



JOHNS HOPKINS
UNIVERSITY
Chemical and Biomolecular Engineering

Masters of Science in Engineering (MSE)

Student Handbook

2023 – 2024

(Updated August 2023)

A Welcome from The Director of Masters' Studies

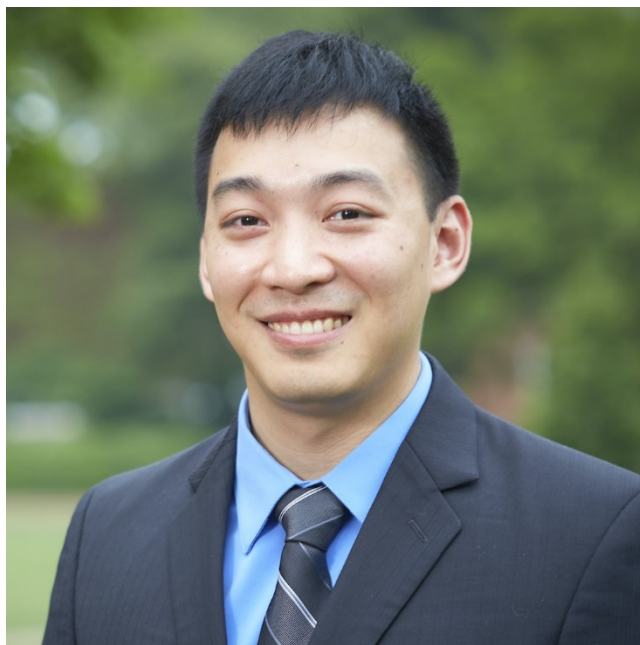
Hello! Welcome to the Johns Hopkins University Department of Chemical and Biomolecular Engineering! We're excited that you've chosen to join us for your Masters' studies, and we're eager to help get you to where you want to be once you complete our program. Our graduates go on to pursue careers in industry or further graduate study through PhD or even MD programs, and we hope that through your time here you will be well-prepared for your next steps!

Regardless of where you are coming from, whether your undergrad studies were at a big school or a small one, whether you studied chemical engineering previously or not, whether you are an international or domestic student, whether you are the first in your family to come to graduate school or come from a long line of Nobel Laureates, we will work with you to make sure you have a strong start and a strong finish here. Please do not hesitate to ask any questions! We much prefer to be asked too much than asked too little! We also recognize that some parts of pursuing a MSE can be stressful, and we again encourage you to ask for help than to tough it out on your own. All of us have gotten to where we are through the kindness of others, and we are ready to spend time with you to make sure you are supported every step of the way until graduation!

We look forward to getting to know each and every one of you!

Sincerely,

Sakul Ratanaalert, PhD
Senior Lecturer and Director of Masters' Studies



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Master of Science in Engineering (MSE) Degree Program Overview

The MSE in Chemical and Biomolecular Engineering at Johns Hopkins is a flexible, dynamic program, with several options or “tracks” to accommodate students’ varied interests and career aspirations.

The Essay-Based MSE:

The most popular track, this is a research-intensive MSE program. Students take 18 credits of graduate-level coursework (typically 6 classes) and also undertake original research, which culminates in a final presentation, open to the department, and essay. The essay-based option typically requires four semesters, plus the summer of the second year, to complete; it may take fewer semesters to complete for students who began their research project while an undergraduate at Hopkins or for students who do their research through the INBT Co-op Program (see p. 7 for more information on the Co-op program).

The Design-based MSE¹:

This track is classified as a subset of the essay-based track and is very similar to it, except that students in the design-based track work in a group of 3–4 on a product design project for 3–4 semesters rather than conducting research. 3–4 semesters of Product Design are taken in addition to the six other graduate-level courses, and the end product is a written report and a presentation open to the department. **The design track is on hiatus for Academic Year 2023-2024.**

The Coursework-based MSE:

The department also offers coursework-only degree in which students take ten 3-credit graduate courses. This option typically takes three semesters to complete, but may require fewer semesters for students who began graduate coursework while an undergraduate at Hopkins (see “Combined BS/MSE Program and Students with BS in ChemBE from Johns Hopkins” below for more details).

The Master of Science in Engineering Management (MSEM):

This program is administered through the Center for Leadership Education (CLE), combining courses in ChemBE with those in management. See <https://msem.engineering.jhu.edu> for more details.

¹ The Design-Based MSE option is not offered for the Academic Years 2022-2023 or 2023-2024.

MSE Student Advising and Selection of Courses

- Before beginning their first term in the MSE program, students should **submit their undergraduate transcript** to the Director of Masters' Studies; an unofficial copy is sufficient.
- Essay- and design-based students will be assigned an advisor within the first semester (see details below about the Research Advisor Selection Process); coursework-only students will be advised by the Director of Masters' Studies throughout their degree program.
- Before registration begins for the upcoming semester, the student and their advisor will select courses together to design a curriculum appropriate for the student's research interests and educational needs and goals. Students should consult their advisor when registering for every term. Together, the student and advisor should update the student's MSE checklist each term to ensure that degree/program requirements will be met.
- Course substitutions, exceptions, and waivers must be approved by the Director of Masters' Studies; documentation of these approvals should be shared with the MSE Program Coordinator to include in graduation materials.
- After a student registers for their final semester, they should send the coursework portion of their MSE checklist to their Faculty Advisor for approval and final signature; the final signed MSE checklist is included in graduation materials.

Research Advisor Selection Process

Design-based MSE

To apply for this track, contact Prof. Marc Donohue (mdd@jhu.edu) **prior to registration in your first semester. (The design track is on hiatus for Academic Year 2023-2024.)**

Essay-based MSE

Most students who plan to pursue the essay-based track do not arrive assigned to a faculty research advisor. The selection and assignment process takes place during the student's first semester (typically Fall). MSE students interested in pursuing the essay-based track must inform the Director of Masters' Studies of their interest at the beginning of their first semester. A [list of available research projects](#) for MSE students is published in the first week of the Fall semester and updated regularly to indicate filled positions and add new projects. It is the student's responsibility to arrange meetings with individual faculty members whose projects or lab openings are of interest. When a student and faculty mutually agree to work together on a project, the faculty member, the faculty should e-mail the MSE Academic Program Coordinator, CC'ing their student(s) so that the faculty member may be assigned as the research advisor for that student on SIS.

Should a student interested in a lab placement be unable to arrange one by the end of their first semester, the Director of Masters' Studies will work with that student to arrange a placement where possible. Students without a research advisor at the start of their second semester (typically Spring) will be enrolled in the course-based MSE.

MSE students can do their research with any primary ChemBE faculty or with faculty with

secondary appointments in ChemBE. If a student wants to pursue a project with a faculty member who is not affiliated with the department, the student must find a primary ChemBE faculty member to sponsor the project and serve as their second reader for their essay.

Students should consult with the Director of Masters' Studies to find a faculty sponsor. This primary ChemBE advisor will be the student's advisor on SIS and serve as the primary contact for coursework and department-related discussions. Therefore, the student should meet regularly with the primary ChemBE advisor (at least once per semester) to make sure they are on track to graduate, and it is the student's responsibility to provide these regular updates.

Residency Requirement

Students pursuing an MSE degree are subject to the WSE residency requirement (<https://engineering.jhu.edu/education/graduate-studies/graduate-academic-policies-procedures/>). Every student must register as a full-time graduate student for **at least two semesters** or satisfy an equivalent requirement approved by the appropriate department. Concurrent BS/MSE students are exempt, as are students beginning their MSE degree within two semesters of having completed a JHU undergraduate program.

Course Requirements

The following program requirements and policies apply to all ChemBE MSE students, with exceptions noted.

- Full-time registration for MSE students is 9 credits per semester. For more information about Johns Hopkins University's policy on credit hours, please visit <https://homewoodgrad.jhu.edu/academics/wse-graduate-credit-hours/>.
 - Note that students on the essay-based track must still register for 9 credits per semester, even though they may have finished their coursework. Research credit is typically used to make up the difference and reach 9 credits. Research done towards the MSE degree is a graduation requirement, and therefore full-time status cannot be waived.
- The majority of courses taken for the MSE should be 3+ credit courses.
- Students must take and successfully pass the required minimum of graduate-level coursework (i.e. 600-level and above), depending on their chosen track:
 - 18 credits for Essay- and Design-based students
 - 30 credits for Coursework-based students
- At least 12 of the required 18 credits for essay-based and design-based students, or at least 18 of the required 30 credits for course-based students, must be from courses in the Chemical and Biomolecular Engineering Department (EN.540.6xx or EN.545.6xx). 9 of these credits are in the MSE core courses (see below). Exceptions to this rule are rare made and must be approved by the Director of Masters' Studies. A course from a department other than ChemBE may count towards these credits **only** if the course
 - has significant ChemBE content
 - is 3 credits, and
 - is consistent with the student's research interests and educational goals as determined by the student's research advisor and the Director of Masters' Studies.
- Students may not count 400-level courses towards their MSE degree unless

- the course is not offered at the 600 level
AND
- the department offering the course considers it a graduate-level course in their program. In such cases, a letter from that department's head, chair, or graduate program director should be included in the submission of graduation materials.
- Courses offered at both the 400 and 600 levels **must** be taken at the 600 level to be counted as MSE course requirements. All ChemBE coursework must be taken at the 600 level.
- Courses should be **approved by the student's research advisor and the Director of Masters' Studies prior to registration each semester.**
- To count towards the degree, courses must be taken for a letter grade; such courses **cannot include seminars, independent studies, graduate research, or special studies.**

Courses Required of All ChemBE MSE Students

- All students must complete a mandatory Academic Ethics module their first semester and earn a passing grade. The course EN.500.603 will be automatically added to your SIS enrollments and should not be dropped. See [Graduate Student Orientation - Johns Hopkins Whiting School of Engineering \(jhu.edu\)](https://engineering.jhu.edu/graduate-student-orientation) for more information.
- All students must enroll in at least one semester of Chemical and Biomolecular Engineering Seminar (EN.540.600 in Fall or EN.540.601 in Spring) and earn a passing grade.
- Students must enroll in EN.500.601 Lab Safety in their first semester.²
- All students must complete [Responsible Conduct of Research](#) training, **either** by completing the required modules, which can appear on transcripts as AS.360.624, **or** by taking AS.360.625.

Core Courses

All students must take **three** core courses, **one from each** of the following categories:

- **Core 1: Thermodynamics**
 - EN.540.671 Advanced Thermodynamics in Practice, typically offered in Spring.
 - With approval from the Director of Masters' Studies and the instructor, the more advanced EN.540.630 Thermodynamics & Statistical Mechanics may be substituted; 630 is typically offered in Fall.
- **Core 2: Transport**
 - EN.540.604 Transport Phenomena in Practice, typically offered in Spring.
 - With approval from the Director of Masters' Studies and the instructor, EN.540.652 Advanced Transport Phenomena may be substituted; it is typically offered in the Fall.
- **Core 3: Kinetics**
After consulting with their primary advisor, student may choose any one of the following

² Students who attended JHU for their undergrad program are exempt from this requirement if they took EN.540.490 - Introduction to Chemical Process Safety.

courses:

- EN.540.602 Metabolic Systems Biotechnology
- EN.540.615 Interfacial Science with Applications to Nanoscale Systems
- EN.540.632 Project in Design: Pharmacokinetics
- EN.540.638 Advanced Topics in Pharmacokinetics and Pharmacodynamics I
- EN.540.673 Advanced Chemical Reaction Engineering in Practice
- EN.540.681 Molecular Kinetics and Catalysis

Course Substitutions

Substitutions for core courses may be granted for students with ChemBE backgrounds. However,

- Only one course, EITHER for Core 1 OR for Core 2, may be a substitution. (Students in the BS/MSE program may substitute for both Core 1 and Core 2.)
- Students cannot take both versions of the Core 1 or 2 courses and count both towards their course requirements. For example, students cannot count both EN.540.604 and EN.540.652 towards their requirements.
- Multiple courses in Core 3 can be taken for course requirements and will count as electives.

Preparatory Courses for Students without Degrees in ChemBE

Students will need to demonstrate proficiency in the core Chemical Engineering subjects of Thermodynamics, Transport, and Kinetics to fulfill their MSE degree requirements. This proficiency is typically met through taking the three required MSE core courses. In special circumstances, and with pre-approval from the Director of Masters' Studies, other equivalent courses can be used to substitute for the proficiency requirements.

Incoming MSE students arrive with diverse strengths and preparation. Many of our incoming MSE students do not have backgrounds in Chemical and Biomolecular Engineering, and we celebrate that these students have chosen JHU's program to start their journey in ChemBE! To help these students excel, we recommend they take some undergraduate-level courses to better prepare themselves for the core courses, especially for those who aspire to advance to a PhD program. However, these valuable preparatory courses **do not count** towards your graduate-level course requirements.

Core 1: Thermodynamics

- EN.540.202 Introduction to Chemical and Biological Process Analysis, typically offered both Fall and Spring semesters, recommended to be taken in your first semester. (Students would then take EN.540.671 Advanced Thermodynamics in Practice in spring semester)
- AND
- EN.540.203 Engineering Thermodynamics, typically offered both Fall and Spring semesters, recommended to be taken in Spring semester after EN.540.202 (concurrently with EN.540.671).
 - Students with sufficient background in Thermodynamics and/or Physical Chemistry, as

well as Calculus II, can get approval from the Director of Masters' Studies to go directly to EN.540.671.

Core 2: Transport

- EN.540.303 Transport Phenomena I, typically offered both Fall and Spring semesters, recommended to be taken in your first semester. Students would then take EN.540.604 Advanced Transport Phenomena in Practice in their second semester)
- Students with sufficient background in Transport, as well as Calculus III and Differential Equations, can get approval from the Director of Masters' Studies to go directly to EN.540.604.

Core 3: Kinetics

- EN.540.301 Kinetic Processes, typically offered in Spring, is recommended to be taken in a student's second semester.
- Students with sufficient background in Thermodynamics and/or Physical Chemistry, as well as Calculus III and Differential Equations, may obtain approval from the Director of Masters' Studies to go directly to EN.540.673 and EN.540.681.
- Students with sufficient background in Thermodynamics and/or Physical Chemistry, Calculus II and Differential Equations, *and* Kinetics, may obtain approval from the Director of Masters' Studies to go directly to EN.540.673 and EN.540.681.

In addition to these three Core areas of preparation, some students may wish to supplement their mathematical background prior to registering for graduate coursework, by taking one or more of the following:

- AS.110.109 Calculus II (For Physical Sciences and Engineering)
- AS.110.202 Calculus III
- AS.110.302 Differential Equations and Applications
- EN.553.291 Linear Algebra and Differential Equations.

Consult with the Director of Masters' Studies to plan your course schedule and ensure to finish all your degree requirements on time.

Technical Writing Requirement³

As part of their MSE coursework, students must take at least one of the Technical Writing Course options offered by the CLE Department. These courses were chosen specifically for relevance to Chemical Engineering professionals, and they count towards the required 30 (Coursework based) or 18 (Essay or Design based) credits:

- EN.663.613 Technical Communication for Scientists and Engineers
- EN.663.640 Writing Grant and Contract Proposals
- EN.663.644 Writing for Clarity
- EN.663.645 Improving Presentation Skills for Graduate Students

³ For students who completed their undergrad at JHU and took EN.661.315 Culture of the Engineering Profession, the Technical Writing Requirement is waived.

Combined BS/MSE Program and Students with BS in ChemBE from Johns Hopkins

ChemBE undergraduates may wish to continue into the MSE program concurrently with or after their BS studies. Students in their junior year may apply to the Combined BS/MSE program, and students in their senior year may apply directly to the MSE program.

Any ChemBE undergraduate, regardless of desire to pursue an MSE, is allowed to take graduate-level courses, as long as they have met the prerequisites and get instructor approval. This means that students do not need to rush to complete their undergraduate coursework to get a head-start on the MSE coursework; they should focus on taking courses in the proper order to solidify their foundational knowledge.

Note that the BS and MSE programs are separate entities, even though they exist in the same department. If you have not yet completed your undergraduate coursework, you are recognized as an undergraduate by the university for all policies that depend on student status. Also, if some or all of your coursework towards the MSE is completed while an undergraduate, you will need to submit your undergraduate transcript along with your graduation materials, as the MSE team may not have access to any undergraduate records.

Double-Counting Policy

Courses may be allowed to count towards both the BS and the MSE; however, the ChemBE graduate program's policy on double-counting is stricter than the WSE policy found here: <https://engineering.jhu.edu/education/graduate-studies/graduate-academic-policies-procedures/>

Students pursuing both their undergraduate and masters' degrees in ChemBE at JHU, and students who have already received their BS in ChemBE at JHU, should be aware of the department's rules:

- Up to 2 courses may count towards requirements for both the BS and MSE degrees.
- For classes offered at both the 400 and 600 level, students MUST take the course at the 600 level to apply the course to their Masters' degree. This cannot be changed after the course has been completed.
- If BS/MSE students take more than two 600-level courses and do not need them for BS graduation requirements (i.e., the BS degree audit places these excess courses in the "Reserved for Master's Degree" category), they can count them towards the completion of their MSE degree. (Confirm with the Director of Undergraduate Studies that your audit has placed your courses how you wish BEFORE your BS graduation is finalized.)
- Courses in which the student earns a grade of B- or lower cannot be double-counted.

Course Exemptions

As noted above, students with a BS in ChemBE from Johns Hopkins may substitute for both advanced versions of Core 1 Thermodynamics and Core 2 Transport. Also, students are exempt from the Lab Safety requirement if they took EN.540.490 Introduction to Chemical Process Safety and from the Technical Writing Elective requirement if they took 661.315 Culture of the Engineering Profession. These requirements are thus waived as opposed to being double-counted. Students must still take the full number of required graduate-level credits (18 for essay/design-based students and 30 for course-based students)

Additional Program Requirements

In addition to completing the required coursework at the appropriate levels, students earning the MSE in ChemBE must maintain good academic standing and fulfill other program requirements ed below.

Good Academic Standing

- Students must maintain a B average (GPA 3.0) in coursework to remain in good academic standing and earn their degree.
- Note that while undergraduate courses will not count towards GPA, C+ or below grades in those courses will count towards academic standing.
- Courses in which students earn less than a C- cannot be counted toward degree requirements; however, these courses can be retaken.
- In any given semester, receiving **one** grade of D or F, or **two** C's, will result in the student being placed on academic probation (C-, C, and C+ all count as C grades).
- Once a student is placed on probation, any additional grade of C+ or below will result in the student's termination from the program.
A student will remain on academic probation until they improve their D or F grade upon retake or Director-approved substitution.
- While on academic probation, a student is assigned a case worker for support. A student on probation will meet with the Director of Masters' Studies approximately midway through the semester for which they are on probation, to discuss progress.

Calculating GPA

A student's GPA is calculated based on the graduate-level coursework counted towards their degree, decided by the courses that appear on the MSE Checklist. Thus, at any given time, if a student has fewer graduate-level credits than the minimum requirement, all graduate-level courses will count towards the GPA. If a student has exceeded the minimum credit requirement, the subset of courses that meet all graduation requirements will count towards the GPA. A student can choose to have more courses than the minimum appear on the MSE Checklist.

This means that if a student gets a C+ or below in a course, they have one of two options: (1) Retake the course for a higher grade, in which case the new grade will replace the old one immediately; or (2) Take additional courses such that this course in question is not needed towards graduation and will therefore not be counted. If a student is on academic probation for coursework performance, Option 1 will likely resolve the probation more quickly than Option 2.

Note that while undergraduate courses will not count towards GPA, C+ or below grades in those courses will count towards academic standing.

Additional Requirements for Essay- and Design-based Students

To maintain full-time registration, students must always be registered for at least 9 credits per semester. Therefore, in semesters during which essay-and design-based students pursue research, they must register for as many credits as necessary of their advisor's research course (EN.540.801) to maintain the 9 total credits required. (For example, a student taking one 3-credit course would register for 6 credits of research with their advisor to maintain 9 credits for full-time status.)

Essay- and design-based students must remain in good research standing with their research advisor. Failure to do so will result in probation and transfer to the course-based MSE track. Essay-based students must write an essay based on original research and literature review and present their results at an open seminar attended by faculty and students. The essay must be approved by the departmental graduate committee, which consists of at least (1) the graduate research advisor and (2) a faculty member, one of which must be a faculty member from the Department of Chemical and Biomolecular Engineering (primary or secondary appointment). (See “Essay Presentation” below for details.

Alternatives to Conducting Research On-Campus

INBT Industry Co-Op Program

To broaden the practical training for Master of Science in Engineering (MSE) students in the Whiting School of Engineering, the Institute for NanoBioTechnology (INBT) collaborates with major industry partners to offer a credited and paid co-op opportunity to MSE students in the Chemical and Biomolecular Engineering, Materials Science and Engineering, and Mechanical Engineering programs.

ChemBE students pursuing the essay-based track have the opportunity to choose the co-op program as an alternative to conducting research in JHU laboratories. Students must apply through the INBT office during their first semester. (This application process is separate from, and happens after, being admitted to the ChemBE MSE program.)

Each student accepted to the program will be assigned a research advisor/mentor at the sponsoring company. The company is expected to develop a list of goals and development objectives for the student. Once the project has been determined, a few weeks prior to the start of the co-op or within the first week, students must find a faculty advisor with primary or secondary appointment in ChemBE. During the six-month co-op period, students will meet with the faculty advisor at least once every six weeks to provide progress updates. At the end of the co-op internship, students will complete an essay and present their results at an open seminar attended by faculty and students. The company mentor can serve as the student’s second reader as long as they have a PhD or commensurate work experience.

For more information, please visit <https://inbt.jhu.edu/masters/> or contact David Lee (dlee254@jhu.edu).

Non Resident Status

During course registration for the semester you will go on co-op, you will instead complete paperwork to go on "Non-Residential Student" status. This reduces your tuition for that semester, as you will not be on campus. However, you are not allowed to take any courses during this time, even those that are online-only.

Please find the relevant forms [here](#).

Chemical Product Design Track (Design-based MSE)

Chemical and Biomolecular Engineering MSE students pursuing the design-based track and students pursuing an MSEM can choose to focus on Chemical Product Design rather than on traditional engineering science.

- Students in the Design-based MSE track must take Product Design each semester for 3–4 semesters. These courses do not count towards the 18 credits of required graduate coursework.
- Students in the design-based track work in a group of 3–4 on a product design project for 3–4 semesters rather than conducting research. (Design-based requirements are equivalent to the essay-based requirements plus semesters of Product Design.)
- The group collectively writes a patent application and a value proposition for their product in lieu of a traditional research MSE essay. Instead of submitting the materials to the university, students instead submit them to the Product Design instructor for approval for graduation.
- Students in the MSEM program take 3 engineering science courses and typically work on their product design project for 3–4 semesters.

The Chemical Product Design tracks (for both the MSE and MSEM) will train you how to develop new products based on chemicals or chemical engineering principles.

- The first semester is devoted to exploring how to develop new product ideas and to develop a preliminary product design.
- The second and subsequent semesters are devoted either to building and refining a working prototype of their product or to doing the proof-of-concept experiments to prove that your product design is viable.

The goal is to get the product to Technology Readiness Level 6 by the end of the program.

Essay Presentation

The typical MSE essay presentation is conducted in front of the student's advisor, a second reader or advisor, and is open to attendance by any faculty member. The student's "first reader" will be their advisor, and their "second reader" will be a faculty member chosen by the advisor and student. At least one of these two readers must have an appointment in the ChemBE department. The essay should be provided to the advisor and second reader at least two weeks prior to the presentation date.

Students have 2 options for when and how they will present their essays:

- 1) Individual Presentation:** Students can present their work at an open seminar attended by the committee members, which will be publicized to the department. There is no closed examination period after the essay presentation.
- 2) MSE Day Presentation:** MSE Day is a symposium held at the end of the Spring semester. MSE students will give 20-min presentations to MSE Day participants and attending faculty, followed by a 10-min period for questions. Both the advisor and second reader are expected to attend this presentation.

A "Readers Letter" will be signed by the committee members and submitted to the Academic Program Coordinator with the checklist prior to graduation. Prior to signing, either the advisor

or the reader or both may require the student to revise the essay. The student should contact the Program Coordinator when the date of the presentation is set for a readers letter, then return a pdf copy of the signed readers letter for inclusion in the student's conferral packet.

Students should contact the MSE Academic Program Coordinator at least **eight weeks** prior to the proposed essay presentation to ensure that all necessary information is exchanged. Students should provide the title of their essay to the MSE Academic Program Coordinator at least **two weeks** before the presentation date.

International students should contact OIS at least **eight weeks** in advance of their presentation date to ensure that their visa status and application for their EAD card and Optional Practical Training are in place.

Students will be required to submit their final essay to the library's ETD (Electronic Theses and Dissertations) database. Refer to the *Guidelines for the Preparation of Dissertations and Theses*, which can be found online at <https://www.library.jhu.edu/library-services/electronic-theses-dissertations/>. Once submitted, students must forward the library's approval to the MSE Academic Program Coordinator as part of their graduation materials. The approval will come in the form of an email titled, "**Your ETD submission is approved.**"

COVID-19 P/F Policy (Spring & Fall 2020, and Spring 2021 ONLY)

On the degree conferral checklist, courses with a P*/P** grade taken during the semesters are denoted with "** COVID". Students who took courses during these semesters only may ask their instructors, including undergraduate course instructors, to switch to P/F instead of letter grade. This request should have been made final assignments were submitted. WSE policy states that students cannot switch to P/F once a letter grade has been entered into the SIS system.

- For **essay-based and design-based** MSE students, up to 2 of the 6 required courses taken during these affected semesters were allowed to meet degree requirements with a final grade of P.
- For **course-based** MSE students, up to 4 of the 10 required courses taken during these affected semesters were allowed to meet degree requirements with a final grade of P; at least four ChemBE courses must be taken for a letter grade, so P grades should apply only to up to 4 electives in other departments.

For Spring 2020 courses, the university allowed

- graduate students to opt into P/F for any graded course without needing instructor approval, and
- an unlimited number of spring 2020 P/F courses to count towards degree requirements if a P was received (as long as the courses themselves met the curriculum requirements for the degree).

Steps for Graduation

- Notify the MSE Academic Program Coordinator **before your final semester** if you intend to graduate. Scheduling of the essay presentation can take up to six weeks, and other important materials need to be exchanged.
- Contact OIS if you are an international student. OPT applications must be created three months before completion of your degree.

- Complete the “Application for Graduation” in SIS by the announced deadline. If the deadline is missed, a paper form must be filled out at the registrar’s office.

Note: If no “Application for Graduation” is on file in the registrar’s office, the student will not be included on the degree candidates list signed by the President. Should a student’s degree requirement materials be received after the deadlines listed above, that student’s name will be added to the next semester’s Graduate Board list for completed degrees.

Example Course Schedules

Example Course Schedule 1: Essay-Based Students with BS in ChemBE			
Semester 1 (Fall)		Semester 2 (Spring)	
EN.540.6xx	ChemBE Elective (Elective 4)	EN.540.671	Advanced Thermodynamics in Practice (Core 1)
EN.xxx.6xx	Any-Department Elective (Elective 5)	EN.540.604	Advanced Transport Phenomena in Practice (Core 2)
EN.xxx.6xx	Any-Department Elective (Elective 6*)	EN.540.673	Adv Chemical Reaction Engineering in Practice (Core 3)
EN.540.600	ChemBE Seminar (can be taken any semester)		
EN.500.601	Lab Safety		
Semester 3 (Fall)		Semester 4 (Spring)	
EN.633.6xx	Technical Writing Elective (*can be Elective 6 if 3 cr eq)	EN.540.801	Graduate Research
EN.540.801	Graduate Research		

Example Course Schedule 2: Essay-Based Students without BS in ChemBE			
Semester 1 (Fall)		Semester 2 (Spring)	
EN.540.202	Intro to Process Analysis (pre-Core 1)	EN.540.671	Advanced Thermodynamics in Practice (Core 1)
EN.540.303	Transport Phenomena I (pre-Core 2)	EN.540.604	Advanced Transport Phenomena in Practice (Core 2)
EN.540.6xx	ChemBE Elective (Elective 4)	EN.540.301	Kinetic Processes (pre-Core 3)
EN.540.600	ChemBE Seminar (can be taken any semester)	EN.540.203	Engineering Thermodynamics (co-Core 1)
EN.500.601	Lab Safety		
Semester 3 (Fall)		Semester 4 (Spring)	
EN.540.602	Metabolic Systems Biotechnology (Core 3)	EN.540.801	Graduate Research
EN.xxx.6xx	Any-Department Elective (Elective 5)		
EN.xxx.6xx	Any-Department Elective (Elective 6*)		
EN.633.6xx	Technical Writing Elective (*can be Elective 6 if 3 cr eq)		

Example Course Schedule 3: Course-Based Students with BS in ChemBE

Semester 1 (Fall)

EN.540.6xx	ChemBE Elective (Elective 4)
EN.540.6xx	ChemBE Elective (Elective 5)
EN.540.6xx	ChemBE Elective (Elective 6)
EN.xxx.6xx	Any-Department Elective (Elective 7)
EN.540.600	ChemBE Seminar (can be taken any semester)

Semester 2 (Spring)

EN.540.671	Advanced Thermodynamics in Practice (Core 1)
EN.540.604	Advanced Transport Phenomena in Practice (Core 2)
EN.540.673	Adv Chemical Reaction Engineering in Practice (Core 3)
EN.xxx.6xx	Any-Department Elective (Elective 8)

Semester 3 (Fall)

EN.xxx.6xx	Any-Department Elective (Elective 9)
EN.xxx.6xx	Any-Department Elective (Elective 10*)
EN.633.6xx	Technical Writing Elective (*can be Elective 10 if 3 cr eq)

Example Course Schedule 4: Course-Based Students without BS in ChemBE

Semester 1 (Fall)

EN.540.202	Intro to Process Analysis (pre-Core 1)
EN.540.303	Transport Phenomena I (pre-Core 2)
EN.540.6xx	ChemBE Elective (Elective 4)
EN.540.6xx	ChemBE Elective (Elective 5)
EN.540.600	ChemBE Seminar (can be taken any semester)

Semester 2 (Spring)

EN.540.671	Advanced Thermodynamics in Practice (Core 1)
EN.540.604	Advanced Transport Phenomena in Practice (Core 2)
EN.540.301	Kinetic Processes (pre-Core 3)
EN.540.203	Engineering Thermodynamics (co-Core 1)

Semester 3 (Fall)

EN.540.602	Metabolic Systems Biotechnology (Core 3)
EN.540.6xx	ChemBE Elective (Elective 6)
EN.xxx.6xx	Any-Department Elective (Elective 7*)
EN.633.6xx	Technical Writing Elective (*can be Elective 7 if 3 cr eq)

Semester 4 (Spring)

EN.xxx.6xx	Any-Department Elective (Elective 8)
EN.xxx.6xx	Any-Department Elective (Elective 9)
EN.xxx.6xx	Any-Department Elective (Elective 10)

Additional Useful Policies and Resources

Laboratory Safety

The importance of laboratory safety cannot be overstated. All students are required to complete the safety course prior to beginning work in the lab. This course is offered in the fall and spring semester. Any BS/MSE students who have already taken the undergraduate version of the course and are not required to take it. It should be noted that the laboratory safety course does not cover everything one needs to know regarding safety in each individual lab but is intended to create a safety-minded experience through which the student will be able to evaluate their own lab for potential safety issues and to determine how he/she would respond in that situation.

Students working with either biological hazards and/or radiation are required to take additional appropriate courses through the medical campus.

Annual departmental and university laboratory inspections are conducted by the departmental safety officer and university safety officer. Random laboratory checks are also conducted.

Some relevant contact information for safety issues are:

1. ChemBE Faculty Safety Officer
Rebecca Schulman,
rschulm3@jhu.edu
2. Homewood Laboratory Safety Advocate
Daniel R. Kuespert, (410) 516-5525, dkuespert@jhu.edu
<https://labsafety.jhu.edu/author/dkuespe1/>
3. Emergency Resources_
<https://labsafety.jhu.edu/emergency-resources/>
4. JHU University-Wide Health, Safety & Environment_
https://www.hopkinsmedicine.org/hse/offices_and_programs.html
<https://www.hopkinsmedicine.org/hse/>
<https://www.hopkinsmedicine.org/hse/policies/index.html>

Relevant Security and Safety Phone Numbers

JHU Security

Emergency: (410) 516-7777 (24/7)

Non-emergency: (410) 516-4600 (24/7)

Other Important Numbers

Health, Safety, and Environment: (410) 516-8798 (business hours)

Maryland Poison Center: (800) 222-1222 (24/7)

JHU Radiation Safety: (410) 516-7278

JHU Biosafety: (410) 955-5918

JHMI Needlestick Hotline: (410) 955-STIX (5pm-8am) Blue Jay Shuttle: (410) 516-5121 (24/7)
Plant Operations: (410) 516-8063
Occupational Health Services: (410) 516-0450
Student Health Services: (410) 516-8270

MSE Active Student Communications Policy

The predominant channel through which MSE Program Leadership communicates with MSE students is email. After you activate your JHU email address, the MSE Program Coordinator will add your email to a listserv, and department leadership will use email to disseminate deadlines, updates, policies, opportunities, and other forms of communication that are critical for students' success in the program. **To ensure consistent and reliable communication of information, all active ChemBE MSE Students must remain subscribed to this listserv during their time in the program.**

Continuing to the PhD Program

Many students hope to pursue a PhD at some institution after completing their MSE, so here are some tips on how to make the best use of your time in our program:

- Pursue the essay-based track. Conducting research as part of your MSE requirements demonstrates that you understand what a life of research is like and that you can balance research and coursework.
- Connect with your faculty advisor. You will likely be applying for PhD programs during your third semester, so if your advisor is aware of your ambitions, they can help you get a strong start to your research and start thinking early about their letters of recommendation for your application. Note that it is not an expectation that you will have a publication by the time you graduate with your MSE, let alone in time for PhD application submission, so your work ethic, critical thinking skills, and teamwork with your fellow labmates are what your advisor will be able to comment on.
- Do well in your coursework, especially your core courses. If you demonstrate success in graduate work at our program, that signifies that you will do well at your next school.

While we do not guarantee that it will be possible for a student to continue on to a PhD in our department after completing their MSE, many students have converted from an MSE to a PhD through their faculty advisor, who, after monitoring their work for a year, agrees to take you on for a PhD. Here are some tips that worked for these select students:

- Choose a primary ChemBE faculty as your primary advisor. While we do allow faculty with secondary appointments in ChemBE to advise MSE students without needing a co-advising situation, they will not have the same power to keep students on for a ChemBE PhD, since their primary appointment is not in our department.
- Discuss this possibility during the matching process. Some faculty create MSE projects that are "high risk, high reward", projects that are proof-of-concept but don't yet have funding, and/or projects that are more exploratory and are good for a student's work for two years but not for five. If a faculty does not have the funding or desire to continue the project that you are working on, that decreases your chances of a jump from MSE to PhD.

- Discuss this possibility again during the summer after your first year. This will make sure everyone is in agreement about the move (sometimes things change), and if it is looking like you will not be able to stay, then you have ample time to prepare a PhD application for another school, and your advisor will whole-heartedly support your application.

If you secure a move from MSE to PhD, here are some steps to follow:

- 1) Formally apply for the PhD through the application portal. By Hopkins policy, all students need to have an application on file for anything to be processed.
- 2) Meet with the Director of PhD Studies to discuss which of the courses that you took can be used to waive PhD course requirements.
- 3) Submit your MSE checklist to the Director of Masters' studies and the MSE Academic Coordinator to ensure that you are on track to complete all the MSE requirements before starting your PhD, by department policy.
- 4) Complete your coursework and essay requirements, including presentation. The MSE and PhD Academic Coordinators will then process an internal degree transfer from MSE to PhD.
- 5) We will not submit your MSE degree conferral materials until you are ready to leave our program, with or without a PhD. This policy is for international students, who can better use their OPT time after leaving Hopkins. If you would rather receive your MSE right away, we can process it for you at that time.

Johns Hopkins Policy Information

<https://engineering.jhu.edu/education/graduate-studies/>

Registration Policies

Students are required to register for every semester of study. Registration deadlines will be [published by the Registrar](#) well in advance. It is the student's responsibility to check their account and make sure there are no holds in place to bar registration. For advisor holds, the student should speak to their advisor. For financial holds, the student should contact the Department Administrator. If a student misses the registration deadline, they are responsible for a late fee of \$150-\$300.

Students register over the summer to avoid paying extra FICA taxes. The Academic Program Coordinator will inform students about the procedure and deadlines. Students who miss the deadline will incur a late fee of \$50.

Graduate Board

The Graduate Board is responsible for the administration of University-wide policies and procedures for the award of Master of Arts; MA; Master of Sciences, MS; and Doctor of Philosophy, PhD.

Office of International Services (OIS)

The primary mission of the Office of International Services (OIS) is to assist international students, scholars, and faculty at Johns Hopkins University's Homewood Campus. OIS works with the academic and administrative departments to facilitate the immigration process.

Additionally, OIS' staff members are available to answer your questions about immigration status, financial concerns, health matters, housing, employment possibilities, as well as other

issues that may arise during your stay. Please refer to <http://ois.jhu.edu/>.

For students needing advisor information prior to matriculation for visa-approval purposes, students can use the Director of Masters' Studies' information. Students should explain that the Director of Masters' Studies will serve as their initial academic advisor on a temporary basis until the student matches with a research advisor once they arrive on campus. As such, students will not need to provide the Director of Masters' Studies' resume/CV for this process.

Health Insurance

All graduate students are required to carry sufficient health insurance. The University offers a low-cost health insurance plan for a reduced cost of \$250 for MSE Students.

Students who are already under a plan through their parents or employer have the option to waive the JHU plan by filling out a waiver form and turning it in to the Registrar's Office. This must be done every year. Students who plan to choose this option must also notify the Academic Program Coordinator and Department Administrator. A copy of the waiver form must be turned in to the Department office and kept on file.

Whiting School of Engineering Academic Policies and Procedures

The Academic Policies & Procedures for All Whiting School of Engineering Full time Graduate students is available online and can be accessed using the following link:

<https://engineering.jhu.edu/graduate-studies/academic-policies-procedures-graduate/>

Student Outreach and Support

The Office of the Dean of Student Life provides students with many forms of nonacademic support: <https://studentaffairs.jhu.edu/student-life/> Students are encouraged to explore the many types of support available <https://wellbeing.jhu.edu/>

The case manager designated to support ChemBE MSE students is Chase Oatis; they are available by email to coatis1@jhu.edu or by phone (410) 615 2328. Case managers can help students obtain excused absences for medical reasons, support students in obtaining a Medical Leave of Absence, can assist with mental health concerns, and more. Students who need immediate assistance should contact emergency services any time 24/7:

<https://studentaffairs.jhu.edu/counselingcenter/our-services/crisis-and-emergency-services/>

Additional support available includes a food pantry and emergency funds:

<https://studentaffairs.jhu.edu/student-life/student-outreach-support/>

Graduate Student Conflict Resolution

The Department of Chemical and Biomolecular Engineering endeavors to provide a supportive environment for its graduate students. When the occasional problem arises, and students need help resolving an issue, the department recommends these steps:

- The student can talk to their faculty/research advisor.
- The student can attempt to resolve the conflict by having an in-person conversation with the involved parties. If the student is uncomfortable with this or needs assistance with

these discussions, there are faculty members (in addition to the Department Head, Jennifer Elisseff) who are prepared to help and can be contacted for their assistance:

- Director of Masters' Studies, Sakul Ratanalert
- MSE Academic Program Coordinator, Sonya C. Brown
- Director of Masters' Admissions, Chao Wang

Students can also reach out for assistance beyond the department; several offices on campus can help students resolve various issues:

- Whiting School of Engineering Office of Academic Affairs
- GRO (Graduate Representatives Organization)
- JHU Counseling Center
- JHU Office of Institutional Equity
- Office of the Dean of Student Life
- Homewood Graduate Affairs and Admissions Office
- Office of Student Disability Services

If the situation is serious and cannot be reasonably resolved through any of these options, the Whiting School has a grievance policy, and we will stand with the student to help if a formal complaint is appropriate.

ChemBE Department Information

Up-to-date information on the department is available on our website at:

<https://engineering.jhu.edu/chembe/>

The web link for our core faculty is:

<https://engineering.jhu.edu/chembe/faculty/>

The link for joint/secondary appointed faculty is:

<https://engineering.jhu.edu/chembe/people/secondary-appointment-2/>

Graduate Student Liaison Committee (GSLC)

The Graduate Student Liaison Committee represents the graduate student body in the Department. The group is a voice for all graduate students and works to create a cohesive work and social environment in Chemical and Biomolecular Engineering. The GSLC also organizes social, athletic, and professional events that bring together faculty, graduate students, and undergraduates on a regular basis. These events include our annual Halloween social, Thanksgiving potluck, and Orioles' game. Follow us on social media for updates:

<https://www.facebook.com/ChemBEGSLC/>

https://www.instagram.com/chembe_gslc_jhu/

We are always looking for motivated representatives! If you are interested, please contact the GSLC president found at <https://engineering.jhu.edu/chembe/gslc/>

Department Staff

Our department staff is listed on our department website:

<https://engineering.jhu.edu/chembe/people/staff/>

Department Office and Mailing Address

Department of Chemical and Biomolecular Engineering
Maryland Hall 230
Johns Hopkins University
3400 N. Charles Street
Baltimore, Maryland 21218, USA

Mail and Supplies Policies

Laboratories are responsible for procuring their own supplies and managing their own shipping accounts (FedEx). Each lab should have a person designated to oversee such purchases and track budget spending.

A multi-function photocopier is also available for student use in 230 for tasks related to the conduct of research or the academic pursuits of the faculty. This printer will only scan and send to @jhu.edu e-mail addresses.

Additional Useful JHU Links

Office of the Registrar

<https://studentaffairs.jhu.edu/registrar/>

75 Garland Hall

JCard Services (JHU Student ID)

<https://studentaffairs.jhu.edu/jcard/>

3100 Wyman Park Drive

Student Financial Services

<https://finaid.jhu.edu/>

146 Garland Hall

Student Accounts

<https://studentaffairs.jhu.edu/student-accounts/>

31 Garland Hall

Office of Student Disability Services

<https://studentaffairs.jhu.edu/disabilities/>

385 Garland Hall

Office of Institutional Equity

<http://oie.jhu.edu>

Wyman Park Building Suite 515

Ralph O'Connor Recreation Center

<http://web.jhu.edu/recreation/>

Community Living (Housing)

<https://studentaffairs.jhu.edu/community-living/>

JHU Sheridan Libraries

<https://www.library.jhu.edu/>

Homewood Student Affairs

<https://studentaffairs.jhu.edu>

Digital Media Center

<https://studentaffairs.jhu.edu/dmc/>

Campus Security

<http://www.jhu.edu/~security/>

Campus Police: (410)
516-7777

Security Office: (410) 516-4600

Safety Escort Services

Phone: (410) 516-4600

JHU Transportation Services (including parking)

<http://ts.jhu.edu>

Barnes & Noble Bookstore

<http://johns-hopkins.bncollege.com>

JHU Charles Commons

Office of International Services (visas, etc.)

<http://ois.jhu.edu>

JHU Information Technology

<http://www.it.johnshopkins.edu>

Graduate Representative Organization (GRO)

<https://studentaffairs.jhu.edu/gro/>

JHU Career Center

<https://studentaffairs.jhu.edu/careers/>