (25) semester hours in biology plus 5 hours of upper-level work in math or supporting science content area) with associated laboratory experiences to be fully admitted as a graduate student in the M.A.T. Science Education program. Evidence of successfully completing all sections of the General Knowledge Test (GKT) is also required for full admission to the graduate program.
2. Have a minimum 3.0 GPA overall; and
3. Have a minimum undergraduate 3.25 GPA in the major.

Timeline and Benchmarks:

1. To be considered for acceptance into the Accelerated B.S. Marine Biology/M.A.T. Science Education program students must have completed a minimum of 15 credit hours in the Marine Biology undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.0 overall, and a minimum GPA of 3.25 in the major and passing scores on all sections of the General Knowledge Test (GKT) to be eligible for the accelerated degree program. Information on the General Knowledge Test on the Florida Teacher Certification section may be found on the webpage: http://www.fl.nesinc.com/.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S. and M.A.T. programs will review the applications and approve the nominations. All applications require the approval of the College of Education Graduate Program, the College of Arts and Sciences, and the USF Graduate School.
4. To be promoted to graduate status, students must meet all admission requirements of the M.A.T. in Science Education in the College of Education. Specifically, the following materials must be submitted:
   a. Undergraduate transcripts;
   b. Evidence of possessing a degree in a science discipline (Biology, Chemistry, Physics, Geology, etc.) that is taught in a middle or high school, or comparable coursework in a science teaching field acceptable to the program faculty;
   c. A bachelor's or higher degree in biology or a bachelor's or higher degree with thirty (30) semester hours in science to include twenty-one (21) semester hours in biology with associated laboratory experiences.
   d. Documentation of GKT scores.
5. Students must earn a minimum of a “B” (3.00) in all graduate courses. Failure to earn at least a “B” in a graduate course will result in academic review by the graduate program. Failure to maintain a minimum 3.0 GPA will result in academic probation, according to the procedures of the USF Office of Graduate Studies.

Shared Courses (12 credit hours)

The following courses will satisfy 12 credit hours of Marine Biology elective coursework:

SCE 5325 Methods of Middle Grades Science Education
SCE 5337 Methods of Secondary Science Education
**Undergraduate Degree Requirements for the B.S. in Marine Biology (37-41 credit hours)**

*Please see Undergraduate Catalog for major-specific requirements*

**Required Supporting Courses for the Major (32-34 credit hours)**

The following courses are prerequisite and supporting courses for this major. They are required for the major, but are not counted in the total hours for this major. The degree will not be awarded if these courses have not been taken by the end of the student’s final semester. Students must receive a C- or better to meet requirements for degree (for progression in Math and Chemistry, a minimum grade of C is required).

- CHM 2045 and CHM 2045L General Chemistry I and Laboratory
- CHM 2046 and CHM 2046L General Chemistry II and Laboratory
- CHM 2210 and CHM 2210L Organic Chemistry I and Laboratory
- CHM 2211 and CHM 2211L Organic Chemistry II and Laboratory
- Calculus I: MAC 2241 or MAC 2311 or MAC 2281
- Statistics or Calculus II: STA 2023 or MAC 2242 or MAC 2312 or MAC 2282

One of the Physics Sequences:
- PHY 2053/2053L General Physics I and PHY 2054/2054L General Physics II
- PHY 2048/2048L General Physics I - Calculus Based and PHY 2049/2049L General Physics II - Calculus Based

**Major Core (24-26 credit hours)**

- BSC 2010 Cellular Processes
- BSC 2010L Cellular Processes Laboratory
- BSC 2011 Biodiversity
- BSC 2011L Biodiversity Laboratory
- BSC 3312 Marine Biology
- BSC 4937 Seminar in Marine Biology
- PCB 3043 Principles of Ecology
- PCB 3043L Principles of Ecology Laboratory
- PCB 3063 General Genetics
- PCB 3063L General Genetics Laboratory

**Choose one of the following:**

- BOT 3373C Vascular Plants: Form and Function
- BSC 4933 Selected Topics in Biology*
- MCB 3020 and MCB 3020L General Microbiology and Laboratory
- ZOO 3205C Advanced Invertebrate Zoology
- ZOO 3713C Comparative Vertebrate Anatomy

*Special topics as approved for the major by the Department of Integrative Biology

**Major Electives (13-15 credit hours)**

Students choose 13-15 credit hours of coursework from the following list:

- BCH 4033 Advanced Biochemistry I
- BOT 3373C Vascular Plants: Form and Function
- BOT 4184C Biology of Coastal Plants
- BSC 4313C Advanced Marine Biology
- BSC 4933 Special Topics in Biology*
- GIS 4043C Geographic Information Systems or GIS 5049 GIS for Non-Majors
- GLY 4734 Beaches and Coastal Environments
- MCB 3020 General Microbiology
- MCB 3020L General Microbiology Laboratory
- MCB 4404 Microbial Physiology and Genetics and MCB 4404L Microbial Physiology and Genetics Laboratory
- PCB 3712 General Physiology and PCB 3713L General Physiology Laboratory
- PCB 4674 Organic Evolution
- PCB 4723 Animal Physiology and PCB 4723L Animal Physiology Laboratory
- ZOO 3205C Advanced Invertebrate Zoology
- ZOO 3407 Biology of Sharks and Rays and ZOO 3407L Biology of Sharks and Rays Laboratory
- ZOO 4454 Fish Biology and ZOO 4454 Fish Biology Laboratory
- ZOO 4513 Animal Behavior

*Special topics as approved for the major by the Department of Integrative Biology
Shared Courses (12 credit hours)
The following courses will satisfy 12 credit hours of Marine Biology elective coursework:
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6938 Topics in Science Education: Field Practicum

Graduate Degree Requirements for the M.A.T. in Science Education (39 credit hours)
*Please see Graduate Catalog for major-specific requirements*

All M.A.T. programs include as an admission requirement the passing of all sections of the General Knowledge Test (GKT). Applicants who can document they lived outside the state or country and did not have access to take the GKT before the application deadline may submit passing Praxis scores or GRE scores to be considered for admission. Whether admitted with passing Praxis scores or acceptable GRE scores, the applicant must submit passing scores on the GKT before the last day of classes of the semester of first enrollment, or admission to the College of Education will be revoked.

Core Courses (39 credit hours)
- EDF 6432 Foundations of Measurement
- ESE 5342 Teaching the Adolescent Learner
- ESE 5344 Classroom Management for a Diverse School and Society
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 5564 Reading and Communication in Science Education
- SCE 6416 Teaching Secondary School Biology
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6634 Current Trends in Secondary Science Education
- SCE 6938 Topics in Science Education: Field Practicum
- SCE 6947 Internship (PR: CI and passing scores of FTCE exam)
- TSL 5325 ESOL Strategies for Content Area Teachers

Comprehensive Exam

Student’s participation in the internship experience in classes that correspond to the specific area in which he or she will be certified.

Passing score on the appropriate subject area exam.

Student’s content degree or equivalent (an admission’s requirement).

Comprehensive Examination

A written narrative exam tailored to the individual student. Exam needs to be completed by two weeks before final exam week of the student’s graduating semester. Exams will only be accepted during fall or spring semester, unless previous contract is established with the student’s advisor.

Specialization Requirements for Certification in Separate Areas of Science (Grades 6-12):

In order to be eligible for certification in a separate area of science, students must complete a minimum of thirty (30) semester hours in science to include twenty-one (21) semester hours in the area of desired specialization (chemistry, biology, physics, earth-space science).
Accelerated B.A. in Mathematics and M.A. in Mathematics

This program is designed for superior students having a solid background in high school mathematics and the ability to handle a fast paced, challenging program leading to a B.A. in Mathematics and M.A. in Mathematics in four to five years.

The program meets all the requirements for the B.A. degree but requires the student to take the graduate-level courses required for the M.A. degree during the last two years in the program. Up to 20 hours of graduate courses may be counted towards the M.A. degree as well as the B.A. degree but not towards the undergraduate major (that is, as general electives).

For admission to the program, a student must:
1. have completed at least 30 hours of college credit including 8 hours of 3000-level or above Mathematics courses;
2. have at least a 3.0 GPA for all college courses; and
3. have at least a 3.5 GPA for all Mathematics courses taken at the 3000-level or above.

To apply for admission, send a letter to the Chair of the Department of Mathematics stating your qualifications and desire to enter the program. An important benefit of this program is that a student is eligible to apply for a graduate teaching assistantship once he or she has completed the undergraduate Mathematics major courses.
Accelerated B.S. in Microbiology and M.S. in Microbiology

Description
This program allows undergraduate Microbiology to take graduate courses for the elective part of the Microbiology major and apply them to a non-thesis M.S. in Microbiology. Successful students will be able to earn the M.S. degree in two additional semesters beyond the completion of the B.S. degree.

This accelerated program shares 12 credit hours between already existing degrees:
- B.S. in Microbiology
- M.S. in Microbiology (Non-Thesis)

Target Students and Expected Outcomes
This program will appeal to the more competitive Microbiology majors who would benefit professionally from having the M.S. when they enter the job market but do not want to commit to the longer time a thesis M.S. or a Ph.D. program takes to complete. Professions that do not require bench laboratory experience but desire the broadened knowledge base are targeted. Graduates from this program would be ideally suited for health professions, technology based industry, education, and government. We also expect that some students will be interested in doctoral education in the biological or biomedical areas.

Admission Requirements
Microbiology majors who have completed the following courses may apply to this program:
- PCB 3023 Cell Biology
- PCB 3063 Genetics
- MCB 3410 Cell Metabolism
- MCB 3020 General Microbiology
- MCB 4115 Determinative Bacteriology

Timeline and Benchmarks:
1. Completion of prerequisite upper division courses and application to the accelerated program. Typically, students will be in their junior year.
2. Acceptance into the program and an action plan within a semester of application.
3. Students will take up to 12 credit hours of graduate credit in Cell Biology, Microbiology and Molecular Biology courses following acceptance into the program. Typically, these courses will be taken in the latter half of the junior year and in the senior year. BioAdvise will monitor the progress of the students and ensure they follow their action plan. Students who do not complete at least 9 hours of graduate work by graduation will be dropped from the accelerated M.S. program.
4. GRE exams will be taken in a timely manner so scores will be available for admission to the M.S. portion of the program. Students who do not complete the GRE in time will not be admitted to the accelerated M.S. program.
5. Students admitted to the accelerated program must form a committee prior to the beginning of their first semester in the M.S. portion of the program and must continue to follow the action plan, which will be monitored by BioAdvise.
6. Students admitted to the accelerated M.S. program must complete the requirements within three semesters or will be dismissed from the program.

Shared Courses (12 credit hours)
Twelve (12) credit hours of graduate credit may be shared as follows:
- Three (3) credit hours of 5000-level elective structured courses for 3000- or 4000-level electives
- Nine (9) credit hours of 5000- or 6000-level elective courses for 3000- or 4000-level electives

Undergraduate Degree Requirements for the B.S. in Microbiology (43 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (31 credit hours)
- BSC 2010 Cellular Processes
- BSC 2010L Cellular Processes Laboratory
- BSC 2011 Biodiversity
- BSC 2011L Biodiversity Laboratory
- PCB 3023 Cell Biology
- PCB 3023L Cell Biology Laboratory
- PCB 3063 General Genetics
PCB 3063L General Genetics Laboratory
MCB 3410 Cell Metabolism
MCB 3020 General Microbiology
MCB 3020L General Microbiology Laboratory
MCB 4115 Determinative Bacteriology
MCB 4115L Determinative Bacteriology Laboratory
MCB 4320 Molecular Microbiology

Major Electives (12 credit hours)

Students must choose 12 credit hours from the following list:

- BCH 3053 General Biochemistry
- BOT 4434C Mycology
- BSC 4905 Independent Study (1 credit maximum)
- BSC 5931 Selected Topics in Biology*
- MCB 4313 Industrial Microbiology and Biotechnology
- MCB 4223 Food Microbiology
- MCB 4404 Microbial Physiology and Genetics
- MCB 4404L Microbial Physiology and Genetics Laboratory
- MCB 4503 Virology
- MCB 4905 Microbiology Undergraduate Research (1 or 2 credit hours/semester, no more than 4 credits total)
- MCB 4933 Selected Topics in Microbiology*
- MCB 4934 Seminar in Microbiology
- MCB 5206 Public Health and Pathogenic Microbiology
- MCB 5655 Applied and Environmental Biology
- MCB 5815 Medical Mycology
- PCB 4234 Principles of Immunology
- PCB 4671 Molecular Evolution
- ZOO 4753 Human Histology and Molecular Pathology of Disease

Shared Courses (12 credit hours)

Twelve (12) credit hours of graduate credit may be shared as follows:

- Three (3) credit hours of 5000-level elective structured courses for 3000- or 4000-level electives
- Nine (9) credit hours of 5000- or 6000-level elective courses for 3000- or 4000-level electives

Graduate Degree Requirements for the M.S. in Microbiology (30 credit hours)

*Please see Graduate Catalog for major-specific requirements

Students admitted into the M.S. portion of the program must complete all the requirements for the M.S. degree (non-thesis) within three semesters of admission. The requirement is 30 credit hours of graduate work with at least 16 of these credit hours completed at the 6000-level; 26 credit hours must be formally structured courses; and at least 15 credit hours must be in Cell Biology, Microbiology and Molecular Biology courses. Students will be required to take three core courses from the list below as part of these 26 credit hours. Of the required 26 credit hours, nine (9) credit hours will be derived from the core Cell Biology, Microbiology and Molecular Biology graduate courses listed below (see associated curriculum). These requirements can be partially met by up to 12 credit hours of graduate courses taken as undergraduates. Any graduate class taken outside of Cell Biology, Microbiology and Molecular Biology must be approved by the Cell Biology, Microbiology and Molecular Biology Graduate Director. Students should be aware that a B grade or better is required for every graduate class applied to the M.S. portion of their degree. In addition, students will be required to pass an oral qualifying exam based on a review paper submitted in their final semester. Students must form a committee as part of their action plan to complete their graduate work. This committee will be comprised of at least three Cell Biology, Microbiology and Molecular Biology faculty, and they will serve as the examination committee for the review paper required as part of the M.S. portion of their degree. Upon approval of that paper, students must successfully complete a comprehensive oral exam by their committee.

Comprehensive Oral Qualifying Examination

A final comprehensive oral examination is required for all master’s students. This examination is open to all departmental faculty. Students must take their comprehensive exam within two years of matriculation and the exam is normally taken after the completion of all formal course work. Thesis students must take the examination at least one semester before the thesis is presented. Any graduate work counted toward the requirement for the M.S. degree must be completed within five (5) years after matriculation.
Accelerated B.A. in Physics and M.A.T. in Science Education

Description
This program intends for students to complete a B.A. in Physics (College of Arts and Sciences) and M.A.T. in Science Education (College of Education) over the span of five years. Students completing this program will be eligible for high school and/or middle school science teacher certification. Completion of this program requires students to complete 12 credit hours toward the M.A.T. in Science Education during their senior year in the Physics (B.A.) major.

This accelerated program shares 12 credits between already existing degrees:
- B.A. in Physics
- M.A.T. in Science Education

Target Students and Expected Outcomes
The accelerated B.A. in Physics to M.A.T. in Science Education program is a collaborative effort between the College of Arts and Sciences and the College of Education. This program is an attractive and viable career path for students majoring in Physics that results in secondary science teacher certification. Students who complete this program receive the necessary science content and pedagogy coursework to be highly qualified physics teachers at the secondary level.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the Physics major upon applying and thirty (30) semester hours in science (includes twenty-five (25) semester hours in physics plus 5 hours of upper level work in math or minor science content area) with associated laboratory experiences to be fully admitted as a graduate student in the M.A.T. Science Education Program. Evidence of successfully completing all sections of the General Knowledge Test (GKT) is also required for full admission to the graduate program
2. Have a minimum 3.0 GPA overall; and
3. Have a minimum undergraduate 3.25 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.A. Physics/M.A.T. Science Education program, students must have completed a minimum of 15 credit hours in the undergraduate Physics major.
2. Students must have a minimum undergraduate GPA of 3.0 overall, and a minimum GPA of 3.25 in the major and passing scores on all sections of the General Knowledge Test (GKT) to be eligible for the accelerated degree program. You can find information on the General Knowledge Test on the Florida Teacher Certification section of the following webpage: http://www.fl.nesinc.com/.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.A. and M.A.T. programs will review the applications and approve the nominations. All applications require the approval of the College of Education Graduate Program, the College of Arts and Sciences, and the USF Graduate School.
4. To be promoted to graduate status, students must meet all admission requirements of the M.A.T. in Science Education in the College of Education. Specifically, the following materials must be submitted:
   a. Undergraduate transcripts; and evidence of possessing a degree in a science discipline (biology, chemistry, physics, geology, etc.) that is taught in a middle or high school, or comparable coursework in a science teaching field acceptable to the program faculty. Note, to teach secondary physics the state of Florida requires: A bachelor's or higher degree in physics or a bachelor's or higher degree with thirty (30) semester hours in science to include twenty-one (21) semester hours in physics with associated laboratory experiences.
   b. Documentation of GKT scores.
5. Students must earn a minimum of a “B” (3.00) in all graduate courses. Failure to earn at least a “B” in a graduate course will result in academic review by the graduate program. Failure to maintain a minimum 3.0 GPA will result in academic probation, according to the procedures of the USF Office of Graduate Studies.

Shared Courses (12 credit hours)
The following courses will satisfy 12 credit hours of upper-level coursework:
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6938 Topics in Science Education: Field Practicum
Undergraduate Degree Requirements for the B.A. in Physics (33 credit hours)

*Please see Undergraduate Catalog for major-specific requirements

Required Supporting Courses for the Major (20 credit hours)
The following courses are prerequisite and supporting courses for this major. They are required for the major, but are not counted in the total hours for this major. The degree will not be awarded if these courses have not been taken by the end of the student’s final semester.

- CHM 2045 General Chemistry I
- CHM 2045L General Chemistry I Lab
- CHM 2046 General Chemistry II
- CHM 2046L General Chemistry II Lab
- MAC 2311 Calculus I or 2281 Engineering Calculus I
- MAC 2312 Calculus II or 2282 Engineering Calculus II
- MAC 2313 Calculus III or 2283 Engineering Calculus III

Core Courses (31 credit hours)

- PHY 2048 General Physics I
- PHY 2048L General Physics I Lab
- PHY 2049 General Physics II
- PHY 2049L General Physics II Lab
- PHY 3101 Modern Physics
- PHZ 3113 Mathematical Methods in Physics
- PHY 3622L Intermediate Lab
- PHY 3220 Classical Mechanics
- PHY 3323 Electricity and Magnetism I
- PHY 4823L Advanced Laboratory
- PHY 4930 Undergraduate Seminar
- PHY 4604 Introduction to Quantum Mechanics

Elective Courses (2 credit hours)

Two (2) credit hours of Physics electives subject to approval of undergraduate advisor.

Shared Courses (12 credit hours)
The following courses will satisfy 12 credit hours of upper-level coursework:

- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6938 Topics in Science Education: Field Practicum

Graduate Degree Requirements for the M.A.T. in Science Education (39 credit hours)

*Please see Graduate Catalog for major-specific requirements

All M.A.T. programs include as an admission requirement the passing of all sections of the General Knowledge Test (GKT). Applicants who can document they lived outside the state or country and did not have access to take the GKT before the application deadline may submit passing Praxis scores or GRE scores to be considered for admission. Whether admitted with passing Praxis scores or acceptable GRE scores, the applicant must submit passing scores on the GKT before the last day of classes of the semester of first enrollment, or admission to the College of Education will be revoked.

Core Courses (39 credit hours)

- EDF 6432 Foundations of Measurement
- ESE 5342 Teaching the Adolescent Learner
- ESE 5344 Classroom Management for a Diverse School and Society
- SCE 5325 Methods of Middle Grades Science Education
- SCE 5337 Methods of Secondary Science Education
- SCE 5584 Reading and Communication in Science Education
- SCE 6416 Teaching Secondary School Biology
- SCE 6456 Teaching Secondary School Physical and Earth Science
- SCE 6634 Current Trends in Secondary Science Education
- SCE 6938 Topics in Science Education: Field Practicum
- SCE 6947 Internship (PR: CI and passing scores of FTCE exam)
TSL 5325 ESOL Strategies for Content Area Teachers

Comprehensive Exam
Student’s participation in the internship experience in classes that correspond to the specific area in which he or she will be certified.
Passing score on the appropriate subject area exam.
Student’s content degree or equivalent (an admission's requirement).

Comprehensive Examination
A written narrative exam tailored to the individual student. Exam needs to be completed by two weeks before final exam week of the student’s graduating semester. Exams will only be accepted during fall or spring semester, unless previous contract is established with the student’s advisor.

Specialization Requirements for Certification in Separate Areas of Science (Grades 6-12):
In order to be eligible for certification in a separate area of science, students must complete a minimum of thirty (30) semester hours in science to include twenty-one (21) semester hours in the area of desired specialization (chemistry, biology, physics, earth-space science).
Accelerated B.S. in Advertising and M.A. in Mass Communications with a concentration in Strategic Communication Management

Description
This program allows undergraduate students majoring in Advertising (Muma College of Business) to take graduate courses in the Mass Communications with a concentration in Strategic Communication Management (College of Arts and Sciences) program during their senior year. These shared credits will be applicable to the M.A. degree, thus accelerating the time to completion, with successful students able to earn the M.A. degree in two additional semesters beyond the completion of the B.S. degree.

This accelerated program shares 12 credits between already existing degrees/concentrations:
- B.S. in Advertising
- M.A. in Mass Communications with a concentration in Strategic Communication Management

Target Students and Expected Outcomes
This highly competitive program is the result of collaboration between the Department of Marketing in the Muma College of Business and the Zimmerman School of Advertising and Mass Communications in the College of Arts and Sciences. The integrated B.S./M.A. curriculum is designed to provide eligible students the undergraduate coursework necessary to complete a specialized program of study in advertising management at the graduate level. Graduates of this distinctive program will be prepared to take on leading communication management positions in an evolving business and media environment.

Admission Requirements
For admission to the program, a student must:
1. have completed at least 15 hours in the Advertising undergraduate major;
2. have a minimum undergraduate 3.33 GPA overall; and
3. have a minimum undergraduate 3.5 GPA in the major.

To apply for admission, send a letter to the Director of the Advertising Program, within the Zimmerman School of Advertising and Mass Communications stating your qualifications and desire to enter the program. Students may also be nominated by faculty in the Department of Marketing or Zimmerman School of Advertising and Mass Communications.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S. Advertising/M.A. in Mass Communications in the Zimmerman School of Advertising and Mass Communications, students must have completed a minimum of 15 credits in the Advertising undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the major to be eligible for the accelerated degree program.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S. and M.A. programs will review the applications and approve the nominations. All applications require the approval of the Zimmerman School of Advertising and Mass Communications Graduate Program, the College of Arts and Sciences, and the USF Graduate School.
4. To be promoted to graduate status, students must meet all admission requirements of the M.A. in Strategic Communication Management in the Zimmerman School of Advertising and Mass Communications. Specifically, the following materials must be submitted with the Accelerated Program Application Form:
   - Statement of intent (a personal statement about why the student wishes to apply for the program);
   - Undergraduate transcripts;
   - Three letters of recommendation;
   - GRE scores (GRE should be taken before or during the third year of study).
5. Students must earn a minimum of a “B” (3.00) in all graduate courses. Failure to earn at least a “B” in a graduate course will result in academic review by the graduate program. Failure to maintain a minimum 3.0 GPA will result in academic probation, according to the procedures of the USF Office of Graduate Studies.

Shared Courses (12 credit hours)
Twelve (12) credit hours of graduate coursework can be taken in place of six (6) credit hours required for the Advertising Major and six (6) credit hours of Required Business Electives, as follows:
- ADV 4800 Advertising Management
  Satisfied by PUR 6607 Strategic Communication Management
- ADV 4800 Advertising Campaigns
Undergraduate Degree Requirements for the B.S. in Advertising (43 credit hours)

*Please see Undergraduate Catalog for major-specific requirements

Required Supporting Courses for the Major (6 credit hours):
The following courses are prerequisite and supporting courses for this major. They are required for the major, but are not counted in the total hours for this major. The degree will not be awarded if these courses have not been taken by the end of the student’s final semester.

- MMC 2100 Writing for the Mass Media
- MMC 3602 Mass Communications and Society

Major Core (26 credit hours)

Required Courses for Advertising major (26 credit hours):
- ADV 3008 Introduction to Advertising
- ADV 3101 Advertising Creativity
- ADV 3300 Advertising Media Strategy
- ADV 4600 Advertising Management
- ADV 4800 Advertising Campaigns
- ADV 4940 Advertising Practicum
- MAR 3613 Marketing Research
- MMC 4936 Selected Topics in Mass Communications Studies
- MAR 4503 Buyer Behavior

Major Electives (17 credit hours)

Required Business Electives (17 credit hours):
- CGS 2100 Computers in Business
- MAR 3823 Marketing Management
- MAR 4933 Selected Topics in Marketing
- MAR XXXX Upper-Level Marketing Elective
- MAR 3400 Professional Selling
- MAR 3711 Sports Marketing
- MAR 4156 International Marketing
- MAR 4213 Logistics and Physical Distribution Management
- MAR 4231 Retailing Management
- MAR 4333 Promotion Management
- MAR 4403 Sales Management
- MAR 4453 Business to Business Marketing
- MAR 4712 Healthcare Marketing
- MAR 4824 Marketing Management Problems

Required Non-Business Electives (5 credit hours):
- GEB 2935 Selected Topics in Business: Speaker Series
- SLS 2901 Academic Foundations Seminar

Shared Courses (12 credit hours)

Twelve (12) credit hours of graduate coursework can be taken in place of six (6) credit hours required for the Advertising Major and six (6) credit hours of Required Business Electives, as follows:
- ADV 4600 Advertising Management
  - Satisfied by PUR 6607 Strategic Communication Management
- ADV 4800 Advertising Campaigns
  - Satisfied by PUR 6603 Strategic Communication Campaigns
- ADV 4940 Advertising Practicum
  - Satisfied by MMC 6945 Mass Communications Professional Practicum
- MAR 4933 Selected Topics in Marketing: Social Media Applications
  - Satisfied by MAR 6936 Selected Topics in Marketing: Social Media Applications
Graduate Degree Requirements for the M.A. in Mass Communications with a concentration in Strategic Communication Management (39 credit hours)

*Please see Graduate Catalog for major-specific requirements

**Major Core (12 credit hours)**
- MMC 6400 Mass Communication Theory
- MMC 6447 Quantitative Research Methods in Mass Communications
- MMC 6448 Qualitative Research Methods in Mass Communications
- MMC 6920 Introductory Mass Communications Seminar

**Concentration Core (15 credit hours)**
- MMC 6415 Strategic Communication Media
- MMC 6418 Strategic Message Design
- PUR 5505 Introduction to Strategic Communication Theory and Research
- PUR 6603 Strategic Communication Campaigns
- PUR 6607 Strategic Communication Management

**Outside Requirement (3 credit hours)**
- A course in organizational communication, management, or leadership

**Thesis or Applied Research Project Requirement (6 credit hours)**
- The applied research project will serve as an integrative experience for students to bring together all they have learned during their five years at USF. Students will be paired with clients in Tampa and within the state of Florida to solve real-world research problems. With the guidance of a faculty advisor, students will plan, conduct, and present research to their client and the graduate faculty within the Zimmerman School of Advertising and Mass Communications. (MMC 6950 – Applied Research Project)

**Mass Communications or Other Elective (3 credit hours)**
Accelerated B.S. in Business Analytics and Information Systems and M.S. in Business Analytics and Information Systems

Description
The goal of the USF Muma College of Business accelerated program in Business Analytics and Information Systems is to provide outstanding undergraduate students an option to complete the B.S. in Business Analytics and Information Systems and the M.S. in Business Analytics and Information Systems in five years (141 total hours).

The integrated B.S./M.S. in Business Analytics and Information Systems program is a 141-hour accelerated option that allows eligible students to work towards the M.S. degree requirements while completing their undergraduate degree. Students interested in this option will work closely with an advisor and a faculty member to develop an integrated plan of study.

This accelerated program shares 12 credits between already existing degrees/concentrations:
- B.S. in Business Analytics and Information Systems
- M.S. in Business Analytics and Information Systems

General Guidelines
- **Time of admission to the program**: Students will be eligible for admission to the integrated degree program at the beginning of their senior year. Students must apply for admission consideration during their junior year. Students will start taking courses in the graduate program in their senior year.
- **Joint admission**: Students must apply to and meet admission requirements of the M.S. in BAI graduate program.
- **Plan of study**: In consultation with an advisor and a faculty member, students will be required to prepare a Graduate Degree Action Plan.
- **Degree Action Plan**: The plan will cover the entire time period of the program and it will be periodically reviewed with an advisor.
- **Advising**: Students will present their portfolio (see below for details) and a plan of study in person to the integrated program committee prior to being admitted to the program.
- **Tuition charges**: Students will be required to pay graduate tuition rates when taking graduate courses.

Admission Requirements
1. Students with at least a junior standing in their undergraduate degree program may apply for admission consideration into the integrated B.S./M.S. undergraduate/graduate program. Students will submit an Accelerated Program Interest Form that must be signed by the Graduate Program.
2. Students must have a minimum 3.25 GPA.
3. Interested students will be required to present a "Portfolio" of the following credentials:
   - Three letters of recommendation, at least two from faculty
   - Statement of intent—a personal statement about why the student wishes to apply for the integrated program.
   - Undergraduate transcripts.
   - Other supporting documents (e.g., projects and papers, software, work experience, internships, etc.) should be included where possible.
4. The GMAT or GRE should be taken sometime before or during the Fall semester of the junior year of study.
5. All applicants will need to meet any other admission requirements established for the M.S. in BAI program.
6. The application to the integrated program will be considered as a complete package and therefore obtaining a high undergraduate GPA is not a guarantee of admission. Grades in the undergraduate BAIS core courses will be taken in consideration and will have a significant impact on the M.S./BAI acceptance decision.

Shared Courses (12 credit hours)
Students may take the following 12 credit hours of graduate coursework to count toward the undergraduate major:

- ISM 6436 Operations & Supply Chain Processes
  - Satisfies ISM 3431 Operations and Supply Chain Processes
- Nine (9) credit hours of graduate coursework can be taken in place of the nine (9) credit hours of undergraduate elective coursework.
- The student must earn a minimum grade of B in each graduate course to be counted for both degrees.

The following courses are suggested specialization elective courses and are cross-listed between the graduate and undergraduate catalogs:
- ISM 6145 Seminar in Software Testing
Undergraduate Degree Requirements for the B.S. in Business Analytics and Information Systems (24 credit hours)

*Please see Undergraduate Catalog for major-specific requirements

Major Core (15 credit hours)

- ISM 3113 Systems Analysis and Design*
- ISM 3232 Business Application Development*
- ISM 4212 Database Design and Administration
- ISM 4402 Business Intelligence or ISM 4220 Business Data Communications**
- ISM 4300 Managing Information Resources

Major Electives (9 credit hours)

Students must choose nine (9) credit hours of coursework from the following list:

- ISM 4041 Global Cyber Ethics
- ISM 4141 Web Application Development/Java
- ISM 4153 Enterprise Resource Planning Systems
- ISM 4220 Business Data Communications**
- ISM 4234 Object-Oriented Design and Development
- ISM 4252 Mainframe Technologies
- ISM 4314 Project Management
- ISM 4323 Information Security and IT Risk Management
- ISM 4381 Information Systems for Healthcare Analytics
- ISM 4382 Global Information Systems
- ISM 4402 Business Intelligence**
- ISM 4432 Software Testing
- ISM 4480 Electronic Commerce Systems
- ISM 4542 Statistical Programming for Business Analytics
- ISM 4571 Cybersecurity Cases
- ISM 4930 Selected Topics in MIS
- ISM 4940 Business Analytics and Information Systems Internship
- MAN 4505 Healthcare Operations Management

Shared Courses (12 credit hours)

Students may take the following 12 credit hours of graduate coursework to count toward the undergraduate major:

- ISM 6436 Operations & Supply Chain Processes
  Satisfies ISM 3431 Operations and Supply Chain Processes

Nine (9) credit hours of graduate coursework can be taken in place of the nine (9) credit hours of undergraduate elective coursework.

The student must earn a minimum grade of B in each graduate course to be counted for both degrees.

The following courses are suggested specialization elective courses and are cross-listed between the graduate and undergraduate catalogs:

- ISM 6145 Seminar in Software Testing
  - ISM 4432 Software Testing
- ISM 6156 Enterprise Resource Planning and Business Process Management
  - ISM 4153 Information Systems in Organizations
- ISM 6328 Information Security and Risk Management
  - ISM 4323 Information Security and IT Risk Management
- ISM 6316 Project Management
  - ISM 4314 Project Management

Graduate Degree Requirements for the M.S. in Business Analytics and Information Systems (33 credit hours)

*Please see Graduate Catalog for major-specific requirements
MUMA COLLEGE OF BUSINESS

UNIVERSITY OF SOUTH FLORIDA 2017-2018 UNDERGRADUATE CATALOG

Major Core (12 credit hours)
ISM 6124 Advanced Systems Analysis and Design
ISM 6218 Advanced Database Management
ISM 6225 Distributed Information Systems
ISM 6436 Operations and Supply Chain Processes

Capstone Course (3 credit hours)
ISM 6155 Enterprise Information Systems Management

Major Electives (18 credit hours)
Up to eighteen (18) credit hours may be selected from additional Information Systems courses or (with prior approval by the academic advisor) other areas of specialization such as Management, Decision Sciences, Computer Science, Logistics, etc. Existing course offerings:
ISM 6124 Advanced Systems Analysis and Design
ISM 6266 Software Architecture
ISM 6145 Seminar on Software Testing
ISM 6155 Enterprise Information Systems Management
ISM 6218 Advanced Database Management
ISM 6225 Distributed Information Systems
ISM 6305 Managing the Information System Function
ISM 6442 International Aspects of Information Science
ISM 6405 Information and Business Intelligence
ISM 6485 Electronic Commerce
ISM 6905 Independent Study
ISM 6316 Project Management
ISM 6136 Data Mining
ISM 6208 Data Warehousing
ISM 6056 Web Application Development
ISM 6156 Enterprise Resource Planning & Business Process Management
ISM 6328 Information Security and Risk Management

In addition, the following Special Topics are being offered:
ISM 6930 Selected Topics: Multimedia Applications
ISM 6930 Selected Topics: Mainframe Technologies
ISM 6137 Statistical Data Mining

Thesis Option – 6 hours
The master’s thesis option requires six credits of ISM 6971, which count as six of the 18 BAIS elective credits. The thesis must make a well-defined contribution to the research and development in an area of Information Systems.
ISM 6971 Thesis: Masters

Practicum Option – 1-6 hours credit
The practicum option requires an investigation of a new information technology artifact. The project typically occurs in the student’s place of employment and is jointly supervised by a Faculty member and a manager in the company. One credit of ISM 6905 would be taken for each semester that the student works on a project. The practicum would count for one to six credit hours of the 18 hours of BAIS electives.

Research/Project Option – 1-3 credit hours
The research/project option requires working on a BAIS related project that involves research or community engagement. The project is supervised by a faculty member. One to two credits of ISM 6905 would be taken for each semester that the student works on a project. The research/project option would count for one to three credit hours of the 18 hours of BAIS electives.

Comprehensive Exam
In lieu of a comprehensive exam, assessments comprising the capstone course (ISM 6155 fulfill the requirements for the comprehensive assessment in the program.
Accelerated B.S.C.H. in Chemical Engineering and M.S.B.E. in Biomedical Engineering

Description
Students pursuing a B.S.C.H. in Chemical Engineering will earn an M.S.B.E. in Biomedical Engineering in an accelerated manner by sharing three (3) core graduate courses (9 credit hours) taken as upper-level departmental electives as part of the undergraduate Chemical Engineering major. The B.S.C.H. requires a total of 131 hours and the M.S.B.E. requires 30 hours. By sharing nine (9) credit hours, the total credit hours earned will be 152 hours. This accelerated program shares nine (9) credit hours between already existing degrees:
- B.S.C.H. in Chemical Engineering
- M.S.B.E. in Biomedical Engineering

Target Students and Expected Outcomes
Academically high achieving undergraduate students in the B.S.C.H. program with high overall and major GPA will be targeted for the accelerated program. Expected outcomes are the increase in M.S.B.E. degrees granted, increase in graduate SCH, and enhancement of the quality of the graduate program by addition of academically accomplished students.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the undergraduate major;
2. Have a minimum 3.33 GPA overall; and
3. Have a minimum undergraduate 3.50 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S.C.H. Chemical Engineering/M.S.B.E. Biomedical Engineering program, students must have completed a minimum of 15 credit hours in the Chemical Engineering undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the major.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S.C.H. and M.S.B.E. majors will review the applications and approve the nominations. All applications require the approval of USF’s Office of Graduate Studies, the College of Engineering’s Graduate Program, and the Department of Chemical and Biomedical Engineering.
4. To be promoted to graduate status, students must meet all admission requirements of the M.S.B.E. in Biomedical Engineering.
5. Students must earn a minimum of a “B” (3.00) in all shared graduate courses. Failure to earn at least a “B” in a shared graduate course will result in academic review by the graduate program. Failure to maintain good standing as a graduate student will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
6. A comprehensive plan of study to complete the Accelerated B.S.C.H. Chemical Engineering/M.S.B.E. Biomedical Engineering program will be developed with the guidance of an advisor and a faculty member.

Shared Courses (9 credit hours)
Three (3) of the following five (5) core graduate courses replace nine (9) credit hours of upper-level departmental electives in Chemical Engineering:
- BME 6000 Biomedical Engineering I
- BME 6931 Biomedical Engineering II
- GMS 6440 Basic Medical Physiology or BME 6409 Engineering Physiology
- GMS 6605 Basic Medical Anatomy
- PHC 6051 Biostatistics II

Undergraduate Degree Requirements for the B.S.C.H. in Chemical Engineering (107 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (94 credit hours)
- Math and Science (36 credit hours)
  - MAC 2281 Engineering Calculus I or MAC 2311 Calculus I
  - MAC 2282 Engineering Calculus II or MAC 2312 Calculus II
MAC 2283 Engineering Calculus III or MAC 2313 Calculus III
EGN 3433 Modeling and Analysis of Engineering Systems or MAP 2302 Differential Equations
CHM 2045 General Chemistry I
CHM 2045L General Chemistry I Laboratory
CHM 2046 General Chemistry II
CHM 2046L General Chemistry II Laboratory
PHY 2048 General Physics I
PHY 2048L General Physics I Laboratory
PHY 2049 General Physics II
PHY 2049L General Physics II Laboratory
CHM 2210 Organic Chemistry I
CHM 2210L Organic Chemistry Laboratory I

**Basic Engineering (4 credit hours)**
EGN 3000 Foundations of Engineering
EGN 3000L Foundations of Engineering Lab
EGN 3343 Thermodynamics I

**Specialization (51 credit hours)**
ECH 3002 Introduction to Chemical & Biomedical Engineering
ECH 3854 Chemical & Biomedical Engineering Computations
ECH 3023 Material and Energy Balances
ECH 4123 Chemical Engineering Thermodynamics
ECH 3266 Transport Phenomena I
ECH 4846 Numerical Methods in Chemical Engineering
ECH 3702 Instrument Systems I
ECH 4418 Separation Processes
ECH 4267 Transport Phenomena II
BME 4406 Engineering of Biological Systems
ECH 3240L Chemical Engineering Lab I
ECH 4504 Kinetics and Reaction Engineering
ECH 4605 Product and Process Systems Engineering
EMA 4003 Introduction to Materials Science
ECH 4241L Chemical Engineering Laboratory II
ECH 4323 Process Dynamics and Control
ECH 4615 Product and Process Design (CPST)

**Technical Writing (3 credit hours)**
ENC 3246 Communications for Engineers (WRIN)

**Major Electives (13 hours)**
13 hours of Departmental Upper-Level Electives
BME 4100 Biomedical Engineering
BME 4409 Engineering Physiology
BME 4571 Nanomedicine
BME 4931 Selected Topics in Biomedical Engineering
ECH 4905 Independent Study
ECH 4931 Special Topics in Chemical Engineering II
ECH 4936 Undergraduate Seminar
ECH 4944 Industry Internship

**Shared Courses (9 credit hours)**
Three (3) of the following five (5) core graduate courses replace nine (9) credit hours of upper-level departmental electives in Chemical Engineering:
BME 6000 Biomedical Engineering I
BME 6931 Biomedical Engineering II
GMS 6440 Basic Medical Physiology or BME 6409 Engineering Physiology
GMS 6605 Basic Medical Anatomy
PHC 6051 Biostatistics II
Graduate Degree Requirements for the M.S.B.E. in Biomedical Engineering (30 Credit Hours)
*Please see Graduate Catalog for major-specific requirements

Major Core (15 credit hours)
- BME 6000 Biomedical Engineering I
- BME 6931 Biomedical Engineering II
- GMS 6440 Basic Medical Physiology or BME 6409 Engineering Physiology
- GMS 6605 Basic Medical Anatomy
- PHC 6051 Biostatistics II

Major Electives (15 credit hours)
Students select from additional approved courses to complete the 30 credit hour requirement. A minimum of 16 credit hours must be at the 6000-level. In addition, all of the elective courses must consist of engineering-prefix courses, although the Thesis Committee (thesis option) or the BME Program Advisor (non-thesis option) may approve courses in relevant areas such as chemistry, physics, pharmacy, communication sciences and disorders, public health, or medicine, in their place.

Thesis Option
Thesis option students can count up to six (6) credit hours of thesis research towards the elective requirements.

Comprehensive Exam
Students in the non-thesis track will complete a comprehensive exam. For students in the thesis track, the thesis and oral defense serve as the comprehensive exam.
Accelerated B.S.C.H. in Chemical Engineering and M.S.C.H. in Chemical Engineering

Description
Students pursuing a B.S.C.H. in Chemical Engineering will earn an M.S.C.H. in Chemical Engineering in an accelerated manner by sharing two (2) ECH-prefixed graduate courses (6 credit hours) taken as upper-level departmental electives as part of the undergraduate Chemical Engineering major. The B.S.C.H. requires a total of 131 credit hours and the M.S.C.H. requires 30 hours. By sharing six (6) credit hours, the total credit hours earned will be 155 credit hours.

This accelerated program shares six (6) credit hours between already existing degrees:
- B.S.C.H. in Chemical Engineering
- M.S.C.H. in Chemical Engineering

Target Students and Expected Outcomes
Academically high achieving undergraduate students in the B.S.C.H. program with high overall and major GPA will be targeted for the accelerated program. Expected outcomes are the increase in M.S.C.H. degrees granted, increase in graduate SCH, and enhancement of the quality of the graduate program by addition of academically accomplished students.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the undergraduate major;
2. Have a minimum 3.33 GPA overall; and
3. Have a minimum undergraduate 3.50 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S.C.H. Chemical Engineering/M.S.C.H. in Chemical Engineering undergraduate major,
   - Students must have completed a minimum of 15 credit hours in the Chemical Engineering undergraduate major.
   - Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the major.
   - Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S.C.H. and M.S.C.H. majors will review the applications and approve the nominations. All applications require the approval of USF’s Office of Graduate Studies, the College of Engineering’s Graduate Program, and the Department of Chemical and Biomedical Engineering.
2. To be promoted to graduate status, students must meet all admission requirements of the M.S.C.H. in Chemical Engineering.
   - Students must earn a minimum of a “B” (3.00) in all shared graduate courses. Failure to earn at least a “B” in a shared graduate course will result in academic review by the graduate program. Failure to maintain good standing as a graduate student will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
3. A comprehensive plan of study to complete the Accelerated B.S.C.H. Chemical Engineering/M.S.C.H. Chemical Engineering program will be developed with the guidance of an advisor and a faculty member.

Shared Courses (6 credit hours)
The following courses will satisfy six (6) credit hours of Chemical Engineering elective coursework:
Two (2) ECH courses at the 6000-level to count toward upper-level Chemical Engineering electives

Undergraduate Degree Requirements for the B.S.C.H. in Chemical Engineering (107 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (94 credit hours)
Math and Science (36 credit hours)
- MAC 2281 Engineering Calculus I or MAC 2311 Calculus I
- MAC 2282 Engineering Calculus II or MAC 2312 Calculus II
- MAC 2283 Engineering Calculus III or MAC 2313 Calculus III
- EGN 3433 Modeling and Analysis of Engineering Systems or MAP 2302 Differential Equations
- CHM 2045 General Chemistry I
- CHM 2045L General Chemistry I Laboratory
CHM 2046 General Chemistry II
CHM 2046L General Chemistry II Laboratory
PHY 2048 General Physics I
PHY 2048L General Physics I Laboratory
PHY 2049 General Physics II
PHY 2049L General Physics II Laboratory
CHM 2210 Organic Chemistry I
CHM 2210L Organic Chemistry Laboratory I

**Basic Engineering (4 credit hours)**
EGN 3000 Foundations of Engineering
EGN 3000L Foundations of Engineering Lab
EGN 3343 Thermodynamics I

**Specialization (51 credit hours)**
ECH 3002 Introduction to Chemical & Biomedical Engineering
ECH 3854 Chemical & Biomedical Engineering Computations
ECH 3023 Material and Energy Balances
ECH 4123 Chemical Engineering Thermodynamics
ECH 3266 Transport Phenomena I
ECH 4846 Numerical Methods in Chemical Engineering
ECH 3702 Instrument Systems I
ECH 4418 Separation Processes
ECH 4267 Transport Phenomena II
BME 4406 Engineering of Biological Systems
ECH 3240L Chemical Engineering Lab I
ECH 4504 Kinetics and Reaction Engineering
ECH 4605 Product and Process Systems Engineering
EMA 4003 Introduction to Materials Science
ECH 4241L Chemical Engineering Laboratory II
ECH 4323 Process Dynamics and Control
ECH 4615 Product and Process Design (CPST)

**Technical Writing (3 credit hours)**
ENC 3246 Communications for Engineers (WRIN)

**Major Electives (13 hours)**
13 hours of Departmental Upper-Level Electives
BME 4100 Biomedical Engineering
BME 4409 Engineering Physiology
BME 4571 Nanomedicine
BME 4931 Selected Topics in Biomedical Engineering
ECH 4905 Independent Study
ECH 4931 Special Topics in Chemical Engineering II
ECH 4936 Undergraduate Seminar
ECH 4944 Industry Internship

**Shared Courses (6 credit hours)**
The following courses will satisfy six (6) credit hours of Chemical Engineering elective coursework:
Two (2) ECH courses at the 6000-level to count toward upper-level Chemical Engineering electives

**Graduate Degree Requirements for the M.S.C.H. in Chemical Engineering (30 Credit Hours)**
*Please see Graduate Catalog for major-specific requirements

**Major Core (12 credit hours)**
ECH 6105 Advanced Thermodynamics
ECH 6285 Advanced Transport or BME 6634 Biotransport Phenomenon
ECH 6515 Advanced Reaction Engineering
ECH 6412 Processes Analysis and Modeling

**Major Electives (18 credit hours)**
Nine (9) credit hours of other 5000 or 6000 course or ECH 6907
Nine (9) credit hours of additional approved 5000 or 6000 ECH courses
Thesis Option - 6 hours minimum

At least two 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 just be scheduled after the Thesis Supervisory Committee has approved the Thesis. The Graduate Coordinator should be notified so he/she can coordinate the seminar scheduling. Students in this program are also required to pass the FE (Fundamentals of Engineering Examination) offered by the Society of Professional Engineers.

Comprehensive Exam

Candidates who have at least one publication in a journal or proceedings or presentation at a conference (based on their M.S.C.H. Thesis research) may be exempt from this comprehensive examination requirement.
Accelerated B.S.C.H. in Chemical Engineering and M.S.E.M. in Engineering Management

Description
Students pursuing a B.S.C.H. in Chemical Engineering will earn an M.S.E.M. in Engineering Management in an accelerated manner by sharing 2 EIN graduate courses (6 credit hours) taken as upper-level Technical electives as part of B.S.C.H. program. The B.S.C.H. requires a total of 131 hours and the M.S.E.M. requires 30 hours. By sharing six (6) credit hours, the total credit hours earned will be 155 hours.

This accelerated program shares six (6) credit hours between already existing degrees:
- B.S.C.H. in Chemical Engineering
- M.S.E.M. in Engineering Management

Target Students and Expected Outcomes
Academically high achieving undergraduate students in the B.S.C.H. program with high overall and major GPA will be targeted for the accelerated program. Expected outcomes are the increase in M.S.E.M. degrees granted, increase in graduate SCH, and enhancement of the quality of the graduate program by addition of academically accomplished students.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the undergraduate major
2. Have a minimum 3.33 GPA overall; and
3. Have a minimum undergraduate 3.50 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S.C.H. Chemical Engineering/M.S.E.M. Engineering Management program, students must have completed a minimum of 15 credit hours in the Chemical Engineering undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the major.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S.C.H. and M.S.E.M. majors will review the applications and approve the nominations. All applications require the approval of USF’s Office of Graduate Studies, the College of Engineering’s Graduate Program, the Department of Chemical and Biomedical Engineering’s Undergraduate Program, and the Industrial and Management Systems Engineering’s Graduate Program.
4. To be promoted to graduate status, students must meet all admission requirements of the M.S.E.M. in Engineering Management.
5. Students must earn a minimum of a “B” (3.00) in all shared graduate courses. Failure to earn at least a “B” in a shared graduate course will result in academic review by the graduate program. Failure to maintain good standing as a graduate student will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
6. A comprehensive plan of study to complete the Accelerated B.S.C.H. Chemical Engineering/M.S.E.M. Engineering Management program will be developed with the guidance of an advisor and a faculty member.

Shared Courses (6 credit hours)
The following courses will satisfy six (6) credit hours of Chemical Engineering elective coursework:
- EIN 5182 Principles of Engineering Management
- EIN 6386 Management of Technological Change

Undergraduate Degree Requirements for the B.S.C.H. in Chemical Engineering (107 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (94 credit hours)
Math and Science (36 credit hours)
- MAC 2281 Engineering Calculus I or MAC 2311 Calculus I
- MAC 2282 Engineering Calculus II or MAC 2312 Calculus II
- MAC 2283 Engineering Calculus III or MAC 2313 Calculus III
- EGN 3433 Modeling and Analysis of Engineering Systems or MAP 2302 Differential Equations
- CHM 2045 General Chemistry I
CHM 2045L General Chemistry I Laboratory
CHM 2046 General Chemistry II
CHM 2046L General Chemistry II Laboratory
PHY 2048 General Physics I
PHY 2048L General Physics I Laboratory
PHY 2049 General Physics II
PHY 2049L General Physics II Laboratory
CHM 2210 Organic Chemistry I
CHM 2210L Organic Chemistry Laboratory I

**Basic Engineering (4 credit hours)**
EGN 3000 Foundations of Engineering
EGN 3000L Foundations of Engineering Lab
EGN 3343 Thermodynamics I

**Specialization (51 credit hours)**
ECH 3002 Introduction to Chemical & Biomedical Engineering
ECH 3854 Chemical & Biomedical Engineering Computations
ECH 3023 Material and Energy Balances
ECH 4123 Chemical Engineering Thermodynamics
ECH 3266 Transport Phenomena I
ECH 4846 Numerical Methods in Chemical Engineering
ECH 3702 Instrument Systems I
ECH 4418 Separation Processes
ECH 4267 Transport Phenomena II
BME 4406 Engineering of Biological Systems
ECH 3240L Chemical Engineering Lab I
ECH 4504 Kinetics and Reaction Engineering
ECH 4605 Product and Process Systems Engineering
EMA 4003 Introduction to Materials Science
ECH 4241L Chemical Engineering Laboratory II
ECH 4323 Process Dynamics and Control
ECH 4615 Product and Process Design (CPST)

**Technical Writing (3 credit hours)**
ENC 3246 Communications for Engineers (WRIN)

**Major Electives (13 hours)**
13 hours of Departmental Upper-Level Electives
BME 4100 Biomedical Engineering
BME 4409 Engineering Physiology
BME 4571 Nanomedicine
BME 4931 Selected Topics in Biomedical Engineering
ECH 4905 Independent Study
ECH 4931 Special Topics in Chemical Engineering II
ECH 4936 Undergraduate Seminar
ECH 4944 Industry Internship

**Shared Courses (6 credit hours)**
The following courses will satisfy six (6) credit hours of Chemical Engineering elective coursework:
EIN 5182 Principles of Engineering Management
EIN 6386 Management of Technological Change

**Graduate Degree Requirements for the M.S.E.M. in Engineering Management (30 Credit Hours)**
*Please see Graduate Catalog for major-specific requirements

**Major Core (18 credit hours)**

**General Core Area - 12 credit hours**
EIN 5182 Principles of Engineering Management
EIN 5350 Technology and Finance
EIN 6183 Engineering Management Policy & Strategy
EIN 6386 Management of Technological Change

**Quantitative Core Area - 3 credit hours**
Three (3) credit hours must be selected from the following options, as approved by advisor.
### Job Design Core Area - 3 credit hours
Three (3) credit hours must be selected from the following options, as approved by advisor.
- EIN 6108 Engineering Management: Human Relations
- EIN 6319 Work Design, Motivation & Productivity

### Major Electives (12 credit hours)
Twelve (12) credit hours minimum must be selected from the following options, as approved by advisor.
- EIN 5174 Total Quality Management (TQM) Concepts
- EIN 5201 Creativity in Technology
- EIN 5510 Manufacturing Systems Analysis
- EIN 6106 Technology and Law
- EIN 6112 Information Systems Design for Engineering
- EIN 6145 Project Management
- EIN 6178 ISO 9000/14000
- EIN 6154 Technical Entrepreneurship
- EIN 6215 Systems Safety Engineering
- EIN 6216 Occupation Safety Engineering
- EIN 6217 Construction Safety Engineering
- EIN 6275 Design Controls for Medical Devices
- EIN 6324 Engineering the Supply Chain
- EIN 6336 Production Control Systems
- EIN 6392 New Product Development
- EIN 6420 Non-Linear Programming
- EIN 6430 Overview of Regulated Industries
- EIN 6431 Regulatory Quality Systems & Controls for Medical Devices
- EIN 6432 Regulated Product Approval Process
- EIN 6433 Human Factors Engineering in Medical Devices
- EIN 6435 International Regulations for Medical Devices
- EIN 6934 Systems Integration
- EIN 6935 Lean Six Sigma
- EIN 6936 Advanced Lean Six Sigma
- ESI 5236 Reliability Engineering
- ESI 5522 Computer Simulation
- ESI 6213 Stochastic Decision Models I
- ESI 6448 Integer Programming
- ESI 6491 Linear Programming & Network Optimization

### Thesis Option - 6 hours minimum
**EIN 6971 Thesis**
A thesis option is available to M.S.E.M. students who are interested in applied research. In the thesis option, 18 hours of core coursework, 6 hours of electives, and 6 hours of thesis are the minimum requirements. Students in the Thesis option are required to have a Thesis Defense.
Accelerated B.S.C.H. in Chemical Engineering and M.S.M.S.E. in Materials Science and Engineering

Description
Students pursuing a B.S.C.H. in Chemical Engineering will earn an M.S.M.S.E. in Materials Science and Engineering in an accelerated manner by sharing two (2) ECH-prefixed graduate-level courses (6 credit hours) taken as upper-level departmental electives as part of the undergraduate Chemical Engineering major. The B.S.C.H. requires a total of 131 credit hours and the M.S.M.S.E. requires 30 hours. By sharing six (6) credit hours, the total credit hours earned will be 155 credit hours.

This accelerated program shares six (6) credit hours between already existing degrees:
- B.S.C.H. in Chemical Engineering
- M.S.M.S.E. in Materials Science and Engineering

Target Students and Expected Outcomes
Academically high achieving undergraduate students in the B.S.C.H. program with high overall and major GPA will be targeted for the accelerated program. Expected outcomes are the increase in M.S.M.S.E. degrees granted, increase in graduate SCH, and enhancement of the quality of the graduate program by addition of academically accomplished students. In addition, some of these M.S.M.S.E. students will continue on to Ph.D. programs in Engineering and Physical Science and enhance the doctoral programs as well.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the undergraduate major;
2. Have a minimum 3.33 GPA overall; and
3. Have a minimum undergraduate 3.50 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S.C.H. Chemical Engineering/M.S.M.S.E. Materials Science and Engineering program, students must have completed a minimum of 15 credit hours in the Chemical Engineering undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the major.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S.C.H. and M.S.M.S.E. majors will review the applications and approve the nominations. All applications require the approval of USF’s Office of Graduate Studies, the College of Engineering’s Graduate Program, and the Department of Chemical and Biomedical Engineering.
4. To be promoted to graduate status, students must meet all admission requirements of the M.S.M.S.E. in Materials Science and Engineering.
5. Students must earn a minimum of a “B” (3.00) in all shared graduate courses. Failure to earn at least a “B” in a shared graduate course will result in academic review by the graduate program. Failure to maintain good standing as a graduate student will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
6. A comprehensive plan of study to complete the Accelerated B.S.C.H. Chemical Engineering/M.S.M.S.E. Materials Science and Engineering program will be developed with the guidance of an advisor and a faculty member.

Shared Courses (6 credit hours)
The following courses will satisfy six (6) credit hours of Chemical Engineering elective coursework:
Two (2) ECH courses at the 6000-level to count toward upper-level Chemical Engineering electives

Undergraduate Degree Requirements for the B.S.C.H. in Chemical Engineering (107 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (94 credit hours)
Math and Science (36 credit hours)
- MAC 2281 Engineering Calculus I or MAC 2311 Calculus I
- MAC 2282 Engineering Calculus II or MAC 2312 Calculus II
- MAC 2283 Engineering Calculus III or MAC 2313 Calculus III
EGN 3433 Modeling and Analysis of Engineering Systems or MAP 2302 Differential Equations
CHM 2045 General Chemistry I
CHM 2045L General Chemistry I Laboratory
CHM 2046 General Chemistry II
CHM 2046L General Chemistry II Laboratory
PHY 2048 General Physics I
PHY 2048L General Physics I Laboratory
PHY 2049 General Physics II
PHY 2049L General Physics II Laboratory
CHM 2210 Organic Chemistry I
CHM 2210L Organic Chemistry Laboratory I

Basic Engineering (4 credit hours)
EGN 3000 Foundations of Engineering
EGN 3000L Foundations of Engineering Lab
EGN 3343 Thermodynamics I

Specialization (51 credit hours)
ECH 3002 Introduction to Chemical & Biomedical Engineering
ECH 3854 Chemical & Biomedical Engineering Computations
ECH 3023 Material and Energy Balances
ECH 4123 Chemical Engineering Thermodynamics
ECH 3266 Transport Phenomena I
ECH 4846 Numerical Methods in Chemical Engineering
ECH 3702 Instrument Systems I
ECH 4418 Separation Processes
ECH 4267 Transport Phenomena II
BME 4406 Engineering of Biological Systems
ECH 3240L Chemical Engineering Lab I
ECH 4241L Chemical Engineering Laboratory II
ECH 4504 Kinetics and Reaction Engineering
ECH 4605 Product and Process Systems Engineering
EMA 4003 Introduction to Materials Science
ECH 4241L Chemical Engineering Laboratory II
ECH 4323 Process Dynamics and Control
ECH 4615 Product and Process Design (CPST)

Technical Writing (3 credit hours)
ENC 3246 Communications for Engineers (WRIN)

Major Electives (13 hours)
13 hours of Departmental Upper-Level Electives
   BME 4100 Biomedical Engineering
   BME 4409 Engineering Physiology
   BME 4571 Nanomedicine
   BME 4931 Selected Topics in Biomedical Engineering
   ECH 4905 Independent Study
   ECH 4931 Special Topics in Chemical Engineering II
   ECH 4936 Undergraduate Seminar
   ECH 4944 Industry Internship

Shared Courses (6 credit hours)
The following courses will satisfy six (6) credit hours of Chemical Engineering elective coursework:
Two (2) ECH courses at the 6000-level to count toward upper-level Chemical Engineering electives

Graduate Degree Requirements for the M.S.M.S.E. in Materials Science and Engineering (30 Credit Hours)
*Please see Graduate Catalog for major-specific requirements

Major Core (5 credit hours)
EMA 6510 Characterization of Materials
ECH 6931 Graduate Seminar or PHY 6938 Graduate Seminar

Major Electives (19-25 credit hours)
19 credit hours minimum; will be structured upon consultation with graduate coordinator based on focus area of student interest. Must be approved by the graduate coordinator.
Thesis Option
The thesis option requires the completion of 24 credit hours of graduate level courses (5 credit hours core and 19 hours of electives) and 6 credit hours of thesis.
XXX 6971 Thesis

Non-Thesis Option
The non-thesis option requires 30 credit hours, with 5 credit hours core and 25 credit hours of electives.
The thesis defense serves as the comprehensive exam for the thesis option. A comprehensive/critical review on a materials topic approved and graded by the graduate coordinator serves as the comprehensive exam for the non-thesis option.
Accelerated B.S.C.P. in Computer Engineering and M.S.C.P. in Computer Engineering

Description
Students pursuing a B.S.C.P. in Computer Engineering will earn an M.S.C.P. in Computer Engineering in an accelerated manner by sharing two (2) graduate courses (6 credit hours) taken as upper-level departmental (Technical) electives as part of the undergraduate Computer Engineering major. The B.S.C.P. requires a total of 128 hours and the M.S.C.P. requires 30 hours. By sharing six (6) credit hours, the total credit hours earned will be 152 credit hours.

This accelerated program shares six (6) credit hours between already existing degrees:
B.S.C.P. in Computer Engineering
M.S.C.P. in Computer Engineering

Target Students and Expected Outcomes
Academically high achieving undergraduate students in the B.S.C.P. program with high overall and major GPA will be targeted for the accelerated program. Expected outcomes are the increase in M.S.C.P. degrees granted, increase in graduate SCH, decrease time to graduation, decrease in tuition dollars for the student, increase in the research productivity, increase in the number of US students receiving M.S.C.P. degrees, including minorities and students from under-represented groups in Computer Science and Engineering, close the national gap of computer scientists needed to satisfy the market demand, and enhance of the quality of the graduate program by addition of academically accomplished students. In addition, some of these M.S.C.P. students will continue on to the Ph.D. program and enhance the doctoral program as well.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the undergraduate major;
2. Have a minimum 3.33 GPA overall; and
3. Have a minimum undergraduate 3.50 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S.C.P. Computer Engineering/M.S.C.P. Computer Engineering program, students must have completed a minimum of 15 credit hours in the Computer Engineering undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the major.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S.C.P. and M.S.C.P. majors will review the applications and approve the nominations. All applications require the approval of USF’s Office of Graduate Studies, the College of Engineering’s Graduate Program, and the Department of Computer Science and Engineering Programs.
4. To be promoted to graduate status, students must meet all admission requirements of the M.S.C.P. in Computer Engineering.
5. Students must earn a minimum of a “B” (3.00) in all shared graduate courses. Failure to earn at least a “B” in a shared graduate course will result in academic review by the graduate program. Failure to maintain good standing as a graduate student will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
6. A comprehensive plan of study to complete the Accelerated B.S.C.P. Computer Engineering/M.S.C.P. Computer Engineering program will be developed with the guidance of undergraduate and graduate advisors.

Shared Courses (6 credit hours)
Two (2) of the following three (3) core graduate courses replace six (6) credit hours of upper-level departmental (Technical) electives in Computer Engineering, including Independent Study and Industry Internship:
EEL 6764 Principles of Computer Architecture
COP 6611 Operating Systems
COT 6405 Introduction to the Theory of Algorithms

Undergraduate Degree Requirements for the B.S.C.P. in Computer Engineering (107 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Math and Science (27 credit hours)
MAC 2281 Engineering Calculus I or MAC 2311 Calculus I
MAC 2282 Engineering Calculus II or MAC 2312 Calculus II
Basic Engineering (15 credit hours)
- EGN 3000 Foundations of Engineering
- EGN 3000L Foundations of Engineering Lab
- EGN 3443 Probability and Statistics for Engineers
- EGN 3615 Engineering Economics with Social and Global Implications
- EGN 3373 Introduction to Electrical Systems I
- EGN 4450 Introduction to Linear Systems
- EEE 3394 Electronic Materials

Specialization (44 credit hours)
- COP 2510 Programming Concepts
- COP 3514 Program Design
- COP 3331 Object-Oriented Software Design
- COP 4530 Data Structures
- COP 4600 Operating Systems
- CDA 3103 Computer Organization
- CDA 3201 Computer Logic and Design
- CDA 3201L Computer Logic and Design Lab
- CDA 4203 Computer System Design
- CDA 4203L Computer System Design Lab
- CDA 4205 Computer Architecture
- CDA 4213 CMOS-VLSI Design
- CDA 4213L CMOS-VLSI Design Lab
- COT 3100 Introduction to Discrete Structures
- COT 4400 Analysis of Algorithms
- CIS 4250 Ethical Issues and Professional Conduct (CPST)
- CIS 4910 Computer Science Project

Composition and Technical Writing (9 credit hours)
- ENC 1101 Composition I
- ENC 1102 Composition II
- ENC 3246 Communication for Engineers (WRIN)

Departmental Upper-Level Technical Electives (12 credit hours)
Departmental upper-level technical electives are classified as “software”, “hardware”, and “theory”. Computer Engineering students must choose 6 hours of hardware electives and an additional, non-overlapping 6 hours of electives in the Department. A maximum of six (6) hours combined of CIS 4900 and/or any other supervised individual study (that is, CIS 4915 and CIS 4940) are allowed as Departmental upper-level technical electives.

Software electives:
- CAP 4034 Computer Animation Fundamentals
- CAP 4063 Web Application Design
- CAP 4401 Image Processing Fundamentals
- CAP 4410 Computer Vision
- CAP 4662 Introduction to Robotics
- CAP 4800 Systems Simulation
- CEN 4020 Software Engineering
- CEN 4072 Software Testing
- CEN 4721 User Interface Design
- CIS 4364 Cryptology and Information Security
- CNT 4004 Computer Networks I
- CNT 4411 Computing and Network Security
- CNT 4504 Computer Networks II
- COP 3257 JAVA Experienced Programmers
- COP 4020 Programming Languages
- COP 4365 Software Systems Development
COP 4620 Compilers
COP 4656 Software Development for Mobile Devices
COP 4710 Database Design

Hardware electives:
CDA 4253 FPGA Design and Analysis
CDA 4621 Control of Mobile Robots

Theory electives:
COT 4115 Advanced Discrete Structures with Cryptology
COT 4210 Automata Theory and Formal Languages
COT 4521 Computational Geometry

Other courses:
CIS 4900 Independent Study
CIS 4915 Supervised Research
CIS 4940 Industry Internship

Shared Courses (6 credit hours)
Two (2) of the following three (3) core graduate courses replace six (6) credit hours of upper-level departmental (Technical) electives in Computer Engineering, including Independent Study and Industry Internship:
EEL 6764 Principles of Computer Architecture
COP 6611 Operating Systems
COT 6405 Introduction to the Theory of Algorithms

Graduate Degree Requirements for the M.S.C.P. in Computer Engineering (30 Credit Hours)
*Please see Graduate Catalog for major-specific requirements

Major Core (9 credit hours)
EEL 6764 Principles of Computer Architecture
COP 6611 Operating Systems
COT 6405 Introduction to the Theory of Algorithms

Major Electives (21 credit hours)
Students must select at least 21 hours from the list of available graduate elective courses below in consultation with the Graduate Program Director or individual advisor:
CAP 5400 Digital Image Processing
CAP 5625 Introduction to Artificial Intelligence
CAP 5682 Expert and Intelligent Systems
CAP 5771 Data Mining
CAP 6415 Computer Vision
CAP 6455 Advanced Robotic Systems
CAP 6615 Neural Networks
CAP 6736 Geometric Modeling
CDA 5416 Introduction to Computer-Aided Verification
CIS 6900 Independent Study
CIS 6930 Special Topics
CIS 6940 Graduate Instruction Methods
CIS 6946 Internships/Practicums/Clinical Practice
CNT 6215 Computer Networks
COP 6621 Programming Languages and Translation
EEL 5771 Introduction to Computer Graphics I
EEL 6706 Testing and Fault Tolerance in Digital Systems
EEL 6766 Advanced Computer Architecture

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

For the thesis option, the requirement for a comprehensive exam is satisfied by the successful completion of the Master’s thesis. For the non-thesis option, the requirement for a comprehensive exam is satisfied by the successful completion of the core courses with a grade of “B” or higher.

Thesis Option- 6 hours minimum
CIS 6971 (6) Thesis

At least two members of the Thesis committee must be from tenured or tenure track Computer Science and Engineering faculty. All thesis option students are required to present and defend their thesis in a public oral examination. The examination must be scheduled after the Thesis Supervisory Committee has approved the Thesis.

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

Description
Students pursuing a B.S.C.P. in Computer Engineering will earn an M.S.C.S. in Computer Science in an accelerated manner by sharing two (2) graduate courses (6 credit hours) taken as upper-level departmental (Technical) electives as part of the undergraduate Computer Engineering major. The B.S.C.P. requires a total of 128 hours and the M.S.C.S. requires 30 hours. By sharing six (6) credit hours, the total credit hours earned will be 152 hours.

This accelerated program shares six (6) credit hours between already existing degrees:
B.S.C.P. in Computer Engineering
M.S.C.S. in Computer Science

Target Students and Expected Outcomes
Academically high achieving undergraduate students in the B.S.C.P. program with high overall and major GPA will be targeted for the accelerated program. Expected outcomes are the increase in M.S.C.S. degrees granted, increase in graduate SCH, decrease time to graduation, decrease in tuition dollars for the student, increase in the research productivity, increase in the number of US students receiving M.S.C.S. degrees, including minorities and students from under-represented groups in Computer Science and Engineering, close the national gap of computer scientists needed to satisfy the market demand, and enhance of the quality of the graduate program by addition of academically accomplished students. In addition, some of these M.S.C.S. students will continue on to the Ph.D. program and enhance the doctoral program as well.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the undergraduate major;
2. Have a minimum 3.33 GPA overall; and
3. Have a minimum undergraduate 3.50 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S.C.P. Computer Engineering/M.S.C.S. Computer Science program, students must have completed a minimum of 15 credit hours in the Computer Engineering undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the major.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S.C.P. and M.S.C.S. majors will review the applications and approve the nominations. All applications require the approval of USF’s Office of Graduate Studies, the College of Engineering’s Graduate Program, and the Department of Computer Science and Engineering Programs.
4. To be promoted to graduate status, students must meet all admission requirements of the M.S.C.S. in Computer Science.
5. Students must earn a minimum of a “B” (3.00) in all shared graduate courses. Failure to earn at least a “B” in a shared graduate course will result in academic review by the graduate program. Failure to maintain good standing as a graduate student will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
6. A comprehensive plan of study to complete the Accelerated B.S.C.P. Computer Engineering/M.S.C.S. Computer Science program will be developed with the guidance of undergraduate and graduate advisors.

Shared Courses (6 credit hours)
Two (2) of the following three (3) core graduate courses replace six (6) credit hours of upper-level departmental (Technical) electives in Computer Engineering, including Independent Study, Supervised Research, and Industry Internship:
EEL 6764 Principles of Computer Architecture
COP 6611 Operating Systems
COT 6405 Introduction to the Theory of Algorithms

Undergraduate Degree Requirements for the B.S.C.P. in Computer Engineering (107 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Math and Science (27 credit hours)
MAC 2281 Engineering Calculus I or MAC 2311 Calculus I
MAC 2282 Engineering Calculus II or MAC 2312 Calculus II  
MAC 2283 Engineering Calculus III or MAC 2313 Calculus III  
MAP 2302 Differential Equations or EGN 3433 Modeling and Analysis of Engineering Systems  
CHM 2045 General Chemistry I or CHS 2440 Chemistry for Engineers  
CHM 2045L General Chemistry I Laboratory or CHS 2440L Chemistry for Engineers Lab  
PHY 2048 General Physics I  
PHY 2048L General Physics I Laboratory  
PHY 2049 General Physics II  
PHY 2049L General Physics II Laboratory

**Basic Engineering (15 credit hours)**  
EGN 3000 Foundations of Engineering  
EGN 3000L Foundations of Engineering Lab  
EGN 3443 Probability and Statistics for Engineers  
EGN 3615 Engineering Economics with Social and Global Implications  
EGN 3373 Introduction to Electrical Systems I  
EGN 4450 Introduction to Linear Systems  
EEE 3394 Electronic Materials

**Specialization (44 credit hours)**  
COP 2510 Programming Concepts  
COP 3514 Program Design  
COP 3331 Object-Oriented Software Design  
COP 4530 Data Structures  
COP 4600 Operating Systems  
CDA 3103 Computer Organization  
CDA 3201 Computer Logic and Design  
CDA 3201L Computer Logic and Design Lab  
CDA 4203 Computer System Design  
CDA 4203L Computer System Design Lab  
CDA 4205 Computer Architecture  
CDA 4213 CMOS-VLSI Design  
CDA 4213L CMOS-VLSI Design Lab  
COT 3100 Introduction to Discrete Structures  
COT 4400 Analysis of Algorithms  
CIS 4250 Ethical Issues and Professional Conduct (CPST)  
CIS 4910 Computer Science Project

**Composition and Technical Writing (9 credit hours)**  
ENC 1101 Composition I  
ENC 1102 Composition II  
ENC 3246 Communication for Engineers (WRIN)

**Departmental Upper-Level Technical Electives (12 credit hours)**  
Departmental upper-level technical electives are classified as "software", "hardware", and "theory". Computer Engineering students must choose 6 hours of hardware electives and an additional, non-overlapping 6 hours of electives in the Department. A maximum of six (6) hours combined of CIS 4900 and/or any other supervised individual study (that is, CIS 4915 and CIS 4940) are allowed as Departmental upper-level technical electives.

Software electives:  
CAP 4034 Computer Animation Fundamentals  
CAP 4063 Web Application Design  
CAP 4401 Image Processing Fundamentals  
CAP 4410 Computer Vision  
CAP 4662 Introduction to Robotics  
CAP 4800 Systems Simulation  
CEN 4020 Software Engineering  
CEN 4072 Software Testing  
CEN 4721 User Interface Design  
CIS 4364 Cryptology and Information Security  
CNT 4004 Computer Networks I  
CNT 4411 Computing and Network Security  
CNT 4504 Computer Networks II  
COP 3257 JAVA Experienced Programmers  
COP 4020 Programming Languages
COP 4365 Software Systems Development
COP 4620 Compilers
COP 4656 Software Development for Mobile Devices
COP 4710 Database Design

Hardware electives:
CDA 4253 FPGA Design and Analysis
CDA 4621 Control of Mobile Robots

Theory electives:
COT 4115 Advanced Discrete Structures with Cryptology
COT 4210 Automata Theory and Formal Languages
COT 4521 Computational Geometry

Other courses:
CIS 4900 Independent Study
CIS 4915 Supervised Research
CIS 4940 Industry Internship

Shared Courses (6 credit hours)
Two (2) of the following three (3) core graduate courses replace six (6) credit hours of upper-level departmental (Technical) electives in Computer Engineering, including Independent Study, Supervised Research, and Industry Internship:
EEL 6764 Principles of Computer Architecture
COP 6611 Operating Systems
COT 6405 Introduction to the Theory of Algorithms

Graduate Degree Requirements for the M.S.C.S. in Computer Science (30 Credit Hours)
*Please see Graduate Catalog for major-specific requirements

Major Core (9 credit hours)
EEL 6764 Principles of Computer Architecture
COP 6611 Operating Systems
COT 6405 Introduction to the Theory of Algorithms

Major Electives (21 credit hours)
Students must select at least 21 hours from the list of available graduate elective courses below in consultation with the Graduate Program Director or individual advisor:
CAP 5400 Digital Image Processing
CAP 5625 Introduction to Artificial Intelligence
CAP 5682 Expert and Intelligent Systems
CAP 5771 Data Mining
CAP 6415 Computer Vision
CAP 6455 Advanced Robotic Systems
CAP 6615 Neural Networks
CAP 6736 Geometric Modeling
CDA 5416 Introduction to Computer-Aided Verification
CIS 6900 Independent Study
CIS 6930 Special Topics
CIS 6940 Graduate Instruction Methods
CIS 6946 Internships/Practicums/Clinical Practice
CNT 6215 Computer Networks
COP 6621 Programming Languages and Translation
EEL 5771 Introduction to Computer Graphics I
EEL 6706 Testing and Fault Tolerance in Digital Systems
EEL 6766 Advanced Computer Architecture

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

For the thesis option, the requirement for a comprehensive exam is satisfied by the successful completion of the Master’s thesis. For the non-thesis option, the requirement for a comprehensive exam is satisfied by the successful completion of the core courses with a grade of “B” or higher.

Thesis Option - 6 hours minimum

CIS 6971 (6) Thesis

At least 2 members of the Thesis committee must be from tenured or tenure track Computer Science and Engineering faculty. All thesis option students are required to present and defend their thesis in a public oral examination. The examination must be scheduled after the Thesis Supervisory Committee has approved the Thesis.

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

Description
Students pursuing a B.S.C.P. in Computer Engineering will earn an M.S.I.T. in Information Technology in an accelerated manner by sharing two (2) graduate courses (6 credit hours) taken as upper-level departmental (Technical) electives as part of the undergraduate Computer Engineering major. The B.S.C.P. requires a total of 128 hours and the M.S.I.T. requires 30 credit hours. By sharing six (6) credit hours, the total credit hours earned will be 152 credit hours.

This accelerated program shares six (6) credit hours between already existing degrees:
- B.S.C.P. in Computer Engineering
- M.S.I.T. in Information Technology

Target Students and Expected Outcomes
Academically high achieving undergraduate students in the B.S.C.P. program with high overall and major GPA will be targeted for the accelerated program. Expected outcomes are the increase in M.S.I.T. degrees granted, increase in graduate SCH, decrease time to graduation, decrease tuition dollars for the student, increase in the number of US students receiving M.S.I.T. degrees, including minorities and students from under-represented groups in Computer Science and Engineering, close the national gap of IT graduates needed to satisfy the market demand and enhance the quality of the graduate program by addition of academically accomplished students.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the undergraduate major;
2. Have a minimum 3.33 GPA overall; and
3. Have a minimum undergraduate 3.50 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S.C.P. Computer Engineering/M.S.I.T. Information Technology program, students must have completed a minimum of 15 credit hours in the Computer Engineering undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the major.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S.C.P. and M.S.I.T. majors will review the applications and approve the nominations. All applications require the approval of USF’s Office of Graduate Studies, the College of Engineering's Graduate Program, and the Department of Computer Science and Engineering Programs.
4. To be promoted to graduate status, students must meet all admission requirements of the M.S.I.T. program.
5. Students must earn a minimum of a "B" (3.00) in all shared graduate courses. Failure to earn at least a “B” in a shared graduate course will result in academic review by the graduate program. Failure to maintain good standing as a graduate student will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
6. A comprehensive plan of study to complete the Accelerated B.S.C.P. Computer Engineering/M.S.I.T. Information Technology program will be developed with the guidance of undergraduate and graduate advisors.

Shared Courses (6 credit hours)
Two (2) of the following three (3) core graduate courses replace six (6) credit hours of upper-level departmental (Technical) electives in Computer Engineering, including Independent Study and Industry Internship:
- CEN 6084 Advances in Object Oriented Programming for Information Technology
- CIS 6930 Selected Topics: Ethical Hacking for IT
- ISM 6218 Advanced Database Administration

Undergraduate Degree Requirements for the B.S.C.P. in Computer Engineering (107 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Math and Science (27 credit hours)
- MAC 2281 Engineering Calculus I or MAC 2311 Calculus I
- MAC 2282 Engineering Calculus II or MAC 2312 Calculus II
- MAC 2283 Engineering Calculus III or MAC 2313 Calculus III
- MAP 2302 Differential Equations or EGN 3433 Modeling and Analysis of Engineering Systems
### Basic Engineering (15 credit hours)
- EGN 3000 Foundations of Engineering
- EGN 3000L Foundations of Engineering Lab
- EGN 3443 Probability and Statistics for Engineers
- EGN 3615 Engineering Economics with Social and Global Implications
- EGN 3373 Introduction to Electrical Systems I
- EGN 4450 Introduction to Linear Systems
- EEE 3394 Electronic Materials

### Specialization (44 credit hours)
- COP 2510 Programming Concepts
- COP 3514 Program Design
- COP 3331 Object-Oriented Software Design
- COP 4530 Data Structures
- COP 4600 Operating Systems
- CDA 3103 Computer Organization
- CDA 3201 Computer Logic and Design
- CDA 3201L Computer Logic and Design Lab
- CDA 4203 Computer System Design
- CDA 4203L Computer System Design Lab
- CDA 4205 Computer Architecture
- CDA 4213 CMOS-VLSI Design
- CDA 4213L CMOS-VLSI Design Lab
- COT 3100 Introduction to Discrete Structures
- COT 4400 Analysis of Algorithms
- CIS 4250 Ethical Issues and Professional Conduct (CPST)
- CIS 4910 Computer Science Project

### Composition and Technical Writing (9 credit hours)
- ENC 1101 Composition I
- ENC 1102 Composition II
- ENC 3246 Communication for Engineers (WRIN)

### Departmental Upper-Level Technical Electives (12 credit hours)
Departmental upper-level technical electives are classified as "software", "hardware", and "theory". Computer Engineering students must choose 6 hours of hardware electives and an additional, non-overlapping 6 hours of electives in the Department. A maximum of six (6) hours combined of CIS 4900 and/or any other supervised individual study (that is, CIS 4915 and CIS 4940) are allowed as Departmental upper-level technical electives.

#### Software electives:
- CAP 4034 Computer Animation Fundamentals
- CAP 4063 Web Application Design
- CAP 4401 Image Processing Fundamentals
- CAP 4410 Computer Vision
- CAP 4662 Introduction to Robotics
- CAP 4800 Systems Simulation
- CEN 4020 Software Engineering
- CEN 4072 Software Testing
- CEN 4721 User Interface Design
- CIS 4364 Cryptology and Information Security
- CNT 4004 Computer Networks I
- CNT 4411 Computing and Network Security
- CNT 4504 Computer Networks II
- COP 3257 JAVA Experienced Programmers
- COP 4020 Programming Languages
- COP 4365 Software Systems Development
- COP 4620 Compilers
- COP 4656 Software Development for Mobile Devices
COP 4710 Database Design

Hardware electives:
- CDA 4253 FPGA Design and Analysis
- CDA 4621 Control of Mobile Robots

Theory electives:
- COT 4115 Advanced Discrete Structures with Cryptology
- COT 4210 Automata Theory and Formal Languages
- COT 4521 Computational Geometry

Other courses:
- CIS 4900 Independent Study
- CIS 4915 Supervised Research
- CIS 4940 Industry Internship

Shared Courses (6 credit hours)

Two (2) of the following three (3) core graduate courses replace six (6) credit hours of upper-level departmental (Technical) electives in Computer Engineering, including Independent Study and Industry Internship:
- CEN 6084 Advances in Object Oriented Programming for Information Technology
- CIS 6930 Selected Topics: Ethical Hacking for IT
- ISM 6218 Advanced Database Administration

Graduate Degree Requirements for the M.S.I.T. in Information Technology (30 Credit Hours)

*Please see Graduate Catalog for major-specific requirements

Major Core (9 credit hours)
- CEN 6084 Advances in Object Oriented Programming for Information Technology
- CIS 6930 Selected Topics: Ethical Hacking for IT
- ISM 6218 Advanced Database Administration

Major Electives (21 credit hours)
Select six of the following courses, or other graduate course as approved by the Graduate Program Director:
- CAP 6663 IT Robotics Applications
- CGS 6842 IT & Systems for E-Business
- CIS 6900 Independent Study
- CIS 6930 Selected Topics: Cloud Computing for Information Technology
- CIS 6930 Selected Topics: Human Computer Interaction
- CIS 6930 Selected Topics: Introduction to Hadoop and Big Data
- CIS 6930 Selected Topics: Networks II
- CIS 6930 Selected Topics: Practical Cybersecurity
- CIS 6930 Selected Topics: Software Development for Mobile Devices
- CIS 6946 Internships/Practicums/Clinical Practice
- CTS 6716 Network Programming for Information Technology
- ISM 6136 Data Mining
- ISM 6137 Statistical Data Mining
- ISM 6145 Seminar on Software Testing
- ISM 6155 Enterprise Information Systems Management
- ISM 6266 Software Architecture

With prior permission from the Graduate Director, students can take a maximum of 3 hours of Independent Study or Internship and up to twelve credit hours outside of the major, as follows: three credit hours from the MSCS/MSCE majors; three credit hours outside of the department (e.g. EE, IE, Math); three credit hours on business practice, project management, leadership, entrepreneurship, or similar; three credit hours on big data, data analytics, data mining or similar.

Comprehensive Exam
The requirement for a comprehensive exam is satisfied by the successful completion of the core courses with a grade of “B” or higher.

Thesis/Non-Thesis
This is a non-thesis program.
Accelerated B.S.I.E. in Industrial Engineering and M.S.B.E. in Biomedical Engineering

Description
Students pursuing a B.S.I.E. in Industrial Engineering will earn an M.S.B.E. in Biomedical Engineering in an accelerated manner by sharing two (2) graduate courses (6 credit hours) taken as upper-level departmental (Technical) electives as part of the undergraduate Industrial Engineering major. The B.S.I.E. requires a total of 128 credit hours and the M.S.B.E. requires 30 credit hours. By sharing six (6) credit hours, the total credit hours earned will be 152 credit hours.

This accelerated program shares six (6) credit hours between already existing degrees:
B.S.I.E. in Industrial Engineering
M.S.B.E. in Biomedical Engineering

Target Students and Expected Outcomes
Academically high achieving undergraduate students in the B.S.I.E. program with high overall and major GPA will be targeted for the accelerated program. Expected outcomes are the increase in M.S.B.E. degrees granted, increase in graduate SCH, and enhancement of the quality of the graduate program by addition of academically accomplished students.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the undergraduate major;
2. Have a minimum 3.33 GPA overall; and
3. Have a minimum undergraduate 3.50 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S.I.E. Industrial Engineering/M.S.B.E. Biomedical Engineering program, students must have completed a minimum of 15 credit hours in the Industrial Engineering undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the major.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S.I.E. and M.S.B.E. majors will review the applications and approve the nominations. All applications require the approval of USF’s Office of Graduate Studies, the College of Engineering’s Graduate Program, the Department of Industrial and Management Systems Engineering’s Undergraduate Program, and the Department of Chemical and Biomedical Engineering’s Graduate Program.
4. To be promoted to graduate status, students must meet all admission requirements of the M.S.B.E. in Biomedical Engineering.
5. Students must earn a minimum of a “B” (3.00) in all shared graduate courses. Failure to earn at least a “B” in a shared graduate course will result in academic review by the graduate program. Failure to maintain good standing as a graduate student will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
6. A comprehensive plan of study to complete the Accelerated B.S.I.E. Industrial Engineering/M.S.B.E. Biomedical Engineering program will be developed with the guidance of undergraduate and graduate advisors.

Shared Courses (6 credit hours)
Two (2) of the following five (5) core graduate courses replace six (6) credit hours of upper-level departmental (Technical) electives in Industrial Engineering:
- BME 6000 Biomedical Engineering I
- BME 6931 Biomedical Engineering II
- GMS 6440 Basic Medical Physiology or BME 6409 Engineering Physiology
- GMS 6605 Basic Medical Anatomy
- PHC 6051 Biostatistics II

Undergraduate Degree Requirements for the B.S.I.E. in Industrial Engineering (107 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (102 credit hours)
- Math and Science (27 credit hours)
  - MAC 2281 Engineering Calculus I or MAC 2311 Calculus I
MAC 2282 Engineering Calculus II or MAC 2312 Calculus II
MAC 2283 Engineering Calculus III or MAC 2313 Calculus III
MAP 2302 Differential Equations or EGN 3433 Modeling and Analysis of Engineering Systems
CHM 2045 General Chemistry I or CHS 2440 Chemistry for Engineers
CHM 2045L General Chemistry I Laboratory or CHS 2440L Chemistry for Engineers Lab
PHY 2048 General Physics I
PHY 2048L General Physics I Laboratory
PHY 2049 General Physics II
PHY 2049L General Physics II Laboratory

Basic Engineering (24 credit hours)
EGN 3000 Foundations of Engineering
EGN 3000L Foundations of Engineering Lab
EGN 3443 Probability and Statistics for Engineers
EGN 4450 Introduction to Linear Systems
EGN 1113 Introduction to Design Graphics
EGN 3311 Statics
EGN 3373 Introduction to Electrical Systems I
EGN 3365 Materials Engineering I
EGN 3343 Thermodynamics I
EGN 3615 Engineering Economics with Social and Global Implications

Specialization (48 credit hours)
ESI 4007 Engineering Programming
EIN 4312C Work Analysis
EIN 4621C Manufacturing Processes
ESI 4312 Deterministic O.R.
EIN 4333 Production Control
ESI 4221 Statistical Quality Control
ESI 4313 Probabilistic O.R.
ESI 4620 Design of Industrial Information Systems
ESI 4606 Engineering Analytics I
EIN 4364 Facilities Design and Cost Analysis
ESI 4244 Design of Experiments
ESI 4523 Systems Simulation
EIN 4243C Human Factors
EIN 4601C Automation and Robotics
EIN 4891 Capstone Design (CPST)
ESI 4607 Engineering Analytics II

Technical Writing (6 credit hours)
ENC 3246 Communication for Engineers (WRIN)

Major Electives (5 credit hours)
Five (5) credit hours of Departmental Upper-Level Electives (Industrial Engineering Technical Elective)
EIN 4142 Project Management
EIN 4172 ISO 9000/14000
EIN 4173 Quality Systems Management
EIN 4180 Principles of Engineering Management
EIN 4200 Creativity in Technology
EIN 4213 Engineering Systems Safety
EIN 4214 Occupational Safety Engineering
EIN 4385 Management of Technical Change
EIN 4453 Advanced Lean Six Sigma
EIN 4933 Special Topics in Industrial Engineering
EIN 5182 Principles of Engineering Management
EIN 5275 Work Physiology and Biomechanics
EIN 5510 Manufacturing Systems Analysis
ESI 4326 Engineering the Supply Chain
ESI 5236 Reliability Engineering
ESI 5522 Computer Simulation
Shared Courses (6 credit hours)
Two (2) of the following five (5) core graduate courses replace six (6) credit hours of upper-level departmental (Technical) electives in Industrial Engineering:
- BME 6000 Biomedical Engineering I
- BME 6931 Biomedical Engineering II
- GMS 6440 Basic Medical Physiology or BME 6409 Engineering Physiology
- GMS 6605 Basic Medical Anatomy
- PHC 6051 Biostatistics II

Graduate Degree Requirements for the M.S.B.E. in Biomedical Engineering (30 Credit Hours)
*Please see Graduate Catalog for major-specific requirements

Major Core (15 credit hours)
- BME 6000 Biomedical Engineering I
- BME 6931 Biomedical Engineering II
- GMS 6440 Basic Medical Physiology or BME 6409 Engineering Physiology
- GMS 6605 Basic Medical Anatomy
- PHC 6051 Biostatistics II

Major Electives (15 credit hours)
Students select from additional approved courses to complete the 30 credit hour requirement. A minimum of 16 credit hours must be at the 6000-level. In addition, all of the elective courses must consist of engineering-prefix courses, although the Thesis Committee (thesis option) or the BME Program Advisor (non-thesis option) may approve courses in relevant areas such as chemistry, physics, pharmacy, communication sciences and disorders, public health, or medicine, in their place.

Thesis Option
Thesis option students can count up to six (6) credit hours of thesis research towards the elective requirements.

Comprehensive Exam
Students in the non-thesis track will complete a comprehensive exam. For students in the thesis track, the thesis and oral defense serve as the comprehensive exam.
Description
Students pursuing a B.S.I.E. in Industrial Engineering will earn an M.S.E.M. in Engineering Management in an accelerated manner by sharing two (2) graduate courses (6 credit hours) taken as upper-level departmental (Technical) electives as part of the undergraduate Industrial Engineering major. The B.S.I.E. requires a total of 128 credit hours and the M.S.E.M. requires 30 credit hours. By sharing six (6) credit hours, the total credit hours earned will be 152 credit hours.

This accelerated program shares six (6) credit hours between already existing degrees:
- B.S.I.E. in Industrial Engineering
- M.S.E.M. in Engineering Management

Target Students and Expected Outcomes
Academically high achieving undergraduate students in the B.S.I.E. program with high overall and major GPA will be targeted for the accelerated program. Expected outcomes are the increase in M.S.E.M. degrees granted, increase in graduate SCH, and enhancement of the quality of the graduate program by addition of academically accomplished students.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the undergraduate major;
2. Have a minimum 3.33 GPA overall; and
3. Have a minimum undergraduate 3.50 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S.I.E. Industrial Engineering/M.S.E.M. Engineering Management program, students must have completed a minimum of 15 credit hours in the Industrial Engineering undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the major.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S.I.E. and M.S.E.M. majors will review the applications and approve the nominations. All applications require the approval of USF’s Office of Graduate Studies, the College of Engineering’s Graduate Program, and the Department of Industrial and Management Systems.
4. To be promoted to graduate status, students must meet all admission requirements of the M.S.E.M. in Engineering Management.
5. Students must earn a minimum of a "B" (3.00) in all shared graduate courses. Failure to earn at least a "B" in a shared graduate course will result in academic review by the graduate program. Failure to maintain good standing as a graduate student will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
6. A comprehensive plan of study to complete the Accelerated B.S.I.E. Industrial Engineering/M.S.E.M. Engineering Management program will be developed with the guidance of undergraduate and graduate advisors.

Shared Courses (6 credit hours)
The following courses will satisfy six (6) credit hours of Industrial Engineering elective coursework:
- EIN 5182 Principles of Engineering Management
- EIN 6386 Management of Technological Change

Undergraduate Degree Requirements for the B.S.I.E. in Industrial Engineering (107 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (102 credit hours)
Math and Science (27 credit hours)
- MAC 2281 Engineering Calculus I or MAC 2311 Calculus I
- MAC 2282 Engineering Calculus II or MAC 2312 Calculus II
- MAC 2283 Engineering Calculus III or MAC 2313 Calculus III
- MAP 2302 Differential Equations or EGN 3433 Modeling and Analysis of Engineering Systems
- CHM 2045 General Chemistry I or CHS 2440 Chemistry for Engineers
CHM 2045L General Chemistry I Laboratory or CHS 2440L Chemistry for Engineers Lab
PHY 2048 General Physics I
PHY 2048L General Physics I Laboratory
PHY 2049 General Physics II
PHY 2049L General Physics II Laboratory

**Basic Engineering (24 credit hours)**
- EGN 3000 Foundations of Engineering
- EGN 3000L Foundations of Engineering Lab
- EGN 3443 Probability and Statistics for Engineers
- EGN 4450 Introduction to Linear Systems
- EGN 1113 Introduction to Design Graphics
- EGN 3311 Statics
- EGN 3373 Introduction to Electrical Systems I
- EGN 3365 Materials Engineering I
- EGN 3343 Thermodynamics I
- EGN 3615 Engineering Economics with Social and Global Implications

**Specialization (48 credit hours)**
- ESI 4007 Engineering Programming
- EIN 4312C Work Analysis
- EIN 4621 Manufacturing Processes
- ESI 4312 Deterministic O.R.
- EIN 4333 Production Control
- ESI 4221 Statistical Quality Control
- ESI 4313 Probabilistic O.R.
- ESI 4620 Design of Industrial Information Systems
- ESI 4606 Engineering Analytics I
- EIN 4364 Facilities Design and Cost Analysis
- ESI 4244 Design of Experiments
- ESI 4523 Systems Simulation
- EIN 4243C Human Factors
- EIN 4601C Automation and Robotics
- EIN 4891 Capstone Design (CPST)
- ESI 4607 Engineering Analytics II

**Technical Writing (6 credit hours)**
- ENC 3246 Communication for Engineers (WRIN)

**Major Electives (5 credit hours)**
- Five (5) credit hours of Departmental Upper-Level Electives (Industrial Engineering Technical Elective)
  - EIN 4142 Project Management
  - EIN 4172 ISO 9000/14000
  - EIN 4173 Quality Systems Management
  - EIN 4180 Principles of Engineering Management
  - EIN 4200 Creativity in Technology
  - EIN 4213 Engineering Systems Safety
  - EIN 4214 Occupational Safety Engineering
  - EIN 4385 Management of Technical Change
  - EIN 4453 Advanced Lean Six Sigma
  - EIN 4933 Special Topics in Industrial Engineering
  - EIN 5182 Principles of Engineering Management
  - EIN 5275 Work Physiology and Biomechanics
  - EIN 5510 Manufacturing Systems Analysis
  - ESI 4326 Engineering the Supply Chain
  - ESI 5236 Reliability Engineering
  - ESI 5522 Computer Simulation

**Shared Courses (6 credit hours)**
- The following courses will satisfy six (6) credit hours of Industrial Engineering elective coursework:
  - EIN 5182 Principles of Engineering Management
  - EIN 6386 Management of Technological Change
Graduate Degree Requirements for the M.S.E.M. in Engineering Management (30 Credit Hours)

*Please see Graduate Catalog for major-specific requirements

Major Core (18 credit hours)

General Core Area - 12 credit hours
- EIN 5182 Principles of Engineering Management
- EIN 5350 Technology and Finance
- EIN 6183 Engineering Management Policy & Strategy
- EIN 6386 Management of Technological Change

Quantitative Core Area - 3 credit hours
Three (3) credit hours must be selected from the following options, as approved by advisor.
- ESI 5219 Statistical Methods for Engineering Managers
- ESI 5306 Operations Research for Engineering Managers
- ESI 6247 Statistical Design Models

Job Design Core Area - 3 credit hours
Three (3) credit hours must be selected from the following options, as approved by advisor.
- EIN 6108 Engineering Management: Human Relations
- EIN 6319 Work Design, Motivation & Productivity

Major Electives (12 credit hours)
Twelve (12) credit hours minimum must be selected from the following options, as approved by advisor.
- EIN 5174 Total Quality Management (TQM) Concepts
- EIN 5201 Creativity in Technology
- EIN 5510 Manufacturing Systems Analysis
- EIN 6106 Technology and Law
- EIN 6112 Information Systems Design for Engineering
- EIN 6145 Project Management
- EIN 6178 ISO 9000/14000
- EIN 6154 Technical Entrepreneurship
- EIN 6215 Systems Safety Engineering
- EIN 6216 Occupation Safety Engineering
- EIN 6217 Construction Safety Engineering
- EIN 6275 Design Controls for Medical Devices
- EIN 6324 Engineering the Supply Chain
- EIN 6336 Production Control Systems
- EIN 6392 New Product Development
- EIN 6420 Non-Linear Programming
- EIN 6430 Overview of Regulated Industries
- EIN 6431 Regulatory Quality Systems & Controls for Medical Devices
- EIN 6432 Regulated Product Approval Process
- EIN 6433 Human Factors Engineering in Medical Devices
- EIN 6435 International Regulations for Medical Devices
- EIN 6934 Systems Integration
- EIN 6935 Lean Six Sigma
- EIN 6936 Advanced Lean Six Sigma
- ESI 5236 Reliability Engineering
- ESI 5522 Computer Simulation
- ESI 6213 Stochastic Decision Models I
- ESI 6448 Integer Programming
- ESI 6491 Linear Programming & Network Optimization

Thesis Option - 6 hours minimum

EIN 6971 Thesis
A thesis option is available to M.S.E.M. students who are interested in applied research. In the thesis option, 18 hours of core coursework, 6 hours of electives, and 6 hours of thesis are the minimum requirements. Students in the Thesis option are required to have a Thesis Defense.
**Accelerated B.S.M.E. in Mechanical Engineering and M.S.B.E. in Biomedical Engineering**

**Description**

Students pursuing a B.S.M.E. in Mechanical Engineering will earn an M.S.B.E. in Biomedical Engineering in an accelerated manner by sharing two (2) core graduate courses (6 credit hours) taken as upper-level departmental electives as part of the undergraduate Mechanical Engineering major. The B.S.M.E. requires a total of 128 hours and the M.S.B.E. requires 30 hours. By sharing six (6) credit hours, the total credit hours earned will be 152 hours.

This accelerated program shares six (6) credit hours between already existing degrees:
- B.S.M.E. in Mechanical Engineering
- M.S.B.E. in Biomedical Engineering

**Target Students and Expected Outcomes**

Academically high achieving undergraduate students in the B.S.M.E. program with high overall and major GPA will be targeted for the accelerated program. Expected outcomes are the increase in M.S.B.E. degrees granted, increase in graduate SCH, and enhancement of the quality of the graduate program by addition of academically accomplished students.

**Admission Requirements**

For admission to the program, a student must:
1. Have completed 15 hours in the undergraduate major;
2. Have a minimum 3.33 GPA overall; and
3. Have a minimum undergraduate 3.50 GPA in the major.

**Timeline and Benchmarks:**

1. To be considered for acceptance into the Accelerated B.S.M.E. Mechanical Engineering/M.S.B.E. Biomedical Engineering program, students must have completed a minimum of 15 credit hours in the Mechanical Engineering undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in Mechanical Engineering the major.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S.M.E. and M.S.B.E. majors will review the applications and approve the nominations. All applications require the approval of USF’s Office of Graduate Studies, the College of Engineering’s Graduate Program, the Department of Mechanical Engineering’s Undergraduate Program, and the Department of Chemical and Biomedical Engineering’s Graduate Program.
4. To be promoted to graduate status, students must meet all admission requirements of the M.S.B.E. in Biomedical Engineering.
5. Students must earn a minimum of a “B” (3.00) in all shared graduate courses. Failure to earn at least a “B” in a shared graduate course will result in academic review by the graduate program. Failure to maintain good standing as a graduate student will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
6. A comprehensive plan of study to complete the Accelerated B.S.M.E. in Mechanical Engineering/M.S.B.E. in Biomedical Engineering program will be developed with the guidance of an advisor and a faculty member.

**Shared Courses (6 credit hours)**

Two (2) of the following five (5) core graduate courses replace six (6) credit hours of upper-level departmental electives in Mechanical Engineering:
- BME 6000 Biomedical Engineering I
- BME 6931 Biomedical Engineering II
- GMS 6440 Basic Medical Physiology or BME 6409 Engineering Physiology
- GMS 6605 Basic Medical Anatomy
- PHC 6051 Biostatistics II

**Undergraduate Degree Requirements for the B.S.M.E. in Mechanical Engineering** (107 credit hours)

*Please see Undergraduate Catalog for major-specific requirements

**Major Core (95 credit hours)**

**Math and Science (27 credit hours)**
- MAC 2281 Engineering Calculus I or MAC 2311 Calculus I
MAC 2282 Engineering Calculus II or MAC 2312 Calculus II
MAC 2283 Engineering Calculus III or MAC 2313 Calculus III
MAP 2302 Differential Equations
CHS 2440 General Chemistry for Engineers or CHM 2045 General Chemistry I
CHS 2440L General Chemistry for Engineers Laboratory or CHM 2045 General Chemistry I Laboratory
PHY 2048 General Physics I
PHY 2048L General Physics I Laboratory
PHY 2049 General Physics II
PHY 2049L General Physics II Laboratory

Basic Engineering (22 credit hours)
EGN 3000 Foundations of Engineering
EGN 3000L Foundations of Engineering Laboratory
EGN 3311 Statics
EGN 3321 Dynamics
EGN 3615 Engineering Economics with Social and Global Implications
EGN 3365 Materials Engineering I
EGN 3373 Introduction to Electrical Systems I
EGN 3343 Thermodynamics I
EGN 3443 Probability & Statistics for Engineers

Specialization (43 credit hours)
EML 3035 Programming Concepts for Mechanical Engineers
EML 3500 Mechanics of Solids
EML 3022 Computer Aided Design and Engineering (CAD)
EML 3041 Computational Methods
EML 3262 Kinematics and Dynamics of Machinery
EML 3701 Fluid Systems
EML 4325 Mechanical Manufacturing Processes
EML 3303 Mechanical Engineering Lab I
EML 4123 Heat Transfer
EML 4501 Machine Design
EML 4106C Thermal Systems and Economics
EML 4220 Vibrations
EML 4302 Mechanical Engineering Laboratory II
EML 4312 Mechanical Controls
EML 4551 Capstone Design (CPST)

Technical Writing (3 credit hours)
ENC 3246 Communication for Engineers (WRIN)

Major Electives (12 credit hours)
12 hours of Upper-Level Departmental Electives (Technical Design Elective) from the list below:
BME 4332 Cell and Tissue Engineering
BME 4440 Introduction to Bioastronautics
EAS 4121 Hydro and Aerodynamics
EGN 4366 Materials Engineering II
EML 4141 Thermal Management of Electronic Systems
EML 4230 Introduction to Composite Materials
EML 4246 Tribology
EML 4310 Microcontrollers
EML 4326 Advanced Materials Processing
EML 4414 Power Plant Engineering
EML 4419 Propulsion I
EML 4421 Internal Combustion Engines
EML 4450 Alternative & Renewable Energy
EML 4503 Sustainable Design and Materials
EML 4552 Senior Mechanical Design
EML 4575 Principles of Fracture Mechanics
EML 4593 Haptics
EML 4601 Air Conditioning Design
EML 4702 Fluid Dynamics II
EML 4703 Mechanics of Compressible Fluids
EML 4905 Independent Study
EML 4930 Special Topics in Mechanical Engineering
OSE 4601 Optical Product Technology

Shared Courses (6 credit hours)
Two (2) of the following five (5) core graduate courses replace six (6) credit hours of upper-level departmental electives in Mechanical Engineering:
- BME 6000 Biomedical Engineering I
- BME 6931 Biomedical Engineering II
- GMS 6440 Basic Medical Physiology or BME 6409 Engineering Physiology
- GMS 6605 Basic Medical Anatomy
- PHC 6051 Biostatistics II

Graduate Degree Requirements for the M.S.B.E. in Biomedical Engineering (30 Credit Hours)
*Please see Graduate Catalog for major-specific requirements

Major Core (15 credit hours)
- BME 6000 Biomedical Engineering I
- BME 6931 Biomedical Engineering II
- GMS 6440 Basic Medical Physiology or BME 6409 Engineering Physiology
- GMS 6605 Basic Medical Anatomy
- PHC 6051 Biostatistics II

Major Electives (15 credit hours)
Students select from additional approved courses to complete the 30 credit hour requirement. A minimum of 16 credit hours must be at the 6000-level. In addition, all of the elective courses must consist of engineering-prefix courses, although the Thesis Committee (thesis option) or the BME Program Advisor (non-thesis option) may approve courses in relevant areas such as chemistry, physics, pharmacy, communication sciences and disorders, public health, or medicine, in their place.

Thesis Option
Thesis option students can count up to six (6) credit hours of thesis research towards the elective requirements.

Comprehensive Exam
Students in the non-thesis track will complete a comprehensive exam. For students in the thesis track, the thesis and oral defense serve as the comprehensive exam.
Accelerated B.S.M.E. in Mechanical Engineering and M.S.E.M. in Engineering Management

Description
Students pursuing a B.S.M.E. in Mechanical Engineering will earn an M.S.E.M. in Engineering Management in an accelerated manner by sharing two (2) 6000-level EIN or ESI courses (6 credit hours) taken as upper-level departmental electives as part of the undergraduate Mechanical Engineering major. The B.S.M.E. requires a total of 128 hours and the M.S.E.M. requires 30 hours. By sharing six (6) credit hours, the total credit hours earned will be 152 hours.

This accelerated program shares six (6) credit hours between already existing degrees:
- B.S.M.E. in Mechanical Engineering
- M.S.E.M. in Engineering Management

Target Students and Expected Outcomes
Academically high achieving undergraduate students in the B.S.M.E. program with high overall and major GPA will be targeted for the accelerated program. Expected outcomes are that the increase in M.S.E.M. degrees granted, increase in graduate SCH, and enhancement of the quality of the graduate program by addition of academically accomplished students.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the undergraduate major;
2. Have a minimum 3.33 GPA overall; and
3. Have a minimum undergraduate 3.50 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S.M.E. Mechanical Engineering/M.S.E.M. Engineering Management program, students must have completed a minimum of 15 credit hours in the Mechanical Engineering undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the Mechanical Engineering major.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S.M.E. and M.S.E.M. majors will review the applications and approve the nominations. All applications require the approval of USF’s Office of Graduate Studies, the College of Engineering’s Graduate Program, and the Department of Industrial and Management System Engineering’s Graduate Program.
4. To be promoted to graduate status, students must meet all admission requirements of the M.S.E.M. in Engineering Management.
5. Students must earn a minimum of a “B” (3.00) in all shared graduate courses. Failure to earn at least a “B” in a shared graduate course will result in academic review by the graduate program. Failure to maintain good standing as a graduate student will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
6. A comprehensive plan of study to complete the Accelerated B.S.M.E. in Mechanical Engineering/M.S.E.M. in Engineering Management program will be developed with the guidance of an advisor and a faculty member.

Shared Courses (6 credit hours)
The following courses will satisfy six (6) credit hours of Mechanical Engineering elective coursework:
- Two (2) EIN or ESI courses at the 6000-level to count toward the Upper-Level Technical Design electives

Undergraduate Degree Requirements for the B.S.M.E. in Mechanical Engineering (107 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (95 credit hours)
- Math and Science (27 credit hours)
  MAC 2281 Engineering Calculus I or MAC 2311 Calculus I
  MAC 2282 Engineering Calculus II or MAC 2312 Calculus II
  MAC 2283 Engineering Calculus III or MAC 2313 Calculus III
  MAP 2302 Differential Equations
CHS 2440 General Chemistry for Engineers or CHM 2045 General Chemistry I
CHS 2440L General Chemistry for Engineers Laboratory or CHM 2045 General Chemistry I Laboratory
PHY 2048 General Physics I
PHY 2048L General Physics I Laboratory
PHY 2049 General Physics II
PHY 2049L General Physics II Laboratory

**Basic Engineering (22 credit hours)**
EGN 3000 Foundations of Engineering
EGN 3000L Foundations of Engineering Laboratory
EGN 3311 Statics
EGN 3321 Dynamics
EGN 3615 Engineering Economics with Social and Global Implications
EGN 3365 Materials Engineering I
EGN 3373 Introduction to Electrical Systems I
EGN 3343 Thermodynamics I
EGN 3443 Probability & Statistics for Engineers

**Specialization (43 credit hours)**
EML 3035 Programming Concepts for Mechanical Engineers
EML 3500 Mechanics of Solids
EML 3022 Computer Aided Design and Engineering (CAD)
EML 3041 Computational Methods
EML 3262 Kinematics and Dynamics of Machinery
EML 3701 Fluid Systems
EML 4325 Mechanical Manufacturing Processes
EML 3303 Mechanical Engineering Lab I
EML 4123 Heat Transfer
EML 4501 Machine Design
EML 4106C Thermal Systems and Economics
EML 4220 Vibrations
EML 4302 Mechanical Engineering Laboratory II
EML 4312 Mechanical Controls
EML 4551 Capstone Design (CPST)

**Technical Writing (3 credit hours)**
ENC 3246 Communication for Engineers (WRIN)

**Major Electives (12 credit hours)**
12 hours of Upper-Level Departmental Electives (Technical Design Elective) from the list below:
BME 4332 Cell and Tissue Engineering
BME 4440 Introduction to Bioastronautics
EAS 4121 Hydro and Aerodynamics
EGN 4366 Materials Engineering II
EML 4141 Thermal Management of Electronic Systems
EML 4230 Introduction to Composite Materials
EML 4246 Tribology
EML 4310 Microcontrollers
EML 4326 Advanced Materials Processing
EML 4414 Power Plant Engineering
EML 4419 Propulsion I
EML 4421 Internal Combustion Engines
EML 4450 Alternative & Renewable Energy
EML 4503 Sustainable Design and Materials
EML 4552 Senior Mechanical Design
EML 4575 Principles of Fracture Mechanics
EML 4593 Haptics
EML 4601 Air Conditioning Design
EML 4702 Fluid Dynamics II
EML 4703 Mechanics of Compressible Fluids
EML 4905 Independent Study
EML 4930 Special Topics in Mechanical Engineering
OSE 4601 Optical Product Technology
Shared Courses (6 credit hours)
The following courses will satisfy six (6) credit hours of Mechanical Engineering elective coursework:
  Two (2) EIN or ESI courses at the 6000-level to count toward the Upper-Level Technical Design electives

Graduate Degree Requirements for the M.S.E.M. in Engineering Management (30 Credit Hours)
*Please see Graduate Catalog for major-specific requirements

Major Core (18 credit hours)
  General Core Area - 12 credit hours
    EIN 5182 Principles of Engineering Management
    EIN 5350 Technology and Finance
    EIN 6183 Engineering Management Policy & Strategy
    EIN 6386 Management of Technological Change
  Quantitative Core Area - 3 credit hours
    Three (3) credit hours must be selected from the following options, as approved by advisor.
      ESI 5219 Statistical Methods for Engineering Managers
      ESI 5306 Operations Research for Engineering Managers
      ESI 6247 Statistical Design Models
  Job Design Core Area - 3 credit hours
    Three (3) credit hours must be selected from the following options, as approved by advisor.
      EIN 6108 Engineering Management: Human Relations
      EIN 6319 Work Design, Motivation & Productivity

Major Electives (12 credit hours)
  Twelve (12) credit hours minimum must be selected from the following options, as approved by advisor.
    EIN 5174 Total Quality Management (TQM) Concepts
    EIN 5201 Creativity in Technology
    EIN 5510 Manufacturing Systems Analysis
    EIN 6106 Technology and Law
    EIN 6112 Information Systems Design for Engineering
    EIN 6145 Project Management
    EIN 6178 ISO 9000/14000
    EIN 6154 Technical Entrepreneurship
    EIN 6215 Systems Safety Engineering
    EIN 6216 Occupation Safety Engineering
    EIN 6217 Construction Safety Engineering
    EIN 6275 Design Controls for Medical Devices
    EIN 6324 Engineering the Supply Chain
    EIN 6336 Production Control Systems
    EIN 6392 New Product Development
    EIN 6420 Non-Linear Programming
    EIN 6430 Overview of Regulated Industries
    EIN 6431 Regulatory Quality Systems & Controls for Medical Devices
    EIN 6432 Regulated Product Approval Process
    EIN 6433 Human Factors Engineering in Medical Devices
    EIN 6435 International Regulations for Medical Devices
    EIN 6934 Systems Integration
    EIN 6935 Lean Six Sigma
    EIN 6936 Advanced Lean Six Sigma
    ESI 5236 Reliability Engineering
    ESI 5522 Computer Simulation
    ESI 6213 Stochastic Decision Models I
    ESI 6448 Integer Programming
    ESI 6491 Linear Programming & Network Optimization

Thesis Option - 6 hours minimum
EIN 6971 Thesis
A thesis option is available to M.S.E.M. students who are interested in applied research. In the thesis option, 18 hours of core coursework, 6 hours of electives, and 6 hours of thesis are the minimum requirements. Students in the Thesis option are required to have a Thesis Defense.
Accelerated B.S.M.E. in Mechanical Engineering and M.S.M.S.E. in Materials Science and Engineering

Description
Students pursuing a B.S.M.E. in Mechanical Engineering will earn an M.S.M.S.E. in Materials Science and Engineering in an accelerated manner by sharing two (2) 6000-level EML courses (6 credit hours) taken as upper-level departmental electives as part of the undergraduate Mechanical Engineering major. The B.S.M.E. requires a total of 128 hours and the M.S.M.S.E. requires 30 hours. By sharing six (6) credit hours, the total credit hours earned will be 152 credit hours.

This accelerated program shares six (6) credit hours between already existing degrees:
- B.S.M.E. in Mechanical Engineering
- M.S.M.S.E. in Materials Science and Engineering

Target Students and Expected Outcomes
Academically high achieving undergraduate students in the B.S.M.E. program with high overall and major GPA will be targeted for the accelerated program. Expected outcomes are that the increase in M.S.M.S.E. degrees granted, increase in graduate SCH, and enhancement of the quality of the graduate program by addition of academically accomplished students. In addition, some of these M.S.M.S.E. students will continue on to Ph.D. programs in Engineering and Physical Science and enhance the doctoral programs as well.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the undergraduate major;
2. Have a minimum 3.33 GPA overall; and
3. Have a minimum undergraduate 3.50 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S.M.E. Mechanical Engineering/M.S.M.S.E. Materials Science and Engineering program, students must have completed a minimum of 15 credit hours in the Mechanical Engineering undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the Mechanical Engineering major.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S.M.E. and M.S.M.S.E. majors will review the applications and approve the nominations. All applications require the approval of USF’s Office of Graduate Studies, the College of Engineering’s Graduate Program, and the Department of Mechanical Engineering’s Undergraduate Program.
4. To be promoted to graduate status, students must meet all admission requirements of the M.S.M.S.E. in Materials Science and Engineering.
5. Students must earn a minimum of a “B” (3.00) in all shared graduate courses. Failure to earn at least a “B” in a shared graduate course will result in academic review by the graduate program. Failure to maintain good standing as a graduate student will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
6. A comprehensive plan of study to complete the Accelerated B.S.M.E. in Mechanical Engineering/M.S.M.S.E. in Materials Science and Engineering program will be developed with the guidance of an advisor and a faculty member.

Shared Courses (6 credit hours)
The following courses will satisfy six (6) credit hours of Mechanical Engineering elective coursework:
Two (2) EML courses at the 6000-level to count toward the Upper-Level Technical Design electives

Undergraduate Degree Requirements for the B.S.M.E. in Mechanical Engineering (107 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (95 credit hours)
Math and Science (27 credit hours)
- MAC 2281 Engineering Calculus I or MAC 2311 Calculus I
- MAC 2282 Engineering Calculus II or MAC 2312 Calculus II
- MAC 2283 Engineering Calculus III or MAC 2313 Calculus III
MAP 2302 Differential Equations
CHS 2440 General Chemistry for Engineers or CHM 2045 General Chemistry I
CHS 2440L General Chemistry for Engineers Laboratory or CHM 2045 General Chemistry I Laboratory
PHY 2048 General Physics I
PHY 2048L General Physics I Laboratory
PHY 2049 General Physics II
PHY 2049L General Physics II Laboratory

Basic Engineering (22 credit hours)
EGN 3000 Foundations of Engineering
EGN 3000L Foundations of Engineering Laboratory
EGN 3311 Statics
EGN 3321 Dynamics
EGN 3615 Engineering Economics with Social and Global Implications
EGN 3365 Materials Engineering I
EGN 3373 Introduction to Electrical Systems I
EGN 3343 Thermodynamics I
EGN 3443 Probability & Statistics for Engineers

Specialization (43 credit hours)
EML 3035 Programming Concepts for Mechanical Engineers
EML 3500 Mechanics of Solids
EML 3022 Computer Aided Design and Engineering (CAD)
EML 3041 Computational Methods
EML 3262 Kinematics and Dynamics of Machinery
EML 3701 Fluid Systems
EML 4325 Mechanical Manufacturing Processes
EML 3303 Mechanical Engineering Lab I
EML 4123 Heat Transfer
EML 4501 Machine Design
EML 4106C Thermal Systems and Economics
EML 4220 Vibrations
EML 4302 Mechanical Engineering Laboratory II
EML 4312 Mechanical Controls
EML 4551 Capstone Design (CPST)

Technical Writing (3 credit hours)
ENC 3246 Communication for Engineers (WRIN)

Major Electives (12 credit hours)
12 hours of Upper-Level Departmental Electives (Technical Design Elective) from the list below:
BME 4332 Cell and Tissue Engineering
BME 4440 Introduction to Bioastronautics
EAS 4121 Hydro and Aerodynamics
EGN 4366 Materials Engineering II
EML 4141 Thermal Management of Electronic Systems
EML 4230 Introduction to Composite Materials
EML 4246 Tribology
EML 4310 Microcontrollers
EML 4326 Advanced Materials Processing
EML 4414 Power Plant Engineering
EML 4419 Propulsion I
EML 4421 Internal Combustion Engines
EML 4450 Alternative & Renewable Energy
EML 4503 Sustainable Design and Materials
EML 4552 Senior Mechanical Design
EML 4575 Principles of Fracture Mechanics
EML 4593 Haptics
EML 4601 Air Conditioning Design
EML 4702 Fluid Dynamics II
EML 4703 Mechanics of Compressible Fluids
EML 4905 Independent Study
EML 4930 Special Topics in Mechanical Engineering
OSE 4601 Optical Product Technology
Shared Courses (6 credit hours)
The following courses will satisfy six (6) credit hours of Mechanical Engineering elective coursework:
  Two (2) EML courses at the 6000-level to count toward the Upper-Level Technical Design electives

Graduate Degree Requirements for the M.S.M.S.E. in Materials Science and Engineering (30 Credit Hours)
*Please see Graduate Catalog for major-specific requirements

Major Core (5 credit hours)
  EMA 6510 Characterization of Materials
  ECH 6931 Graduate Seminar or PHY 6938 Graduate Seminar

Major Electives (19-25 credit hours)
  19 credit hours minimum; will be structured upon consultation with graduate coordinator based on focus area of student interest. Must be approved by the graduate coordinator.

Thesis Option
  The thesis option requires the completion of 24 credit hours of graduate level courses (5 credit hours core and 19 hours of electives) and 6 credit hours of thesis.
    XXX 6971 Thesis

Non-Thesis Option
  The non-thesis option requires 30 credit hours, with 5 credit hours core and 25 credit hours of electives.
  The thesis defense serves as the comprehensive exam for the thesis option. A comprehensive/critical review on a materials topic approved and graded by the graduate coordinator serves as the comprehensive exam for the non-thesis option.
Accelerated B.S.M.E. in Mechanical Engineering and M.M.E. in Mechanical Engineering

Description
Students pursuing a B.S.M.E. in Mechanical Engineering will earn an M.M.E. in Mechanical Engineering in an accelerated manner by sharing two (2) 6000-level EML courses (6 credit hours) taken as upper-level departmental electives as part of the undergraduate Mechanical Engineering major. The B.S.M.E. requires a total of 128 hours and the M.M.E. requires 30 hours. By sharing six (6) credit hours, the total credit hours earned will be 152 hours.

This accelerated program shares six (6) credit hours between already existing degrees:
B.S.M.E. in Mechanical Engineering
M.M.E. in Mechanical Engineering

Target Students and Expected Outcomes
Academically high achieving undergraduate students in the B.S.M.E. program with high overall and major GPA will be targeted for the accelerated program. Expected outcomes are the increase in M.M.E. degrees granted, increase in graduate SCH, and enhancement of the quality of the graduate program by addition of academically accomplished students.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the undergraduate major;
2. Have a minimum 3.33 GPA overall; and
3. Have a minimum undergraduate 3.50 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S.M.E. Mechanical Engineering/M.M.E. Mechanical Engineering program, students must have completed a minimum of 15 credit hours in the Mechanical Engineering undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the Mechanical Engineering major.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S.M.E. and M.M.E. majors will review the applications and approve the nominations. All applications require the approval of USF’s Office of Graduate Studies, the College of Engineering’s Graduate Program, and the Department of Mechanical Engineering.
4. To be promoted to graduate status, students must meet all admission requirements of the M.M.E. in Mechanical Engineering.
5. Students must earn a minimum of a “B” (3.00) in all shared graduate courses. Failure to earn at least a “B” in a shared graduate course will result in academic review by the graduate program. Failure to maintain good standing as a graduate student will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
6. A comprehensive plan of study to complete the Accelerated B.S.M.E. in Mechanical Engineering/M.M.E. in Mechanical Engineering program will be developed with the guidance of an advisor and a faculty member.

Shared Courses (6 credit hours)
The following courses will satisfy six (6) credit hours of Mechanical Engineering elective coursework:
Two (2) EML courses at the 6000-level to count toward the Upper-Level Technical Design electives

Undergraduate Degree Requirements for the B.S.M.E. in Mechanical Engineering (107 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (95 credit hours)
Math and Science (27 credit hours)
MAC 2281 Engineering Calculus I or MAC 2311 Calculus I
MAC 2282 Engineering Calculus II or MAC 2312 Calculus II
MAC 2283 Engineering Calculus III or MAC 2313 Calculus III
MAP 2302 Differential Equations
CHS 2440 General Chemistry for Engineers or CHM 2045 General Chemistry I
CHS 2440L General Chemistry for Engineers Laboratory or CHM 2045 General Chemistry I Laboratory
PHY 2048 General Physics I
PHY 2048L General Physics I Laboratory
PHY 2049 General Physics II
PHY 2049L General Physics II Laboratory

**Basic Engineering (22 credit hours)**

- EGN 3000 Foundations of Engineering
- EGN 3000L Foundations of Engineering Laboratory
- EGN 3311 Statics
- EGN 3321 Dynamics
- EGN 3615 Engineering Economics with Social and Global Implications
- EGN 3365 Materials Engineering I
- EGN 3373 Introduction to Electrical Systems I
- EGN 3343 Thermodynamics I
- EGN 3443 Probability & Statistics for Engineers

**Specialization (43 credit hours)**

- EML 3035 Programming Concepts for Mechanical Engineers
- EML 3500 Mechanics of Solids
- EML 3022 Computer Aided Design and Engineering (CAD)
- EML 3041 Computational Methods
- EML 3262 Kinematics and Dynamics of Machinery
- EML 3701 Fluid Systems
- EML 4325 Mechanical Manufacturing Processes
- EML 3303 Mechanical Engineering Lab I
- EML 4123 Heat Transfer
- EML 4501 Machine Design
- EML 4106C Thermal Systems and Economics
- EML 4220 Vibrations
- EML 4302 Mechanical Engineering Laboratory II
- EML 4312 Mechanical Controls
- EML 4551 Capstone Design (CPST)

**Technical Writing (3 credit hours)**

- ENC 3246 Communication for Engineers (WRIN)

**Major Electives (12 credit hours)**

12 hours of Upper-Level Departmental Electives (Technical Design Elective) from the list below:

- BME 4332 Cell and Tissue Engineering
- BME 4440 Introduction to Bioastronautics
- EAS 4121 Hydro and Aerodynamics
- EGN 4366 Materials Engineering II
- EML 4141 Thermal Management of Electronic Systems
- EML 4230 Introduction to Composite Materials
- EML 4246 Tribology
- EML 4310 Microcontrollers
- EML 4326 Advanced Materials Processing
- EML 4414 Power Plant Engineering
- EML 4419 Propulsion I
- EML 4421 Internal Combustion Engines
- EML 4450 Alternative & Renewable Energy
- EML 4503 Sustainable Design and Materials
- EML 4552 Senior Mechanical Design
- EML 4575 Principles of Fracture Mechanics
- EML 4593 Haptics
- EML 4601 Air Conditioning Design
- EML 4702 Fluid Dynamics II
- EML 4703 Mechanics of Compressible Fluids
- EML 4905 Independent Study
- EML 4930 Special Topics in Mechanical Engineering
- OSE 4601 Optical Product Technology

**Shared Courses (6 credit hours)**

The following courses will satisfy six (6) credit hours of Mechanical Engineering elective coursework:

Two (2) EML courses at the 6000-level to count toward the Upper-Level Technical Design electives
Graduate Degree Requirements for the M.M.E. in Mechanical Engineering (30 Credit Hours)

*Please see Graduate Catalog for major-specific requirements

Major Core (12 credit hours)
Students take one course in each of the following three (3) categories:

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

**Mechanics, Manufacturing, and Materials**
- EML 6290 Micro and Nano Manufacturing
- EML 6570 Fracture Mechanics
- EML 6653 Applied Elasticity
- EML 6930 Advanced Manufacturing
- EML 6930 Advanced Materials

**Dynamical Systems and Controls**
- EML 6273 Advanced Dynamics of Machinery
- EML 6801 Robotic Systems
- EML 6930 Advanced Controls
- EML 6930 Advanced Vibrations

Students must take one of the following courses:
- EML 6931 Advanced Mathematics
- EML 6930 Advanced Mathematics II

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

Comprehensive Exam
M.M.E. students must also pass a final Comprehensive Oral Examination.
Accelerated B.S.M.E. in Mechanical Engineering and M.S.M.E. in Mechanical Engineering

Description
Students pursuing a B.S.M.E. in Mechanical Engineering will earn an M.S.M.E. in Mechanical Engineering in an accelerated manner by sharing two (2) 6000-level EML courses (6 credit hours) taken as upper-level departmental electives as part of the undergraduate Mechanical Engineering major. The B.S.M.E. requires a total of 128 hours and the M.S.M.E. requires 30 hours. By sharing six (6) credit hours, the total credit hours earned will be 152 hours.

This accelerated program shares six (6) credit hours between already existing degrees:
- B.S.M.E. in Mechanical Engineering
- M.S.M.E. in Mechanical Engineering

Target Students and Expected Outcomes
Academically high achieving undergraduate students in the B.S.M.E. program with high overall and major GPA will be targeted for the accelerated program. Expected outcomes are the increase in M.S.M.E. degrees granted, increase in graduate SCH, and enhancement of the quality of the graduate program by addition of academically accomplished students.

Admission Requirements
For admission to the program, a student must:
1. Have completed 15 hours in the undergraduate major;
2. Have a minimum 3.33 GPA overall; and
3. Have a minimum undergraduate 3.50 GPA in the major.

Timeline and Benchmarks:
1. To be considered for acceptance into the Accelerated B.S.M.E. Mechanical Engineering/M.S.M.E. Mechanical Engineering program, students must have completed a minimum of 15 credit hours in the Mechanical Engineering undergraduate major.
2. Students must have a minimum undergraduate GPA of 3.33 overall, and a minimum GPA of 3.50 in the Mechanical Engineering major.
3. Following completion of a minimum of 15 hours in the undergraduate major, students may be considered for acceptance into the accelerated program through faculty nomination or student self-nomination, via submission of an Accelerated Program Application Form. Both B.S.M.E. and M.S.M.E. majors will review the applications and approve the nominations. All applications require the approval of USF’s Office of Graduate Studies, the College of Engineering’s Graduate Program, and the Department of Mechanical Engineering.
4. To be promoted to graduate status, students must meet all admission requirements of the M.S.M.E. in Mechanical Engineering.
5. Students must earn a minimum of a “B” (3.00) in all shared graduate courses. Failure to earn at least a “B” in a shared graduate course will result in academic review by the graduate program. Failure to maintain good standing as a graduate student will result in academic probation, according to the procedures of the USF Office of Graduate Studies.
6. A comprehensive plan of study to complete the Accelerated B.S.M.E. in Mechanical Engineering/M.S.M.E. in Mechanical Engineering program will be developed with the guidance of an advisor and a faculty member.

Shared Courses (6 credit hours)
The following courses will satisfy six (6) credit hours of Mechanical Engineering elective coursework:
- EML 6653 Applied Elasticity
- EML 6713 Advanced Fluid Mechanics

Undergraduate Degree Requirements for the B.S.M.E. in Mechanical Engineering (107 credit hours)
*Please see Undergraduate Catalog for major-specific requirements

Major Core (95 credit hours)
Math and Science (27 credit hours)
- MAC 2281 Engineering Calculus I or MAC 2311 Calculus I
- MAC 2282 Engineering Calculus II or MAC 2312 Calculus II
- MAC 2283 Engineering Calculus III or MAC 2313 Calculus III
- MAP 2302 Differential Equations
- CHS 2440 General Chemistry for Engineers or CHM 2045 General Chemistry I
- CHS 2440L General Chemistry for Engineers Laboratory or CHM 2045 General Chemistry I Laboratory
- PHY 2048 General Physics I
PHY 2048L General Physics I Laboratory  
PHY 2049 General Physics II  
PHY 2049L General Physics II Laboratory  

**Basic Engineering (22 credit hours)**  
EGN 3000 Foundations of Engineering  
EGN 3000L Foundations of Engineering Laboratory  
EGN 3311 Statics  
EGN 3321 Dynamics  
EGN 3615 Engineering Economics with Social and Global Implications  
EGN 3365 Materials Engineering I  
EGN 3373 Introduction to Electrical Systems I  
EGN 3343 Thermodynamics I  
EGN 3443 Probability & Statistics for Engineers  

**Specialization (43 credit hours)**  
EML 3035 Programming Concepts for Mechanical Engineers  
EML 3500 Mechanics of Solids  
EML 3022 Computer Aided Design and Engineering (CAD)  
EML 3041 Computational Methods  
EML 3262 Kinematics and Dynamics of Machinery  
EML 3701 Fluid Systems  
EML 4325 Mechanical Manufacturing Processes  
EML 3303 Mechanical Engineering Lab I  
EML 4123 Heat Transfer  
EML 4501 Machine Design  
EML 4106C Thermal Systems and Economics  
EML 4220 Vibrations  
EML 4302 Mechanical Engineering Laboratory II  
EML 4312 Mechanical Controls  
EML 4551 Capstone Design (CPST)  

**Technical Writing (3 credit hours)**  
ENC 3246 Communication for Engineers (WRIN)  

**Major Electives (12 credit hours)**  
12 hours of Upper-Level Departmental Electives (Technical Design Elective) from the list below:  
BME 4332 Cell and Tissue Engineering  
BME 4440 Introduction to Bioastronautics  
EAS 4121 Hydro and Aerodynamics  
EGN 4366 Materials Engineering II  
EML 4141 Thermal Management of Electronic Systems  
EML 4230 Introduction to Composite Materials  
EML 4246 Tribology  
EML 4310 Microcontrollers  
EML 4326 Advanced Materials Processing  
EML 4414 Power Plant Engineering  
EML 4419 Propulsion I  
EML 4421 Internal Combustion Engines  
EML 4450 Alternative & Renewable Energy  
EML 4503 Sustainable Design and Materials  
EML 4552 Senior Mechanical Design  
EML 4575 Principles of Fracture Mechanics  
EML 4593 Haptics  
EML 4601 Air Conditioning Design  
EML 4702 Fluid Dynamics II  
EML 4703 Mechanics of Compressible Fluids  
EML 4905 Independent Study  
EML 4930 Special Topics in Mechanical Engineering  
OSE 4601 Optical Product Technology  

**Shared Courses (6 credit hours)**  
The following courses will satisfy six (6) credit hours of Mechanical Engineering elective coursework:  
EML 6653 Applied Elasticity
Graduate Degree Requirements for the M.S.M.E. in Mechanical Engineering (30 Credit Hours)

*Please see Graduate Catalog for major-specific requirements

Major Core (12 credit hours)

Students take one course in each of the following three (3) categories:

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

**Mechanics, Manufacturing, and Materials**
- EML 6290 Micro and Nano Manufacturing
- EML 6570 Fracture Mechanics
- EML 6653 Applied Elasticity
- EML 6930 Advanced Manufacturing
- EML 6930 Advanced Materials

**Dynamical Systems and Controls**
- EML 6273 Advanced Dynamics of Machinery
- EML 6801 Robotic Systems
- EML 6930 Advanced Controls
- EML 6930 Advanced Vibrations

Students must take one of the following courses:
- EML 6931 Advanced Mathematics
- EML 6930 Advanced Mathematics II

Major Electives (12 credit hours)

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

**Thesis (6 credit hours)**
- EML 6971 Thesis: Master's

**Comprehensive Exam**

A student must pass the final Oral Comprehensive Examination after the student has presented his/her thesis to the Supervisory Committee.
Accelerated Bachelor’s and Master’s Degree in Public Health

Description

Undergraduate students who are seeking a career in public health can select to major in a broad range of Bachelor degree programs including engineering, business, social sciences, biological sciences, nursing, social work, pre-medicine, other allied health specialties or interdisciplinary degrees in order to be prepared for graduate work in the College. Pre-medical students seeking admission to medical school may want to consider completing a Master's degree in public health prior to application or admission to medical schools or as an alternative to clinical degrees. The College offers several programs that allow students to complete their undergraduate and Master's degrees in an accelerated format including the Undergraduate Accelerated Entry Program for Master's Degree in Public Health Education, Fast Track for Honors BMS, ISS and INS Students, and (4 + 1) Environmental and Occupational Health.

Admission and Application Process for Enrollment

Students are encouraged to apply early and applications will be accepted starting in the fall of the student's junior year. Applicants must complete the Accelerated Graduate Program Application form and submit the completed form to Graduate Admissions. The form is available at http://www.grad.usf.edu/inc/linked-files/Accelerated_Program_Application.pdf. Admission is for fall semester and applications must be received by May 1 for guaranteed consideration. Applications received after May 1 will be processed for fall admission although there is no guarantee that processing will be completed in time. Spring and summer admissions will be considered on an individual basis. Applicants are also required to complete the SOPHAS application (see http://sophas.org/) for application procedures. While SOPHAS is required, the USF Graduate School application does not need to be completed if the Accelerated Program Application is used.

Admission Requirements

- All applicants must take the Graduate Record Exam (GRE) or have taken an equivalent admissions examination within the five years preceding application and must meet the following criteria: equivalent exams include the GMAT, MCAT, DAT, or PCAT; LSAT is not accepted in lieu of the GRE; and although there are no minimum scores, the applicant’s GRE score will be compared to the applicant pool and the national GRE norms.
- Good standing in the Honors program.
- Senior status.
- Two letters of recommendation from undergraduate faculty.
- One letter from the Honors advisor noting GPA of 3.2 or better.
- Desire for a public health career as documented in a one page goal statement.
- Approval by appropriate department admission committee.
- Approval by the College and Graduate School

Undergraduate (3+2) Master’s Degree in Public Health Education

The Department of Community and Family Health in the College of Public Health offers an accelerated entry program that enables qualified undergraduate students to enter the Master of Public Health (MPH) degree program with a concentration in Public Health Education. Applicants must have attained a grade point average of at least a 3.0 on a four-point scale. All applicants must take the Graduate Record Exam (GRE) or have taken an equivalent admissions examination within the five years preceding application and must meet the following criteria: equivalent exams include the GMAT, MCAT, DAT, or PCAT; LSAT is not accepted in lieu of the GRE; and although there are no minimum scores, the applicant’s GRE score will be compared to the applicant pool and the national GRE norms. Applicants must have completed 90 undergraduate semester hours in public health. Interested students are encouraged to contact the advisor upon completing 60 undergraduate semester hours. Contact: Annette Strzelecki (813) 974-9135; email: amanson@health.usf.edu or Kenneth Griffin 813-974-9372 email: kgriffi3@health.usf.edu.

Fast Track for Honors BMS, ISS, and INS Students

This program provides opportunities for Honor students to enroll in a Masters in Public Health program at the beginning of their senior year. Eligible seniors complete up to 20 graduate credits in public health that count toward the bachelor's degree as well as a Master of Public (MPH) or a Master of Science in Public Health (MSPH). The MPH is considered a professional degree and is appropriate for student wishing to be prepared to work in a public health career. The MSPH is considered a research oriented degree.

(4 + 1) Environmental and Occupational Health

This program provides opportunities for students to enroll in a MPH or MSPH program in the College of Public Health at the beginning of their senior year. Eligible seniors complete up to 20 graduate credits in public health that count toward the bachelor's degree as well as an MPH or MSPH. Admission requirements include minimum verbal
score of 450 and minimum quantitative score of 550 on the Graduate Record Exam (GRE) General Test, or a mean
MCAT of 8, good academic standing in the undergraduate program, senior status at the start of the program, two
letters of recommendation from undergraduate faculty, transcripts from all institutions of higher learning, a one-page
career goal statement, approval by the Departmental Student Affairs and Admission Committee; and approval by the
College and Graduate School.