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1. Background

The Florida A&M University-Florida State University (FAMU-FSU) College of Engineering is a joint college that serves Florida A&M University, which is a historically black institution founded in 1887, and the Florida State University, which traces its history back to 1851. Established in 1982 and located in Tallahassee, Florida, the mission of the FAMU-FSU College of Engineering is as follows: to provide an innovative academic program of excellence at the undergraduate and graduate levels, as judged by the highest standards and recognized by national peers; to attract and produce greater numbers of women and minorities in professional engineering, engineering teaching, and engineering research; and to attain national and international recognition of the College through educational and research achievements and professional service of its faculty and students. The FAMU-FSU College of Engineering has an enrollment of more than 2700 undergraduate students and approximately 550 graduate students.

The Department of Chemical & Biomedical Engineering is committed to providing a high quality and modern education in the fundamental principles and practices of chemical and biomedical engineering. The fundamental unifying theme of chemical engineering is the study of multicomponent multiphase systems at both the molecular and macroscopic scale with particular emphasis on processes with chemical transformation, *i.e.*, chemical reaction. The biomedical engineering emphasis in CBE builds upon the chemical engineering strength and is focused on cellular and biochemical transformations in natural and synthetic environments. An integral part of the education process involves faculty and students conducting groundbreaking and innovative research in areas of critical importance to society. CBE seeks to prepare students for academic and professional work through classroom and laboratory instruction and research with modern experimental, mathematical and computational tools.

The vision of the Department of Chemical & Biomedical Engineering is to serve the state and nation by providing a leading educational and research program in chemical and biomedical engineering. We aim to capitalize on the fundamental strengths of (a) chemical engineering in the study and application of multi-component, multiphase transport and reaction processes and (b) biomedical engineering in the study of materials, processes, instrumentation and signal analysis to make innovative and creative advances that address pressing societal problems in human health, environment and industry.

1.1 Degrees Offered

CBE maintains undergraduate and graduate programs that lead to the following degrees:

- Bachelor of Science (BS) in Biomedical Engineering with majors in Biomaterials & Biopolymers, Cell & Bioprocess, and Image & Signal Processing
- Bachelor of Science (BS) in Chemical Engineering with majors in Chemical & Materials Engineering
- Master of Science (MS) in Biomedical Engineering (course work and thesis)
- Master of Science (MS) in Chemical Engineering (course work and thesis)
- Bachelor of Science and Master of Science (BS-MS) pathway (course work and thesis)
- Doctor of Philosophy (PhD) in Biomedical Engineering
- Doctor of Philosophy (PhD) in Chemical Engineering

The CBE graduate program has research activities in these areas:

1) Advanced Materials

Focus Areas: Additive manufacturing, biomaterials, complex fluids and colloids, electrochemical materials, nanocomposites, polymers, superconductors and semiconductors, quantum materials

2) Energy, Environment, and Sustainability

Focus Areas: Energy generation and storage, electrocatalysis, reaction engineering, magnetic field-assisted separations, membrane separations, recyclable plastics, plasma chemical engineering

3) Life and Health

Focus Areas: Molecular, cellular, and tissue engineering, regenerative medicine, bioimaging and spectroscopy, nanomedicine

4) Theory, Computation, and Artificial Intelligence

Focus Areas: Machine learning, molecular dynamics, Monte Carlo simulations, multiscale modeling, neural networks

1.2 Graduate Program Objectives and Outcomes

Program Objectives: To provide the highest quality advanced biomedical & chemical engineering educational and research opportunities for graduate students, and advance statewide, national and international reputations for excellence in engineering education and research.

Educational Outcomes: Upon graduation, biomedical & chemical engineering students will have acquired the following skillset:

1. *Written and Oral Communication Skills:* The successful student demonstrates oral and written communication skills in the technical aspects of biomedical/chemical engineering.
2. *Analysis of Literature:* The successful student can analyze pertinent literature critically and fully and determine the state-of-the-art in each topic.
3. *Critical Thinking Skills:* The successful student demonstrates critical thinking skills and theoretical abilities in the field of biomedical/chemical engineering.
4. *Solve Chemical/Biomedical Engineering Problems Using Computational & Experimental Skills:* The successful student can solve biomedical/chemical engineering problems using simulations, experimental techniques, molecular and continuum theories, etc.
5. *Solve Original Research Problems:* The successful student will be able to propose and pursue original research in the field of biomedical/chemical engineering.

2. Admissions Requirements

Individuals seeking admission to graduate study in CBE must meet the criteria set by both the university and department. The following sections detail the admission requirements as set by the Department. Applicants should note that the Graduate Offices at both FAMU and FSU have additional requirements including application fees. Information on FAMU admission requirements may be found at www.applyweb.com/famug and FSU admission requirements may be found at www.admissions.fsu.edu. Because the college is shared between FAMU and FSU, applicants can apply for the CBE graduate program through either University depending on individual circumstances or preferences.

For PhD fall semester admission, [application deadlines](#) set by the department are as follows:

Decision Type	Deadline
Early Admissions	12 December
Full Funding Consideration/Admissions	15 January
Regular Domestic (USA) Student Admissions	1 May

- ❖ International Applicants living outside of the United States are highly encouraged to apply by January 15 for the Fall semester.

CBE primarily admits new graduate students to start in the Fall semester. Under special and unique conditions, new graduates can be admitted to begin in the Spring and Summer semesters, but only with prior communication with the department. The universities won't accept any applications after the May 1st deadline for fall admission. CBE advises that applications and all supporting documents must be submitted well in advance of these department deadlines, especially for applicants interested in financial support (including stipends, tuition and health insurance subsidy). In addition to the admission requirements of each University, a candidate for post-baccalaureate study in CBE also must meet the following requirements based on the intended degree.

2.1 MS Program (Thesis or Non-Thesis)

Under the disciplines of biomedical engineering or chemical engineering, the Master of Science (MS) degree has two options. The thesis MS option has a research component and requires completion of a thesis, and we only have fall admission for the thesis option. The non-thesis MS option (course base) requires only successful completion of coursework and it has spring, summer and fall admissions. CBE admission requirements for the MS degree program are as follows:

- A baccalaureate degree in chemical/biomedical engineering or an allied field from an accredited college or university. Depending on the students' academic background certain undergraduate classes might have to be taken to prepare the student for success in a chemical/biomedical engineering curriculum.
- An undergraduate upper-division or graduate GPA of 3.0 (on a 4.0 scale) or higher.
- The GRE requirement has been waived (and extended) for all engineering master's applicants through Fall 2026.
- CV/Resume - Information should be current.
- Statement of Purpose – Outlining your research and career goals. We want to know how your background and prior training make you the right candidate and why FAMU-FSU College of Engineering is a good fit for you.
- Two Letters of Recommendation – Academics or professionals who can comment on the academic and research potential of the applicant.
- Credit Requirements
 - International Credit Requirements — International applicants or degrees earned from international institutions must submit official transcripts through a NACES approved evaluator. We recommend using SpanTran for your course-by-course evaluation. We are unable to review applications with unofficial transcripts from international institutions. The University will not waive this requirement. For more information visit [FSU Graduate School](#) or [FAMU Graduate School](#).

- US Credit Requirements — Credits earned from US institutions can be reviewed with unofficial transcripts.
- For International students, an English Proficiency Score Report is required if:
 - The applicant's country's official language is NOT English or
 - The applicant did NOT graduate from an accredited US institution with either a bachelor's or master's degree.
 - The following are the minimum scores required for admission to the University:
 - Internet based TOEFL ([IBTOEFL](#)): 80
 - Paper based TOEFL ([TOEFL](#)): 550
 - International English Language Testing System ([Academic IELTS](#)): 6.5
 - Pearson Test of English ([PTE](#)): 55
 - [Duolingo](#): 120 (only accepted if applying through FAMU)
 - [Cambridge C1 Advanced Level](#): 180
 - [Michigan Language Assessment](#): 55

❖ ***Students who do not possess a bachelor's degree in biomedical or chemical engineering may be required to complete a department-designated sequence of undergraduate courses with a grade of "B" or higher in each course. Transfer credit from another institution is limited to six (6) hours with departmental approval. Typical undergraduate course sequences (in preparation for graduate courses) can be found on the department [admission website](#).***

2.2 BS-MS Pathway

CBE has implemented a [Bachelor of Science and Master of Science \(BS-MS\) pathway](#) based on the existing bachelor and Master of Science degree programs that cover the areas of Chemical and Biomedical Engineering. The Department wants to allow academically talented students to obtain both a BS and MS degree in a shorter time span, while still producing engineers that are qualified fully to enter professional practice in industry. This program is designed for students pursuing an undergraduate degree in Biomedical or Chemical Engineering who also wish to obtain a graduate degree in either Biomedical or Chemical Engineering. Well-qualified students who expect to have a GPA of 3.0 or better in engineering studies are invited to apply for the program during the spring semester of their third year in the College. Students who have graduated by this pathway have successfully been able to find jobs or have pursued advanced degrees in Chemical Engineering, Materials Engineering, Biomedical Engineering, Medicine, Business, Patent Law and other related fields.

● **BS-MS Pathway Application Requirements and Procedure**

Students initiate the process to enter the BS-MS pathway by meeting with their undergraduate advisor to determine eligibility. If qualified, the student submits an application for review by the department. If accepted by the department, the student must maintain a GPA of 3.0 and meet other admission requirements before they apply to the graduate programs.

A senior or upper-division honors student may carry graduate courses for dual undergraduate-graduate credit provided the student:

- 1) has earned a department/program grade point average (GPA) of at least 3.0 ("B") or.
- 2) carries a course load of no more than fifteen (15) semester credit hours.

Upon admission to the graduate program, up to twelve (12) semester hours may be counted toward

the combined program's MS degree, provided the course has not been counted towards a previous degree, except for the undergraduate degree that is part of the BS-MS pathway.

The FAMU-FSU College of Engineering offers a tuition waiver to cover the tuition differential for up to twelve (12) credit hours of graduate coursework taken by eligible undergraduate students in the program, meaning undergraduate BS-MS students will pay only undergraduate rates for double-counted graduate courses, if eligibility criteria are maintained. Note, students in the BS-MS pathway may take no more than 15 hours of coursework in any semester, undergraduate or graduate.

2.3 PhD Degree

CBE offers degrees in both biomedical engineering and chemical engineering. Applicants may enter either discipline with either a BS or MS degree, with the latter typically earning some transfer of credit towards the terminal degree (discussed later). Admissions requirements for the PhD program are as follows:

- A baccalaureate degree in chemical/biomedical engineering or an allied field from an accredited college or university. Depending on the students' academic background certain undergraduate classes might have to be taken to prepare the student for success in a chemical/biomedical engineering curriculum.
- An undergraduate upper-division GPA or graduate GPA of 3.0 (on a 4.0 scale) or higher.
- A recommended Graduate Record Examination General Test (GRE) score of a minimum GRE percentile of at least 48% on the verbal portion and 75% on the quantitative portion of the test. However, the decision to admit will be based on a prospective student's entire application package. Note: The GRE percentiles of funded graduate students on assistantship are typically higher than these minima. GRE waiver request form. [GRE waiver request form](#).
- CV/Resume - Information should be current.
- Statement of Purpose – Outlining your research and career goals. We want to know how your background and prior training make you the right candidate and why FAMU-FSU College of Engineering is a good fit for you.
- Two Letters of Recommendation – Two signed letters of recommendation on official letterheads, from academic or professionals who can comment on the academic and research potential of the applicant.
- Credit Requirements
 - International Credit Requirements — International applicants or degrees earned from international institutions must submit official transcripts through a NACES approved evaluator. We recommend using SpanTran for your course-by-course evaluation. We are unable to review applications with unofficial transcripts from international institutions. The University will not waive this requirement. For more information visit [FSU Graduate School](#) or [FAMU Graduate School](#).
 - US Credit Requirements — Credits earned from US institutions can be reviewed with unofficial transcripts.

- For International students, an English Proficiency Score Report is required if:
 - The applicant's country's official language is NOT English or
 - The applicant did NOT graduate from an accredited US institution with either a bachelor's or master's degree.
 - The following are the minimum scores required for admission to the University:
 - Internet based TOEFL ([IBTOEFL](#)): 80
 - Paper based TOEFL ([TOEFL](#)): 550
 - International English Language Testing System ([Academic IELTS](#)): 6.5
 - Pearson Test of English ([PTE](#)): 55
 - [Duolingo](#): 120 (only accepted if applying through FAMU)
 - [Cambridge C1 Advanced Level](#): 180
 - [Michigan Language Assessment](#): 55

Applicants who meet admission requirements are encouraged to apply directly for the PhD program. Students who maintain a 3.0 graduate GPA and demonstrate proficiency in conducting research in biomedical or chemical engineering by passing the CBE PhD preliminary examination (see PhD Preliminary Examination Requirements for more details) are admitted to PhD candidacy. Students who fulfill these requirements may, upon approval of the graduate committee and faculty supervisor, proceed directly toward the PhD without first obtaining a MS degree.

Students with a thesis MS degree in biomedical or chemical engineering from the FAMU-FSU College of Engineering may, with approval of the graduate committee and major professor, take nine (6) additional approved semester hours beyond the MS requirements to satisfy the 30-hour course requirement for the PhD. All other requirements must be fulfilled as stated below. Students with MS degrees from other institutions will be given a specific course plan by the departmental graduate committee.

- ❖ ***Students who do not possess a bachelor's degree in biomedical or chemical engineering may be required to complete a department-designated sequence of undergraduate courses with a grade of "B" or higher in each course. Transfer credit from another institution is limited to six (6) hours with departmental approval. Typical undergraduate course sequences (in preparation for graduate courses) can be found on the department [admission website](#).***

2.4 GRE Waiver

All individuals applying to FAMU-FSU Engineering graduate degree programs must submit a valid GRE general exam result. However, PhD applicants may obtain a GRE waiver if two or more of the following requirements are met. To be considered for a GRE waiver, the online approval form (www.eng.famu.fsu.edu/student/gre-waiver-form) must be completed.

The GRE requirement has been waived (and extended) for all engineering master's applicants through Fall 2026.

3. Program Requirements

3.1 Biomedical Engineering MS Program – Thesis Option

The Master of Science (MS) in Biomedical Engineering with thesis provides students with education in advanced biomedical engineering topics as well as research experience culminating in a thesis.

Curriculum. The MS curriculum includes a total of 30 semester hours, consisting of coursework and thesis research (see below). To enroll in a course, students must satisfy the course prerequisites.

The thesis-type MS degree is awarded upon successful completion of the following requirements:

1. Fifteen (15) semester hours of biomedical engineering graduate core courses (see below)
2. Nine (9) semester hours of approved electives
3. Six (6) semester hours of BME 5971r, Thesis Research (S/U grade only)
4. Oral defense of the MS thesis - BME 8976, Thesis Defense (0) (P/F grade only)
5. Registration and attendance at all departmental seminars - BME 5935, BME Seminar (0)

No course with a grade below "C" will be counted toward fulfillment of degree requirements. No more than one course with a grade of "C" will be counted toward fulfillment of degree requirements. The candidate also must complete and defend an original thesis (BME 8976, Thesis Defense).

Transfer credit from another institution is limited to six (6) semester hours towards the MS degree and only with departmental approval.

Graduate Biomedical Engineering Core Courses (fifteen [15] semester hours):

ECH 5052 - Research Methods in Chemical Engineering (3)

ECH 5261 - Advanced Transport Phenomena I (3)

ECH 5840 - Advanced Chemical Engineering Mathematics I (3)

ECH 5852 - Advanced Chemical Engineering Computations (3)

XXX XXXX - Approved Course in Physiology or Cell Biology (3)

- An approved course in Physiology or Cell Biology is required for completion of the graduate BME degree. Approved courses include PCB 5137 - Advanced Cell Biology; **PCB 5204C** - Cell Physiology (FAMU); PCB 5525 - Molecular Biology; PCB 5595 - Advanced Molecular Biology; PCB 5795 - Sensory Physiology; PCB 5845 - Cell and Molecular Neuroscience; and BCH 5405 - Molecular Biology; **BME 5XXX** - Fundamentals of Cell Bioeng (department preferred class). Additional courses may satisfy the physiology/biology requirement but require a petition to the Graduate Committee for approval as a core substitute.

Biomedical Engineering Electives (nine [9] semester hours):

Minimum 6 semester hours are required to be on the biomedical engineering elective courses list. Students should consult their faculty professor to determine the elective courses offered by the department. Additional elective courses may be on the [department website](#). Typical biomedical engineering elective courses:

- BME 5XXX - Advanced Biomaterials (3)
- BME 5314 - Bioengineering (3)

- BME 5362 - Neural Engineering (3)
- BME 5937r - Special Topics in Biomedical Engineering (3)
- BME 6530 - NMR and MRI Methods in Biology and Medicine (3)

Find other elective courses in the [CBE Approved Graduate Elective List](#).

Thesis Hours (six [6] semester hours):

BME 5971r - Thesis (1-9) (S/U grade only)

Thesis Defense (zero [0] semester hours):

BME 8976 - Thesis Defense (0) (P/F grade only) - In addition to the thirty (30) semester hours of coursework and thesis, an oral examination in defense of the thesis is required for the Master of Science in biomedical engineering thesis option. At least two hours of thesis research (BME 5971) must be completed during the term of the thesis defense (BME 8976).

3.2 Chemical Engineering MS Program – Thesis Option

The Master of Science (MS) in Chemical Engineering with thesis provides students with education in advanced chemical engineering topics as well as research experience culminating in a thesis.

Curriculum. The MS curriculum includes a total of 30 semester hours, consisting of coursework and thesis research (see below). To enroll in a course, students must satisfy the course prerequisites.

The thesis-type MS degree is awarded upon successful completion of the following requirements:

1. Fifteen (15) semester hours of chemical engineering graduate core courses (see below)
2. Nine (9) semester hours of approved electives
3. Six (6) semester hours of ECH 5971r, Thesis Research (S/U grade only)
4. Oral defense of the MS thesis - ECH 8976, Thesis Defense (0) (P/F grade only)
5. Registration and attendance at all departmental seminars - ECH 5935, ChE Seminar (0)

No course with a grade below "C" will be counted toward fulfillment of degree requirements. No more than one course with a grade of "C" will be counted toward fulfillment of degree requirements. The candidate also must complete and defend an original thesis (ECH 8976, Thesis Defense).

Transfer credit from another institution is limited to six (6) semester hours towards the MS degree and only with departmental approval.

Graduate Chemical Engineering Core Courses (fifteen [15] semester hours):

ECH 5052 - Research Methods in Chemical Engineering (3)

ECH 5126 - Advanced Chemical Engineering Thermodynamics I (3)

ECH 5261 - Advanced Transport Phenomena I (3)

ECH 5840 - Advanced Chemical Engineering Mathematics I (3)

ECH 5852 - Advanced Chemical Engineering Computations (3)

Chemical Engineering Electives (nine [9] semester hours):

Minimum 6 semester hours are required to be on the chemical engineering elective courses list. Students should consult their faculty professor to determine the elective courses offered by the department. Additional elective courses may be on the [department website](#). Typical chemical engineering elective courses:

- ECH 5262 - Advanced Transport Phenomena II (3)
- ECH 5526 - Advanced Reactor Design (3)
- ECH 5706 - Electrochemical Engineering Science (3)
- ECH 5806 - Petroleum Science and Technology (3)
- ECH 5820 Polymer Physical Science and Engineering (3)
- ECH 5828 - Introduction to Polymer Science and Engineering (3)
- ECH 5834 - Chemical Engineering Materials (3)
- ECH 5838 - X-Ray Structural Characterization of Materials (3)
- ECH 5841 - Advanced Chemical Engineering Mathematics II (3)
- ECH 5934r - Special Topics in Chemical Engineering (3)

Find other elective courses in the [CBE Approved Graduate Elective List](#).

Thesis Hours (six [6] semester hours):

ECH 5971r - Thesis (1-12) (S/U grade only)

Thesis Defense (zero [0] semester hours):

ECH 8976 - Thesis Defense (0) (P/F grade only) - In addition to the thirty (30) semester hours of coursework and thesis, an oral examination in defense of the thesis is required for the Master of Science in chemical engineering thesis option. At least two hours of thesis research, listed as repeatable course (ECH 5971) must be registered for concurrently during the term of the thesis defense (ECH 8976).

3.3 Common MS Thesis Requirements

3.3.1 Annual Safety Training. CBE places a priority on the conduct of research in a safe and responsible fashion. Therefore, all MS thesis students are required to take a minimum of safety training courses offered by the FSU Office of Environmental Health & Safety (www.safety.fsu.edu). All new MS Thesis new students need to attend the safety training in person, and current students can take the safety training online. The safety training normally includes Hazardous Waste Management (Haz Waste), Biosafety Level 2 and Fire Safety (online)

Additional training may be required by individual research laboratories as mandated by the parameters of research and the major professor. Finally, continuing graduate students are required to maintain safety training compliance by completing online refresher courses annually when requested by FSU EH&S and its automatic training notification system.

3.3.2 RCR Training. MS (thesis) students are required to successfully complete Responsible Conduct of Research (RCR) training as part of the degree requirements in the department.

This training must be completed by the end of the first semester of the student's initial enrollment in a CBE graduate program. (For additional details, please refer to the **Academic Policies** section below.)

3.3.2 Center for the Advancement of Teaching (CAT). All MS graduate students are required to attend the FSU Program for **Center for the Advancement of Teaching (CAT)** online TA training (<https://teaching.fsu.edu/required-training/>) if they are to be assigned to teaching assistant (TA) duties. This requirement is mandatory regardless of the student's classification as a teaching assistant or research assistant. This workshop is provided before the beginning of the fall semester, with a modified version at the start of the spring semester for out-of-cycle admissions.

3.3.3 Faculty Advisor and supervisory committee. The MS Thesis student must select a faculty advisor by the end of first semester in the program, and they also need to form a supervisory committee by the end of their first semester of the 2nd year in the program. The faculty advisor must agree to serve as the student's academic advisor and thesis supervisor and must be a full-time CBE faculty with Graduate Faculty/Directive status.

The MS Thesis student chooses the supervisory committee in consultation with the faculty advisor. The supervisory committee consists of three (3) full-time faculty members, including the faculty advisor as the chair who must be within your program and research area (can have two co-chairs if one is within your program); one member may be from outside of CBE. All committee members must have Graduate Faculty status. Additional members may be appointed to the committee if deemed appropriate by the faculty advisor. The supervisory committee oversees and supervises the student's research efforts, approves the written thesis, attends the oral defense of the thesis and recommends granting of the degree.

3.3.4 Annual Evaluation. All MS Thesis students must report their annual educational and research progress to their supervisory committee at least once a year, typically in the form of an oral presentation. In addition, all students will use the Departmental Annual Evaluation form to provide an update on and changes to the Plan of Study, a self-evaluation of progress over the last year, and an evaluation by the faculty advisor. After discussions with the committee the student should submit the Annual Evaluation (and any other annual evaluation forms required by the Department, College or University, e.g. the FAMU Annual Evaluation for graduate students, Form 2) by the end of the spring semester. The instructions and form for the Annual Evaluation can be found in the internal CBE Graduate Students Canvas Group.

3.3.5 Thesis. The MS Thesis student selects the thesis topic and prepares the thesis with supervision by the faculty advisor and supervisory committee. Before registering for thesis hours, the student must consult with the faculty advisor as to the proportion of time to be devoted to thesis work. It is the student's responsibility to comply with the required thesis format of the University and the deadlines and requirements for thesis submission (see FAMU: www.famu.edu/index.cfm?graduatestudies or FSU: www.gradstudies.fsu.edu).

When the complete thesis is ready for review by the supervisory committee, the faculty advisor will

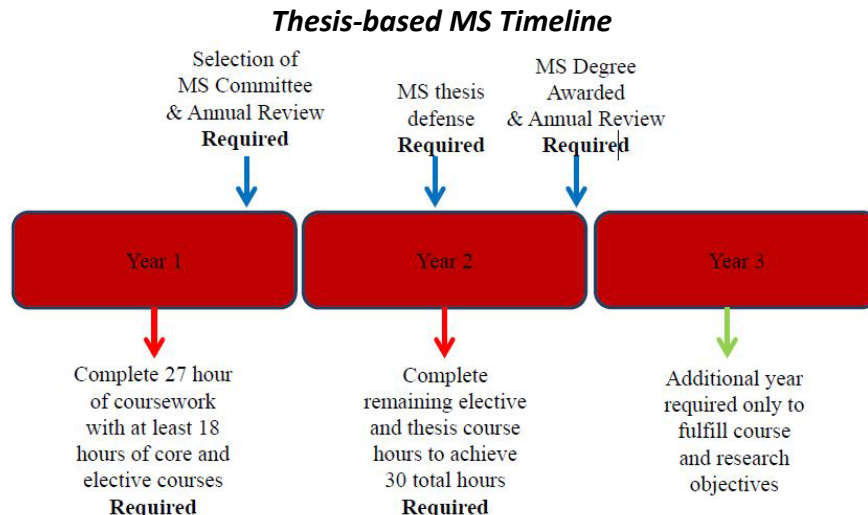
authorize its distribution to committee members. The thesis manuscript should be complete in every respect, including data analysis, figures and tables. The supervisory committee can recommend editorial and/or substantive changes after review and the oral thesis defense. The thesis should be provided to the supervisory committee at least two (2) weeks before the date of the oral thesis defense.

3.3.6 Journal manuscripts. In partial fulfillment of the MS degree requirements, the MS student must prepare a minimum of one (1) complete manuscript that is ready for submittal to a peer-reviewed journal. It is expected that the major professor will submit the manuscript and complete the publication process.

3.3.7 Thesis defense. A thesis defense with oral examination is a mandatory part of the degree requirements. The student must satisfactorily pass this oral examination, as determined by the supervisory committee, before submission of the final thesis to the University.

- The thesis defense will be scheduled only with approval of the faculty advisor, supervisory committee and Department.
- The defense should be scheduled before the final thesis submission deadline with sufficient time to allow for revisions; see University deadlines.
- The thesis defense shall be announced at least 2 weeks before the defense date according to department, College and University policies, and will open be to the public.
- The oral defense consists of two parts: 1) a defense presentation that includes appropriate use of visual aids and has a duration of 30-40 minutes and 2) oral examination by the supervisory committee.
- The outcome of the thesis defense is determined by the supervisory committee and is reported by the faculty advisor to the Department on the Thesis Defense Outcome Assessment form

3.3.8 Suggested timeline and checklist. A suggested timeline for completion of the MS Thesis degree requirements and a milestones checklist are provided below, respectively. Students may need to enroll in additional hours to maintain full-time status each semester.



Thesis MS Milestone Checklist

Milestone or Action	When
Select a Faculty Advisor	By the end of 1 st semester of 1 st year
Complete RCR training	By the end of 1 st fall semester
Complete full thesis committee	By the end of 1 st semester of 2 nd year
Submit Annual Evaluations	By the end of each spring semester
Apply for graduation through the University	Beginning of final semester
Prepare a manuscript for journal submission	Final semester
Schedule thesis defense	In final semester, at least two weeks prior to planned defense date
Defend thesis Submit Thesis Assessment form to Department Submit approved final MS thesis to university	Check University for deadlines

3.4 Biomedical Engineering MS Program – Course Option

The Master of Science (MS) in Biomedical Engineering by coursework provides students with additional educational background in advanced biomedical engineering topics.

Curriculum. The MS curriculum includes a total of 30 semester hours, consisting solely of coursework (see below). To enroll in a course, students must satisfy the course prerequisites. Students entering the major without a biomedical or chemical engineering degree also must satisfy the transition program requirements or an alternate plan of study provided by the CBE graduate committee.

The course-based MS degree is awarded upon successful completion of the following requirements:

1. Nine (12) semester hours of biomedical engineering graduate core courses (see below)
2. Eighteen (18) semester hours of approved electives
3. Registration and attendance at all departmental seminars - BME 5935, BME Seminar (0)

No course with a grade below "C" will be counted toward fulfillment of degree requirements. No more than one course with a grade of "C" will be counted toward fulfillment of degree requirements.

Transfer credit from another institution is limited to six (6) semester hours towards the MS degree and only with departmental approval.

Note: Departmental support generally is not available for students pursuing a non-thesis MS degree.

Graduate Biomedical Engineering Core Courses (fifteen [15] semester hours):

- ECH 5052 - Research Methods in Chemical Engineering (3)
- ECH 5261 - Advanced Transport Phenomena I (3)
- ECH 5840 - Advanced Chemical Engineering Mathematics I (3)
- ECH 5852 - Advanced Chemical Engineering Computations (3)
- XXX XXXX - Approved Course in Physiology or Cell Biology (3)

An approved course in Physiology or Cell Biology is required for completion of the graduate BME degree. Approved courses include **PCB 5137** - Advanced Cell Biology; **PCB 5204C** - Cell Physiology (FAMU); **PCB 5525** - Molecular Biology; **PCB 5595** - Advanced Molecular Biology; **PCB 5795** - Sensory Physiology; **PCB 5845** - Cell and Molecular Neuroscience; and **BCH 5405** - Molecular Biology; **BME 5XXX** - Fundamentals of Cell Bioeng (department preferred class). Additional courses may satisfy the physiology/biology requirement but require a petition to the Graduate Committee for approval as a core substitute.

Biomedical Engineering Electives (fifteen [15] semester hours):

Minimum 6 semester hours are required to be on the biomedical engineering elective courses list. Students should consult their faculty advisors to determine the elective courses offered by the department. Additional elective courses may be found on the [department website](#).

Typical biomedical engineering elective courses:

- BME 5XXX - Advanced Biomaterials (3)
- BME 5314 - Bioengineering (3)
- BME 5362 - Neural Engineering (3)
- BME 5937r - Special Topics in Biomedical Engineering (3)
- BME 6530 - NMR and MRI Methods in Biology and Medicine (3)

Find other elective courses in the [CBE Approved Graduate Elective List](#).

3.5 Chemical Engineering MS Program – Course Option

The Master of Science (MS) in Chemical Engineering by coursework provides students with additional educational background in advanced chemical engineering topics.

Curriculum. The MS curriculum includes a total of 30 semester hours, consisting solely of coursework (see below). To enroll in a course, students must satisfy the course prerequisites. Students entering the major without a chemical engineering degree also must satisfy requirements provided by the CBE graduate committee.

The course-based MS degree is awarded upon successful completion of the following requirements:

1. Fifteen (15) semester hours of chemical engineering graduate core courses (see below)
2. Fifteen (15) semester hours of approved electives
3. Registration and attendance at all departmental seminars - ECH 5935, ChE Seminar (0)

No course with a grade below "C" will be counted toward fulfillment of degree requirements. No more than one course with a grade of "C" will be counted toward fulfillment of degree requirements.

Transfer credit from another institution is limited to six (6) semester hours towards the MS degree and only with departmental approval.

Note: Departmental support generally is not normally available for students pursuing a non-thesis MS degree.

Graduate Chemical Engineering Core Courses (fifteen [15] semester hours):

- ECH 5052 - Research Methods in Chemical Engineering (3)
- ECH 5126 - Advanced Chemical Engineering Thermodynamics I (3)
- ECH 5261 - Advanced Transport Phenomena I (3)
- ECH 5840 - Advanced Chemical Engineering Mathematics I (3)
- ECH 5852 - Advanced Chemical Engineering Computations (3)

Chemical Engineering Electives (fifteen [15] semester hours):

Minimum 6 semester hours are required to be on the chemical engineering elective courses list. Students should consult their faculty advisors to determine the elective courses offered by the department. Additional electives could be found on the [department website](#).

Typical chemical engineering elective courses:

- ECH 5262 - Advanced Transport Phenomena II (3)
- ECH 5526 - Advanced Reactor Design (3)
- ECH 5706 - Electrochemical Engineering Science (3)
- ECH 5806 - Petroleum Science and Technology (3)
- ECH 5820 - Polymer Physical Science and Engineering (3)
- ECH 5828 - Introduction to Polymer Science and Engineering (3)
- ECH 5834 - Chemical Engineering Materials (3)
- ECH 5838 - X-Ray Structural Characterization of Materials (3)
- ECH 5841 - Advanced Chemical Engineering Mathematics II (3)
- ECH 5934r - Special Topics in Chemical Engineering (3)

Find other elective courses in the [CBE Approved Graduate Elective List](#).

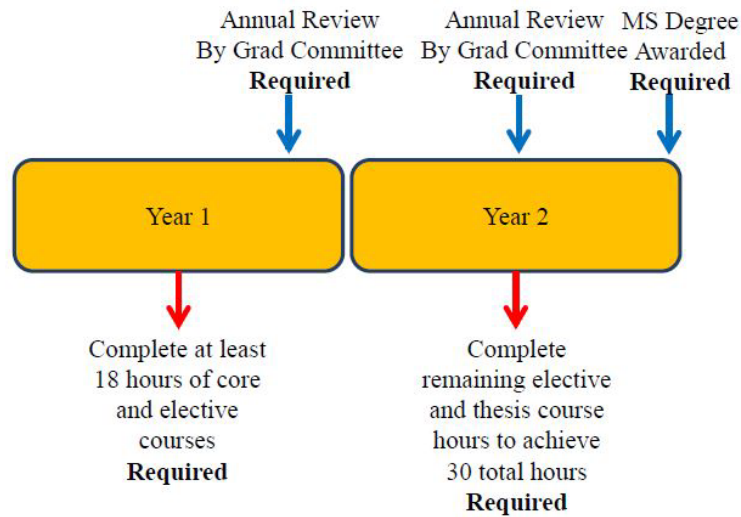
3.6 Common Course-based MS Requirements

3.6.1 Annual Safety Training. CBE places a priority on the conduct of research in a safe and responsible fashion. Therefore, all MS thesis students are required to take a minimum of safety training courses offered by the FSU Office of Environmental Health & Safety (www.safety.fsu.edu). All new MS Thesis new students need to attend the safety training in person, and current students can take the safety training online. The safety training normally includes Hazardous Waste Management (Haz Waste), Biosafety Level 2 and Fire Safety (online). Additional training may be required by individual research laboratories as mandated by the parameters of research and the major professor. Finally, continuing graduate students are required to maintain safety training compliance by completing online refresher courses annually when requested by FSU EH&S and its automatic training notification system.

3.6.2 Center for the Advancement of Teaching (CAT). All MS graduate students are required to attend the FSU Program for Center for the Advancement of Teaching (CAT) online TA training (<https://teaching.fsu.edu/required-training/>) if they are to be assigned to teaching assistant (TA) duties. This requirement is mandatory regardless of the student's classification as a teaching assistant or research assistant. This workshop is provided before the beginning of the fall semester, with a modified version at the start of the spring semester for out-of-cycle admissions.

3.6.3 Suggested timeline and checklist. A suggested timeline for completion of the course-based MS degree requirements and a milestones checklist are provided below, respectively. Students may need to enroll in additional hours to maintain full-time status each semester.

Course-based MS Timeline



Course-based MS Milestone Checklist

Milestone or Action	When
Request transfer credit (if applicable)	By end of 2 nd semester
Annual Review(default advisor, CBE Graduate Director/Graduate Coordinator)	By the end of each spring semester
Apply for graduation with University	Beginning of final semester

3.7 BS-MS Pathway

This pathway provides academically talented undergraduate students an opportunity to complete both a BS and MS degree in five (5) years. Upon approval, this pathway allows up to twelve (12) graduate hours to be double counted toward an undergraduate degree program. The successful BS-MS student will earn the Bachelor of Science (BS) degree upon completion of the undergraduate program and the course-based or Thesis Master of Science (MS) degree upon completion of the graduate program.

The FAMU-FSU College of Engineering offers a tuition waiver to cover the tuition differential for up to twelve (12) credit hours of graduate coursework taken by eligible undergraduate students in the program, meaning undergraduate BS-MS students will pay only undergraduate rates for double-counted graduate courses, if eligibility criteria are maintained. Note, students in the BS-MS pathway may take no more than 15 hours of coursework in any semester, undergraduate or graduate.

Once BS-MS students complete the undergraduate degree and enroll in the graduate program, regular graduate tuition rates apply.

3.8 Biomedical Engineering PhD Program

The [PhD degree in Biomedical Engineering](#) is a research degree designed to produce a scholar; it is granted only to students who have demonstrated mastery in a specialty of biomedical engineering and the capability to conduct original and independent scholarly work.

Curriculum. Fifty-seven (57) semester hours are required for the PhD degree in BME as follows:

1. Fifteen (15) semester hours of BME core courses
2. Fifteen (15) semester hours of approved electives
3. Twenty-seven (27) semester hours of BME 6980r, Dissertation
4. Successful completion of BME 8965r, Doctoral Preliminary Exam (0) (P/F grade only)
5. Successful defense of an oral and written dissertation - BME 8985, Dissertation Defense (0) (P/F grade only)
6. Registration and attendance at all departmental seminars - BME 5935, BME Seminar (0)

No courses with a grade below "C" will be counted toward fulfillment of degree requirements. No more than one course with a grade of "C" will be counted toward fulfillment of degree requirements.

Required Biomedical Engineering Core Graduate Courses (fifteen [15] semester hours):

- ECH 5052 - Research Methods in Chemical Engineering (3)
- ECH 5261 - Advanced Transport Phenomena I (3)
- ECH 5840 - Advanced Chemical Engineering Mathematics I (3)
- ECH 5852 Advanced Chemical Engineering Computations (3)
- XXX XXXX - Approved Course in Physiology or Cell Biology (3)

An approved course in Physiology or Cell Biology is required for completion of the graduate BME degree. Approved courses include **PCB 5137** - Advanced Cell Biology; **PCB 5204C** - Cell Physiology (FAMU); **PCB 5525** - Molecular Biology; **PCB 5595** - Advanced Molecular Biology; **PCB 5795** - Sensory Physiology; **PCB 5845** - Cell and Molecular Neuroscience; and **BCH 5405** - Molecular Biology; **BME 5XXX** - Fundamentals of Cell Bioeng (department preferred class). Additional courses may satisfy the physiology/biology requirement but require a petition to the Graduate Committee for approval as a core substitute.

BME PhD Doctoral Preliminary Examination (zero [0] semester hours):

BME 8965r - Doctoral Preliminary Exam (0) (P/F grade only) – After the first semester of matriculation in the PhD program, students will take the PhD Preliminary Examination as the first step toward PhD candidacy. Currently, this course and its examination are held in the Spring semester, and students are expected to enroll and complete the examination at that time. Retakes of the examination occur in a subsequent semester, with current policy dictating a 2nd attempt in the following fall semester. Students are permitted only two attempts before dismissal from the PhD program. See Section 3.11.1 for details.

NOTE: Following successful completion of the Preliminary Examination, students must take a minimum number (currently, two) of dissertation hours (BME 6980r) EVERY semester that they remain in the PhD program regardless of other class loads. As most tuition waivers provide a maximum of nine (9) credit hours per term, students must consider this requirement when registering for multiple courses and should consult the faculty advisor and CBE Graduate

Director for guidance before enrolling for more than nine hours.

Dissertation Defense (zero [0] semester hours):

BME 8985 - Defense (0) (P/F grade only) - In addition to the thirty (30) semester hours of coursework and dissertation, an oral examination in defense of the dissertation is required for the PhD in biomedical engineering.

NOTE: In the semester of the DISSERTATION DEFENSE (BME 8985), degree candidates must take a minimum number of dissertation hours simultaneously. Currently, the minimum number of dissertation hours (BME 6980r) is two (2) during the semester of defense.

Biomedical Engineering Electives (fifteen [15] semester hours):

Minimum 6 semester hours are required to be in the biomedical engineering major elective courses list. Students should consult with their faculty advisor to determine the elective courses offered by the department. Typical biomedical engineering elective courses are below, and additional electives can be found on the department website.

- BME 5XXX - Advanced Biomaterials (3)
- BME 5314 - Bioengineering (3)
- BME 5362 - Neural Engineering (3)
- BME 5937r - Special Topics in Biomedical Engineering (3)
- BME 6530 - NMR and MRI Methods in Biology and Medicine (3)

Find other elective courses in the [CBE Approved Graduate Elective List](#).

Dissertation Hours (twenty-seven [27] semester hours):

BME 6980r - Dissertation (1-9) (S/U grade only)

NOTE: Following successful completion of the Preliminary Examination, students must take a minimum number (currently, two) of dissertation hours (BME 6980r) EVERY semester that they remain in the PhD program regardless of other class loads.

Dissertation Defense (zero [0] semester hours):

BME 8985 - Dissertation Defense (0) (P/F grade only)NOTE: In the semester of the DISSERTATION DEFENSE (BME 8985), degree candidates must take a minimum number of dissertation hours simultaneously. Currently, the minimum number of dissertation hours (BME 6980r) is two (2) during the semester of defense.Degree Requirements

The following requirements for the PhD degree in biomedical engineering must be met:

1. Passing BME 8965 Doctoral Preliminary Examination within two consecutive exam attempts (see Ph.D. preliminary examination requirements below for more details). Successful completion will result in an initial admission to Ph.D. candidacy.
2. Completion of a minimum of thirty semester hours of advanced coursework (including fifteen semester hours of core coursework and fifteen semester hours of electives).

3. Completion of at least twenty-seven semester hours of dissertation research listed as repeatable course BME 6980 Dissertation.
4. Registration and attendance at all departmental seminars listed as repeatable course BME 5935 Biomedical Engineering Seminar.
5. Selection of a research topic and faculty advisor(s).
6. Complete RCR Training by the end of 1st semester.
7. Complete Annual evaluation in the end of the Spring semester.
8. Formation of a supervisory committee in consultation with the faculty advisor(s).
9. Submission and defense of a prospectus on the dissertation topic to the supervisory committee.
10. One semester teaching assistantship in an undergraduate laboratory.
11. Presentation of a research topic at one local, regional, national, or international professional meeting.
12. Submission or publication of scholarly articles (minimum of one) based on original dissertation research in peer-reviewed journals.
13. Passing BME 8985 Dissertation Defense. At least two hours of dissertation (BME 6980) must be registered concurrently during the term of the dissertation defense (BME 8985).

All paperwork associated with the above requirements must be submitted in a timely fashion to the Departmental with appropriate signatures for review by the CBE Graduate Committee and Director.

3.9 Chemical Engineering PhD Program

The PhD degree in Chemical Engineering is a research degree designed to produce a scholar; it is granted only to students who have demonstrated mastery in a specialty of chemical engineering and capacity to conduct original and independent scholarly work.

Curriculum. Fifty-seven (57) semester hours are required for the PhD degree in ECH as follows:

1. Fifteen (15) semester hours of ECH core courses
2. Fifteen (15) semester hours of approved electives
3. Twenty-seven (27) semester hours of ECH 6980r, Dissertation
4. Successful completion of ECH 8965r, Doctoral Preliminary Exam (0) (P/F grade only)
5. Successful defense of an oral and written dissertation - ECH 8985, Dissertation Defense (0) (P/F grade only)
6. Registration and attendance at all departmental seminars - ECH 5935, ECH Seminar (0)

No courses with a grade below "C" will be counted toward fulfillment of degree requirements. No more than one course with a grade of "C" will be counted toward fulfillment of degree requirements.

Required Chemical Engineering Core Graduate Courses (fifteen [15] semester hours):

- ECH 5052 - Research Methods in Chemical Engineering (3)
- ECH 5126 - Advanced Chemical Engineering Thermodynamics I (3)
- ECH 5261 - Advanced Transport Phenomena I (3)
- ECH 5840 - Advanced Chemical Engineering Mathematics I (3)
- ECH 5852 - Advanced Chemical Engineering Computations (3)

ECH PhD Doctoral Preliminary Examination (zero [0] semester hours):

ECH 8965r - Doctoral Preliminary Exam (0) (P/F grade only) – After the first semester of matriculation in the PhD program, students will take the PhD Preliminary Examination as the first step toward PhD candidacy. Currently, this course and its examination are held in the Spring semester, and students are expected to enroll and complete the examination at that time. Retakes of the examination occur in a subsequent semester, with current policy dictating a 2nd attempt in the following fall semester. Students are permitted only two (2) attempts before dismissal from the PhD program. See Section 3.11.1 for details.

NOTE: Following successful completion of the Preliminary Examination, students must take a minimum number (currently, two) of dissertation hours (ECH 6980r) EVERY semester that they remain in the PhD program regardless of other class loads. As most tuition waivers provide a maximum of nine (9) credit hours per term, students must consider this requirement when registering for multiple courses and should consult the major professor and CBE Graduate Director for guidance before enrolling for more than nine hours.

Dissertation Hours (twenty-seven [27] semester hours):

ECH 6980r - Dissertation (1-9) (S/U grade only)***NOTE: Following successful completion of the Preliminary Examination, students must take a minimum number (currently, two) of dissertation hours (ECH 6980r) EVERY semester that they remain in the PhD program regardless of other class loads.***

Dissertation Defense (zero [0] semester hours):

ECH 8985 - Defense (0) (P/F grade only) - In addition to the thirty (30) semester hours of coursework and dissertation, an oral examination in defense of the dissertation is required for the PhD in chemical engineering.

NOTE: In the semester of the DISSERTATION DEFENSE (ECH 8985), degree candidates must take a minimum number of dissertation hours simultaneously. Currently, the minimum number of dissertation hours (ECH 6980r) is two (2) during the semester of defense.

Chemical Engineering Electives (fifteen [15] semester hours):

Minimum 6 semester hours are required to be in the chemical engineering major elective courses list. Students should consult with their faculty advisor to determine the elective courses offered by the department. Typical chemical engineering major elective courses and additional electives can be found on the department website.

- ECH 5262 - Advanced Transport Phenomena II (3)
- ECH 5526 - Advanced Reactor Design (3)
- ECH 5706 - Electrochemical Engineering Science (3)
- ECH 5806 - Petroleum Science and Technology (3)
- ECH 5820 - Polymer Physical Science and Engineering (3)
- ECH 5828 - Introduction to Polymer Science and Engineering (3)
- ECH 5834 - Chemical Engineering Materials (3)
- ECH 5838 - X-Ray Structural Characterization of Materials (3)
- ECH 5841 - Advanced Chemical Engineering Mathematics II (3)

- ECH 5934r - Special Topics in Chemical Engineering (3)

Find other elective courses in the [CBE Approved Graduate Elective List](#).

Degree Requirements:

The following requirements for the PhD degree in chemical engineering must be met:

1. Passing ECH 8965 Doctoral Preliminary Examination within two consecutive exam attempts (see Ph.D. preliminary examination requirements below for more details). Successful completion will result in an initial admission to Ph.D. candidacy.
2. Completion of 30 semester hours of advanced coursework (including 15 semester hours of core graduate coursework and 15 hours of electives).
3. Completion of at least 27 semester hours of dissertation research, listed under repeatable course ECH 6980 Dissertation.
4. Registration and attendance at all departmental seminars listed under repeatable course ECH 5935 Chemical Engineering Seminar.
5. Selection of a research topic and faculty advisor(s).
6. Complete RCR Training by the end of 1st semester.
7. Complete Annual evaluation in the end of the Spring semester
8. Formation of a supervisory committee in consultation with the faculty advisor(s).
9. Submission and defense of a Ph.D. prospectus on the dissertation topic to the supervisory committee.
10. One semester teaching assistantship in an undergraduate laboratory
11. Presentation of a research topic at one local, regional, national, or international professional meeting.
12. Submission or publication of scholarly articles (minimum of one) based on original dissertation research in peer-reviewed journals.
13. Successful passage of ECH 8985 Dissertation Defense. At least two hours of dissertation (ECH 6980) must be registered for concurrently during the term of the dissertation defense (ECH 8985).

All paperwork associated with the above requirements must be submitted in a timely fashion to the Department with appropriate signatures for review by the CBE Graduate Committee and its Chair.

3.10 Common PhD Program Requirements

The following items are common requirements for all CBE PhD students regardless of discipline.

3.10.1 Progression to PhD following MS Degree or Other Graduate Coursework. Students with MS degrees in BME or ChE from the FAMU-FSU College of Engineering may, with approval of the graduate committee and faculty advisor, take six (6) additional approved semester hours beyond the thesis-type MS course requirements to satisfy the thirty (30) semester hour requirement for the PhD. All other requirements must be fulfilled as stated above.

Students with MS degrees in BME or ChE from other institutions will be given a specific course plan by the departmental graduate committee. A maximum of thirty (30) semester hours may be assigned to remedy any deficiencies in the student's background. Transfer credit from another institution is limited to a maximum of six (6) semester hours towards the PhD degree and only with departmental approval. The petition for credit transfer must be submitted by the student during the first academic year in the program.

3.10.2 Annual Safety Training. CBE places a priority on the conduct of research in a safe and responsible fashion. Therefore, all MS thesis students are required to take a minimum of safety training courses offered by the FSU Office of Environmental Health & Safety (www.safety.fsu.edu). All new MS Thesis new students need to attend the safety training in person, and current students can take the safety training online. The safety training normally includes Hazardous Waste Management (Haz Waste), Biosafety Level 2 and Fire Safety (online). Additional training may be required by individual research laboratories as mandated by the parameters of research and the major professor. Finally, continuing graduate students are required to maintain safety training compliance by completing online refresher courses annually when requested by FSU EH&S and its automatic training notification system.

3.10.3 RCR Training. PhD students are required to successfully complete Responsible Conduct of Research (RCR) training as part of the degree requirements in the department. This training must be completed by the end of the first semester of the student's initial enrollment in a CBE graduate program. (For additional details, please refer to the **Academic Policies** section below.)

3.10.3 Center for the Advancement of Teaching (CAT). All PhD graduate students are required to attend the FSU Program for **Center for the Advancement of Teaching (CAT)** online TA training (<https://teaching.fsu.edu/required-training/>) if they are to be assigned to teaching assistant (TA) duties. This requirement is mandatory regardless of the student's classification as a teaching assistant or research assistant. This workshop is provided before the beginning of the fall semester, with a modified version at the start of the spring semester for out-of-cycle admissions.

3.10.4 Faculty Advisor and supervisory committee. The PhD student selects a faculty advisor by the end of the first semester, and they also need to form a supervisory committee by the end of the first semester in the 2nd year. The faculty advisor must be a full-time CBE faculty member with Graduate Faculty/Directive status and also must agree to serve as the student's academic advisor and dissertation supervisor.

The PhD student will choose the supervisory committee in consultation with the faculty advisor. The supervisory committee consists of four (4) full-time faculty members, including the faculty advisor as the chair; one member must be from outside of CBE and serves as the University Representative. The University Representative must be a tenured member of the faculty (FSU or FAMU depending upon the student's university). The other two members must be CBE faculty members. All committee members must have Graduate Faculty/Directive status. Additional members may be appointed to the committee, if deemed appropriate by the faculty advisor. The supervisory committee oversees and supervises the student's research effort, administers the PhD Prospectus, recommends full doctoral candidacy, attends the oral defense of the dissertation, approves the written dissertation and oral defense, and recommends granting of the degree.

3.10.5 Instructional Responsibilities. Practice and experience in instruction is a component of the doctoral degree. Therefore, PhD students are required to assistance in the teaching of at least one undergraduate laboratory course during their tenure in the Department. During the semester of service as a laboratory teaching assistant (TA), the PhD student will receive a stipend supplement to offset the additional training and instructional time involved in this duty. At present, the following undergraduate laboratory courses satisfy this requirement: BME 4332L – Cell & Tissue Engineering; BME 4403C – QASP; BME 4503L- Bioinstrumentation ;ECH 3274L – Transport Phenomena; and ECH 4404L - Unit Operations. For international students, passage of the SPEAK (Speaking Proficiency English Assessment Kit) examination (www.cies.fsu.edu/programs/english-academic-purposes/speak-exam-information) for conversational English in a classroom setting to enable the performance of laboratory and teaching assistance duties is required. A minimum score of 45 must be obtained before the student is permitted to perform TA duties. In addition, this SPEAK score must be obtained before the student will be permitted to present a PhD prospectus.

3.10.6 PhD Preliminary Examination. Successful PhD candidates will have a sound background in engineering, as well as the creativity and judgment necessary to conduct independent research. The purpose of the Preliminary Examination is to assess these qualities with an emphasis on evaluating the student's potential to conduct an original course of study and investigation. All prospective PhD candidates must enroll in the appropriate Doctoral Preliminary Exam course (either BME 8965r or ECH 8965r) for the semester that they intend to take the preliminary examination. Currently, the Preliminary Examination is administered in the 1st spring semester following initial matriculation in the CBE graduate program unless otherwise determined by the CBE Graduate Committee. Second attempts are administered in the following fall semester.

Students are admitted to candidacy for the PhD degree after passing the Preliminary Examination (see below). The doctoral preliminary committee chair will submit the Preliminary Exam Outcome Assessment form to the CBE graduate coordinator. A student becomes eligible to and must register for dissertation credits (BME or ECH 6980r) the semester after successful completion of the Preliminary Examination and must maintain at least 2 hours of dissertation credits each semester thereafter until defense of the PhD dissertation.

The Preliminary Examination tests the student's ability (1) to define, describe and examine critically relevant literature; (2) to think creatively and to apply basic chemical/biomedical engineering concepts; (3) to communicate in a scholarly and rigorous manner the progress and results of research; and (4) to conduct productive, rigorous and creative scientific investigations.

This exam tests the student's ability to evaluate a fundamental research problem from the literature of chemical or biomedical engineering. Specifically, the student will be asked to:

- Identify the problems addressed in the assigned article;
- Formulate a critical appraisal of the authors' contributions to the problem and the significance of the work;
- Critically evaluate the technical soundness of the approach used and results obtained;
- Summarize and critique advances in the field since the publication of the assigned article;
- Propose in concrete terms research work that might be done to extend and (if necessary) improve upon the study discussed in the article; and
- Comment on the incorporation of the article's findings into the potential course of dissertation work of the student.

The Graduate Preliminary Examination Committee, which will be comprised of at least three faculty members, will assign a fundamental article from the literature of chemical or biomedical engineering. Three weeks following the assignment of the chosen research article, the student will be required to submit a first draft of the written report on the exam problem as well as any additional commentaries or simulations deemed important by the student. This report will be distributed to all members of the Preliminary Examination Committee for review. Committee members will submit comments and questions back to the prospective PhD candidate within five (5) business days. This review will identify (a) aspects of the written report that require additional attention or (b) critical research points that will need to be addressed in the oral presentation. The student will then prepare and submit a final report a week after receiving the committee's feedbacks.

After the submission of the final report, the student will give an oral presentation to the Preliminary Examination Committee. The oral presentation will be approximately one hour in length. The student will give a 40-minute presentation to the committee, followed by a 20-minute question and answer session. The oral presentation should address the exam criteria, as well as any issues raised by the committee's review of the submitted written report. Additionally, the student is permitted to submit any supplementary information to augment the written report. An edited written final report should have been submitted by this time.

Following the oral presentation, the Preliminary Examination Committee will evaluate the student's performance in a closed session. Two outcomes are possible: pass or fail. An affirmative majority vote from the committee is required for the student to pass the examination. A pass permits the student to begin or continue research contributing to the PhD dissertation. The committee may also provide recommendations to support the student's academic progress, such as (but not limited to) the successful completion of specific coursework or completion of a MS degree prior to granting full PhD candidacy. These recommendations do not affect the pass status but are intended to enhance the student's preparation for doctoral research.

Per College policy, the Dean's office will be notified of the outcome of any examination attempt. With committee approval, the student may have one additional attempt to pass the examination if failing the first attempt. The Preliminary Examination Committee will make a recommendation to the

student and faculty advisor about the examination performance of the student and the likelihood of future success. The re-examination will be scheduled at the discretion of the Graduate Committee. The second attempt is usually done a semester afterwards. Students must be registered separately for their first and second attempt, and must receive either a “pass” or a “fail” grade for each attempt. Students can take the examination for admission to candidacy only twice. Failure of the Preliminary Examination on two occasions will eliminate the student from consideration for PhD candidacy, rendering the student ineligible to continue in the degree.

Upon successful completion of the preliminary exam, the student is admitted to PhD candidacy. For each attempt, the Preliminary Examination Committee chair will report the outcomes on the PhD Preliminary Examination Outcome Assessment form and submission to the Graduate Director and Graduate Coordinator.

3.10.7 Annual evaluation. All PhD students must report their annual educational and research progress to their supervisory committee at least once a year, typically in the form of an oral presentation. Additional meetings with the Doctoral Dissertation supervisory committee are encouraged as warranted by research objectives. In addition, all students will use the Departmental Annual Evaluation form to provide an update on and changes to the Plan of Study, a self-evaluation of progress over the last year, and an evaluation by the faculty professor. The graduate student is responsible to submit the completed department annual evaluation form in the “CBE graduate student” Canvas group under the assignment tab by the end of Spring semester. by the end of the spring semester.

3.10.8 PhD 2nd Year Literature Review. During the second year, PhD students are required to present a 30-min literature review to their doctoral committee before the end of the Spring semester of their second year and before the submission of that semester’s Annual Graduate Student Evaluation. In consultation with their faculty advisor, graduate students are required to select a topic relevant to their research, review the literature, and prepare 20-30 slides that summarize and critique the state of the art with respect to that topic and, if appropriate, update the committee on their individual research efforts to date. The student should reference both seminal and relevant current literature, ideally identifying potential dissertation research objectives that address any gaps in current knowledge. It is recommended to begin with a recent comprehensive review article, but the student is expected to perform an in-depth analysis of the relevant literature from original sources. Important components to include are significant problems/challenges in the field, novel approaches to address the challenges, current state of knowledge, and prospects. Students are required to include critical analysis and describe the relevance of the literature to their research. A title and abstract (~150 words) must be submitted to the doctoral committee at least one week before the presentation.

3.10.9 PhD Prospectus. Following completion of the core coursework, PhD Preliminary Examination, and the second-year literature review, the student should prepare and defend a PhD prospectus that lays out the background, strategy and preliminary work conducted to support the proposed PhD dissertation research. The PhD prospectus must be completed by the end of the spring semester of

year 3.

The PhD Prospectus evaluates whether the student has demonstrated the ability to conduct independent research, obtain sufficient relevant scientific knowledge in research and integrate that knowledge into a coherent Ph.D. dissertation. The prospectus has both written and oral components and is administered by the PhD dissertation committee and complies with the requirements of the college and University.

The written component of the PhD Prospectus is a proposal describing the proposed research work for the student's dissertation. The proposal should represent the cumulation to date of educational and research activities focused on the proposed topic of study. At a minimum, the prospectus report should include the following components: abstract, problem statement or hypothesis, research aims or objectives, critical literature review, preliminary work, research plan and tasks, intellectual merit and broader impact, expected outcomes, and timeline for completion. The oral component of the PhD prospectus will include a presentation by the student on the written proposal and dissertation research. The PhD dissertation committee will evaluate both the written and oral components as well as the academic preparation and research activities of the student, and that committee is charged with assessing the proficiency of the student as well as the feasibility of the proposed project. In doing so, the committee may ask any questions of the student about the proposal or other topics relevant to the proposed work or discipline.

The PhD dissertation committee will report the outcome of the PhD Prospectus according to the vote of its members. The committee chair will report the outcome on the PhD Prospectus Assessment form by submission to the Graduate Director and Graduate Coordinator.

The annual evaluation form includes the date of successful completion of the PhD prospectus and the overall recommendation following the above guidelines. The outcome can only be reported as "pass" or "fail". If the student does not pass the PhD prospectus, that student will have one more attempt to pass the PhD prospectus, and normally, the re-examination will require revision to the written document with a repeat of the oral presentation, although individual committees may require only one of the above as deemed appropriate.

In the semester after completion of the prospectus, the student will receive an increase in stipend and should complete all dissertation work within two academic years.

3.10.10 Dissertation. The final and cumulating requirement of the doctoral program is the original and fundamental research resulting in the doctoral dissertation. Students will enroll in dissertation research hours (BME or ECH 6980) only after the successful completion of the Preliminary Examination and entrance to the doctoral candidacy. The student selects the dissertation topic in consultation with the faculty professor and supervisory dissertation committee. The supervisory committee approves the dissertation research topic based on the student's dissertation prospectus proposal. To be acceptable, the dissertation must be original research that is a significant contribution to the discipline, and it must reflect a substantial scholarly effort on the student's part.

It is the student's responsibility to comply with the required dissertation format of the University as

well as the deadlines and requirements for dissertation submission (see www.famu.edu/index.cfm?graduatestudies or www.gradstudies.fsu.edu).

At the completion of the dissertation research and when the complete dissertation is ready for review by the supervisory committee, the major professor will authorize its distribution to committee members. The dissertation should be complete in every respect, including all data analysis, figures and tables. The supervisory committee can recommend editorial and/or substantive changes after review and the oral dissertation defense. The dissertation should be provided to the supervisory committee at least ten (10) working days before the date of the dissertation defense.

The PhD student is required to defend the dissertation publicly according to Department, College and University policies with regards to announcement and scheduling. Notification of the defense is to be posted on the calendars of the Department, College and Graduate school at least two weeks prior to the date of the defense.

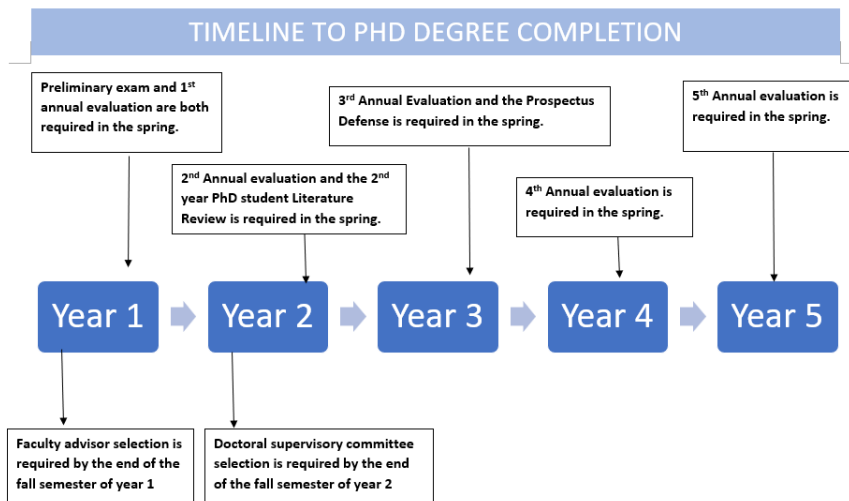
3.10.9 Scholarly Activities. In partial fulfillment of the PhD degree requirements, the PhD student must prepare a minimum of one (1) manuscript for peer-reviewed journals, which should have the status of “Accepted.” Faculty advisors may have more stringent requirements. It is highly recommended and expected that the dissertation will yield a minimum of 3-5 manuscripts and publications. In addition, the PhD student must present a research topic at a local, regional, national or international professional meeting at least once during their tenure in the department.

3.10.11 Dissertation Defense. A dissertation defense with oral examination is a mandatory part of the degree requirements. The student must satisfactorily pass this oral examination, as determined by the supervisory committee, before submission of the final dissertation to the university.

- The dissertation defense will be scheduled only with approval of the major professor, supervisory committee, and department. The student will be permitted to schedule the dissertation defense only if the student has 1) completed the research work, 2) written a complete dissertation, and 3) satisfied the scholarly activities requirement.
- The defense should be scheduled before the final dissertation submission deadline with sufficient time to allow for revisions; see university deadlines.
- The dissertation defense shall be announced and open to the public.
- The oral defense consists of two parts: 1) a public defense presentation that includes appropriate use of visual aids and has a duration of 45-55 minutes and 2) a closed oral examination by the supervisory committee.
- The outcome of the dissertation defense is determined by the supervisory committee and is reported by the major professor to the department. The committee chair will report the outcome on the PhD Defense Assessment form (Section 8, www.eng.famu.fsu.edu/cbe/department-resources) by submission to the Graduate Director and Graduate Committee.

3.10.12 Suggested timeline and checklist. A suggested timeline for completion of the PhD degree requirements and a milestones checklist are provided below. Students may need to enroll in additional hours to maintain enrollment requirements (see Sections 5.1 and 5.3).

Suggested PhD timeline



All PhD students are required to receive their InFlight non-thesis master's degree in year 2 or 3, one year after passing the prelim exam if they don't have the MS degree already.

PhD milestones checklist

Milestone or Action	When
TA training	Before the 1st fall semester
Annual safety training	Every Fall semester
SPEAK Exam (for some international students)	Before the 1st fall semester with repeats as necessary to meet minimum score
Faculty Advisor Selection	By the end of 1 st fall semester
Undergraduate laboratory TA requirement	After the 1 st semester in program & completion of SPEAK minimum requirement (as needed)
Complete RCR training	By the end of 1 st fall semester
PhD Preliminary examination	Spring semester of year 1
Request transfer credit (if applicable)	By end of 1 st academic year
1 st Annual evaluation	The spring semester of year 1 (could use the candidacy form to replace the first evaluation)
Dissertation hours	Minimum enrollment in 2 hours each semester after successful completion of the PhD Preliminary Exam
Supervisory Committee Selection	By end of fall semester of year 2
2nd Annual Evaluation (2nd Year PhD Student Literature Review)	The Spring semester of year 2
3rd Annual Evaluation and the Prospectus Defense	The Spring semester of year 3

Scholarly activity: conference presentation & journal manuscript acceptance (1) for publication	Submitted by semester prior to graduation or earlier
4th Annual Evaluation	The Spring semester of year 4
5th Annual Evaluation	The Spring semester of year 5
Apply for graduation with university	Beginning of final semester
Dissertation defense	Final semester
Submit approved final PhD dissertation	Final semester; check University for manuscript clearance deadlines

4. Academic Policies

All students are required to adhere to the policies of the university, the FAMU-FSU College of Engineering, and the CBE Department. It is the student's responsibility to be familiar with these policies and to refer to them throughout the conduct of studies. These policies include academic policies, graduation requirements, and thesis and dissertation guidelines.

Major university requirements and policies are briefly discussed in Section 5, but students are encouraged to review university bulletins and websites (www.gradschool.fsu.edu and www.famu.edu/index.cfm?graduatestudies, respectively) for additional information. Department academic policies are described in this section.

4.1 Academic Performance

Once enrolled in a CBE graduate program, the student must satisfy the following requirements for retention:

- Maintain a cumulative GPA of at least 3.0. If a student's GPA falls below 3.0, the student will be placed on academic probation. If a student on academic probation does not attain a 3.0 cumulative FSU GPA by the end of the next full term of enrollment, the student will be placed on academic dismissal.
- No grade below a "C" will be credited towards graduate degree requirements.
- Only one "C" will be credited towards graduate degree requirements.
- Satisfy all University graduate student policies (see Section 5).

4.2 Coursework

A minimum of one-half of the total required coursework must be taken at the FAMU-FSU College of Engineering.

Prerequisites. Students must satisfy the prerequisites to enroll in a course. Students entering the major without a biomedical or chemical engineering degree also must satisfy additional course requirements specified by the Graduate Committee.

Undergraduate Courses. For students enrolling in Fall 2019 and later, the University no longer accepts undergraduate courses toward the graduate degree. All courses must be 5000-level or 6000-level courses. Any 4000-level courses taken by a graduate student must be taken as preparatory courses or supplemental to their plan of study, which may affect the ability to apply tuition waivers for those courses.

Letter Grade and S/U Grading. The minimum number of hours of coursework taken on a letter-grade basis is as follows: thesis MS students, at least 21 hours; course MS students, at least 27 hours; and PhD students, at least 27 hours.

Transfer Credit. Transfer of courses not counted toward a previous degree from another accredited graduate school is limited to six (6) semester hours. In addition, transfer of courses not counted toward a previous degree from the institution in which the student is enrolled (*i.e.*, FAMU or FSU) is limited to twelve (12) semester hours total. In all cases, transfer credits require approval of the department and shall be completed with grades of “B” or better.

4.3 RCR Training

MS (thesis) and PhD students are required to successfully complete Responsible Conduct of Research (RCR) training as part of the degree requirements in the department.

This training must be completed by the end of the first semester of the student’s initial enrollment in a CBE graduate program.

RCR training is optional for course-based MS students. PhD students who completed RCR training as MS students at the FAMU-FSU College of Engineering do not need to repeat this training. It is essential that students understand the basic ethical standards behind doing research before they start doing research. The RCR training can be required for certain funded projects as well.

FSU students have two options: take a workshop or enroll in the CITI training (<https://www.research.fsu.edu/research-compliance/rcr/>).

FAMU students have just one option: the CITI training (<https://www.famu.edu/administration/research/training/Responsible-Conduct-in-Research-Training.php>).

We recommend doing the CITI training because it is less time-consuming. Students can easily enroll themselves with their FAMU or FSU credentials. The RCR training is optional for MS non-thesis students who generally just take courses, but we do encourage them to complete the training as well.

MS and PhD students need to confirm that they have completed RCR training in a timely manner and note this completion in their plan of study and annual evaluations. Students also need to share a copy of the certificate by the end of the first semester to the graduate coordinator.

4.4 Academic Advising

All graduate students must meet with their faculty advisor each semester during the registration period. The meeting may be a face-to-face meeting, email, phone or online conferencing. First-semester students who have not selected an advisor can meet with the CBE Graduate Coordinator (course-based MS) or Graduate Director (thesis MS or PhD).

4.5 Annual Assessment of Progress

All PhD students must report on their research progress at least once each year to the supervisory committee. The annual review meeting takes the form of an oral presentation before the committee members, typically at the end of the spring semester. The student will receive this annual assessment in writing; feedback addresses the research plan, progress toward completion, and oral and written communication skills. Students with teaching assistantship (TA) or research assistantship (RA) also will receive written assessment on their performance of their duties by their supervisor.

5. University Requirements and Policies

University requirements and policies are provided by the FAMU Office Graduate Studies and Research (www.famu.edu/index.cfm?a=graduatestudies) and by FSU Graduate School (<http://www.gradstudies.fsu.edu>) (also see the FAMU or FSU Graduate Student Handbooks). Key requirements and policies are highlighted here.

5.1 *Full-time and Part-time Status*

A full-time load is Nine (9) hours per semester. After passage of the preliminary examination for PhD candidacy, a PhD student who has not made a final dissertation submission shall include in the required full-time load a minimum of two (2) credit hours of dissertation per semester until completion of the degree. Any student (MS Thesis or PhD) should take a minimum of two (2) credit hours of thesis or dissertation in the semester of the final defense. A student is typically required to register for at least nine (9) credit hours in a term where an assistantship is awarded. A student must register for at least two (2) credit hours of thesis or dissertation in the semester of their defense. When registering for less than 9 credit hours permission for an underload is required from the Dean's office.

5.2 *Scholarly Engagement*

The purpose of the Scholarly Engagement requirement is to ensure that doctoral students are active participants in the scholarly community. To meet the Scholarly Engagement requirement, doctoral students should interact with faculty and peers in ways that may include enrolling in courses; attending seminars, symposia and conferences; engaging in collaborative study and research beyond the University campus; and utilizing the library, laboratories and other facilities provided by the University. The goal is to prepare students to be scholars who independently can acquire, evaluate and extend knowledge, as well as develop themselves as effective communicators and disseminators of knowledge.

5.3 *Continuous Enrollment*

Students not continuously enrolled from semester to semester during the academic year (fall and spring) may need to reapply for admission through the University.

5.4 *Time to Completion (university requirements)*

For MS students, all work towards the degree must be completed within five years (FAMU) or seven years (FSU) from the time the student originally registers for graduate studies. For doctoral students, all requirements for the PhD degree must be completed within seven years (FAMU) or five calendar years (FSU) from the time the student passes the PhD Preliminary Examination, or the student must pass a new qualifying examination.

5.5 *International Students*

International students must comply with the U.S. Department of Homeland Security rules and regulations. International students enrolled at FAMU are encouraged to consult with the FAMU Office of International Education and Development (www.famu.edu/index.cfm?oied). International students enrolled at FSU are encouraged to consult with the FSU Center for Global Engagement (www.cge.fsu.edu).

5.6 University-Wide Standards for Teaching Assistants

Students who assume any teaching assistant (TA) role (e.g., grader, lab TA, course TA) must satisfy the minimum requirements for the specific teaching role(s). Requirements include graduate coursework or a MS degree in the discipline, participation in the Center for the Advancement of Teaching (CAT)TA training (<https://teaching.fsu.edu/required-training/>) certification of spoken English (SPEAK exam) for those whose native language is not English, supervision by a faculty member & periodic evaluations.(<http://cies.fsu.edu/SPEAK>)

6. Offered Courses

A list of courses offered by CBE is provided in the university general bulletins. Students are responsible for checking the graduate edition of the general bulletin for the university in which they are enrolled to confirm course information:

- FAMU: see https://catalog.famu.edu/preview_entity.php?catoid=12&ent_oid=1129&returnto=1069
- FSU: see https://registrar.fsu.edu/registration_guide/fall/academic_calendar/

Classes with insufficient enrollment are subject to cancellation. Students are encouraged to sign up for classes early in the registration period. Through the FAMU-FSU Cooperative Program, students at either university may take a class at the other parent university if that course is not offered at their home university in a given semester.

7. Checklist for New Students

7.1 FAMU Students

Refer to the FAMU School of Graduate Studies and Research for information on requirements at <https://graduateschool.famu.edu/index.php>

7.2 FSU Students

The Graduate School at FSU provides an information packet and checklist for new graduate students at www.gradschool.fsu.edu/newcurrent-students. In addition, an orientation for new graduate students is held each August. International students enrolled through FSU are encouraged to consult with the Center for Global Engagement (www.cge.fsu.edu).

7.3 All Graduate Students

- College and department orientations are held each Fall semester before classes begin.
- Students must meet with a faculty advisor prior to registering for classes. First-semester students who have not selected an advisor can meet with the graduate director or graduate coordinator for class scheduling.
- See the College Computing Services (CCS) in Room A332 to request an engineering account, which is required to access the public computers at the College of Engineering.

8. Forms

All the departmental forms are accessible internally in the Canvas site for our current graduate students.

Forms for all graduate students:

- Faculty Advisor Selection Form
- Thesis supervisory committee form
- PhD supervisory committee form
- Graduate Student Annual Evaluation Form
- Preliminary Exam Outcome Assessment Form (department form)
- FSU Admission to Candidacy Form
- 2nd year PhD Literature Review Outcome Assessment Form (department form)
- Thesis/Doctoral Supervisory Committee Form (department form)
- Prospectus Defense Form and outcome assessment form (department form)
- Thesis Defense and outcome Assessment Form (department form)
- Dissertation Defense and Outcome Assessment Form (department form)
- FAMU Defense Outcome
- FSU University Representative Doctoral Defense Report (online)
- FSU Manuscript Signature (online)
- TA Evaluation and TA Workload Evaluation Form (Department Form)
- Exit Survey (online)
- Announcement of annual evaluation, preliminary examination, prospectus and defense is done by emailing the CBE Graduate Coordinator the title of the presentation, abstract and name of the advisor.

9. Funding Information

9.1 Teaching & Research Assistantships

A limited number of teaching assistantships (TA) and research assistantships (RA) are available through CBE to graduate students on a competitive basis each semester, with first preference to PhD students and candidates. The Department has limited amount of funding for TA positions, especially for the summer semester. For both TA and RA positions, the student must coordinate closely with the faculty advisor. University matriculation (tuition) waivers also may be granted as supplementary awards to students with assistantship appointments of 20 hours/week. Students with University Graduate Fellowships are expected to perform teaching and/or research tasks equivalent to 20 hours/week effort.

Note: Funded PhD normally receive maximum of 5 years of TA and RA funding support before they graduate.

In addition to department sources of financial support, the universities and external organizations provide fellowships for graduate study.

- FAMU School of Graduate Studies and Research compiles information about fellowships provided by FAMU and external sources (<https://www.famu.edu/students/office-of-financial-aid/index.php>) (see the links to Financial Aid and Funding Opportunities)

- FSU Office of Graduate Fellowships and Awards provides information about external fellowships (www.ogfa.fsu.edu)
- College of Engineering provides information about scholarships and fellowships at (www.eng.famu.fsu.edu/scholarships)
MS and PhD students are strongly encouraged to apply for fellowships from federal funding agencies, such as:
 - National Science Foundation (www.nsf.gov/funding/pgm_summ.jsp?pims_id=6201)
 - Department of Energy (www.science.energy.gov/wdts/scgsr)
 - US Environmental Protection Agency (www.epa.gov/ncer/fellow)

9.2 Travel Support for Graduate Students

The Department will announce the CBE Graduate Research Award each spring semester as part of the CBE Departmental Research Day. Based on oral and/or poster presentation at this event, the award recognizes excellence in graduate student research. Each recipient will receive up to \$500, which can be used for presenting a paper in a conference. The award money can be used any time before the student leaves the graduate program. Generally, two students are awarded based separately on oral and poster presentation performance.

10. Contact Information

For more information about graduate studies in the Department of Chemical & Biomedical Engineering at the FAMU-FSU College of Engineering, please contact:

Department of Chemical & Biomedical Engineering
FAMU-FSU College of Engineering
2525 Pottsdamer Street
Tallahassee, Florida 32310
Phone: 001.850.410.6151
Email: chemical@eng.famu.fsu.edu