

COLLEGE OF ENGINEERING

UNIVERSITY OF SOUTH FLORIDA 2017-2018 UNDERGRADUATE CATALOG

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

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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

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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.

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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 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.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.
4. To be promoted to graduate status, students must meet all admission requirements of the M.S.C.H. in Chemical 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.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

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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 6840 Math Methods **or** 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

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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 must 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.

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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

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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.

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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.

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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

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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.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.

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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.

COLLEGE OF ENGINEERING

UNIVERSITY OF SOUTH FLORIDA 2017-2018 UNDERGRADUATE CATALOG

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

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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

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UNIVERSITY OF SOUTH FLORIDA 2017-2018 UNDERGRADUATE CATALOG

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.

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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.

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UNIVERSITY OF SOUTH FLORIDA 2017-2018 UNDERGRADUATE CATALOG

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

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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

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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.

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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.

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UNIVERSITY OF SOUTH FLORIDA 2017-2018 UNDERGRADUATE CATALOG

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 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.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

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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

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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.

COLLEGE OF ENGINEERING

UNIVERSITY OF SOUTH FLORIDA 2017-2018 UNDERGRADUATE CATALOG

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

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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

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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.

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Accelerated B.S.I.E. in Industrial Engineering and M.S.E.M. in Engineering Management

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

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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

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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.

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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

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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

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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.

COLLEGE OF ENGINEERING

UNIVERSITY OF SOUTH FLORIDA 2017-2018 UNDERGRADUATE CATALOG

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 Department of Mechanical Engineering's Undergraduate 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

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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

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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.

COLLEGE OF ENGINEERING

UNIVERSITY OF SOUTH FLORIDA 2017-2018 UNDERGRADUATE CATALOG

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

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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

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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.

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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

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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

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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.

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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

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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

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EML 6713 Advanced Fluid Mechanics

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.