



JOHNS HOPKINS
UNIVERSITY
Chemical and Biomolecular Engineering

**Graduate MSE Student Handbook
2022 – 2023**

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Important Contacts

Director of Masters' Studies

Sakul Ratanalert, sratana4@jhu.edu

Maryland 124, 410-516-3484

Director of Masters' Admissions

Chao Wang, chaowang@jhu.edu

Maryland 219, 410-516-5843

MSE Senior Academic Program Coordinator

Brett Weinstein, bweinstein@jhu.edu

Maryland 230H, 410-516-9941

Director of PhD Studies

Stavroula Sofou, ssofou1@jhu.edu

Maryland 116, 410-516-0274

Director of PhD Admissions

Efie Kokkoli, kokkoli@jhu.edu

Croft 172, 410-516-1302

PhD Academic Program Administrator

Marcellas Preston, mprest16@jhu.edu

Maryland 230F, 410-516-2943

Departmental Diversity Champion

Jamie Spangler, jamie.spangler@jhu.edu

Maryland 208, 410-516-8695

Department Head

Paulette Clancy, pclancy3@jhu.edu

Maryland 230, 410-516-7170

Associate Director & Life Design Educator for Engineering Masters & EP Students

Mark Savage, msavag16@jhu.edu

Associate Dean for Graduate and Postdoctoral Academic Affairs

Christine Kavanagh, christinekavanagh@jhu.edu

Wyman 2 West, 410-516-0777

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Master of Science (MSE) Degree Program

Students have several options in pursuing a Masters' degree in Chemical and Biomolecular Engineering here:

1. Essay-based MSE: A research-intensive MSE in which students take six 3-credit graduate-level courses and undertake original research. The end product of the research is in the form of an MSE Essay submitted to the university and a presentation open to the department. (See "Essay-Based Students" below for more details.) This option typically takes four semesters and the intervening summer to complete. It can be shorter for students who began working on their research project while an undergraduate at Hopkins (see "Combined BS/MSE Program and Students with BS in ChemBE from Johns Hopkins" below for more details) or for students who do their research through the INBT Co-op Program (see "INBT Industry Co-Op Program" below for more details).
2. Course-based MSE: A coursework-only degree in which students take ten 3-credit graduate-level courses (see "All Students' Course Requirements" below for more details). This option typically takes three semesters to complete. It can be shorter for students who began taking graduate-level courses while an undergraduate at Hopkins (see "Combined BS/MSE Program and Students with BS in ChemBE from Johns Hopkins" below for more details).
3. Design-based MSE: Similar to the essay-based MSE track (and classified as a subset of such), except 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 (see "Chemical Product Design Track (Design-based MSE)" below for more details). Please contact Prof. Marc Donohue (mdd@jhu.edu) for more details and to enroll prior to registration in your first semester (~July 20).

***The Design-Based MSE option is not being offered for the Academic Year 2022-2023**

Students can also pursue a Master of Science in Engineering Management (MSEM), 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.)

All Students' Course Requirements

- All students are required to **submit their undergraduate transcript** to the Director of Masters' Studies **prior** to the beginning of their first term to discuss their course plan. (An unofficial copy is sufficient.)
- Full-time registration for MSE students is 9 credits per semester.
- In students' first semester: there will be a mandatory Academic Ethics module and quiz embedded in the online orientation which is part of every graduate student's degree requirements. This must be completed with a passing grade. You will see the course EN.500.603 added to your SIS enrollments; **do not drop this course!** Information will be sent closer to the start of the semester. See <https://engineering.jhu.edu/admissions/graduate-admissions/full-time-programs/newly-admitted-students/graduate-student-orientation/> for more information.
- 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) throughout their tenure.
- Students must complete Responsible Conduct of Research training. For complete information, see <https://engineering.jhu.edu/research/resources-policies-forms/online-training-course-responsible-conduct-of-research/> . **(New: Course-based students must complete this as well.)**
- Students must complete a total of
 - **Essay-based Students:** 18 credits
 - **Design-based Students:** 18 credits
 - ***The Design-Based MSE option is not being offered for the Academic Year 2022-2023**
 - **Course-based Students:** 30 creditsof graduate-level (i.e. 600-level and above) **coursework approved by the student's research advisor** and the Director of Masters' Studies.
- The student and research advisor will select these courses to design a curriculum appropriate for the student's research interests and educational goals.
- The majority of students' courses should be composed of 3-(or more) credit courses.
- The courses must be taken for a letter grade (See "COVID-19 P/F Policy" below for more details). These courses cannot include seminars, independent studies, graduate research, or special studies.
- Students are not allowed to count 400-level courses towards their MSE degree unless (1) the course is not offered at the 600 level, and (2) the department offering the course considers it to be a graduate-level course in their program.
 - 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 level **must** be taken at the 600 level to fulfill MSE course requirements. All ChemBE coursework must be taken at the 600 level.
- **The semester before a student's intended graduation date, they should send the coursework portion of their MSE checklist to their Faculty Advisor for approval.**
- Minimum ChemBE credit requirement: At least
 - 12 of the 18 credits (for essay-based and design-based students)
 - 18 of the 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 very rare and must be approved by the Director of Masters' Studies. A course from a department other than ChemBE may be allowed to 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 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.
 - ***The Design-Based MSE option is not being offered for the Academic Year 2022-2023**

Core Courses

- 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 the Spring semester.
 - With approval from the Director of Masters' Studies and the instructor, this course may be substituted for the more advanced version, EN.540.630 “Thermodynamics & Statistical Mechanics”, typically offered in the Fall semester.
 - Core 2 – Transport
 - EN.540.604 “Transport Phenomena in Practice”, typically offered in the Spring semester.
 - With approval from the Director of Masters' Studies and the instructor, this course may be substituted for the more advanced version, EN.540.652 “Advanced Transport Phenomena”, typically offered in the Fall semester.
 - Core 3 – Kinetics
 - Any one of the following 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”
- Substitutions for core courses are typically granted if students have ChemBE backgrounds.
 - Between Core 1 and Core 2, only one of these two Cores may be substituted. (Students in the BS/MSE program may substitute for both Core 1 and Core 2.)
 - Students cannot take both versions of the Core 1 courses and have them both count towards their course requirements, and likewise for Core 2. Multiple courses in Core 3 can be taken for course requirements; these excess courses would fall into elective slots.

Preparatory Courses for Students without Degrees in ChemBE

- Many of our students do not have backgrounds in Chemical and Biomolecular Engineering, and it's great that these students have chosen JHU's program to start their journey in ChemBE!
- To help these students excel in their coursework, we recommend that they take some undergraduate-level courses to better prepare themselves for the core courses. For those who are ultimately interested in a Ph.D. program, we especially recommend a solid foundation, as a strong GPA is necessary to compete in the PhD application process. These 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 the 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 the Spring semester, recommended to be taken in students’ second semester.
 - Students with sufficient background in Thermodynamics and/or Physical Chemistry, as well as Calculus III and Differential Equations, can get approval from the Director of Masters’ Studies to go directly to EN.540.673 and EN.540.681.
 - Students with sufficient background in the above bullet as well as Kinetics can get approval from the Director of Masters’ Studies to go directly to EN.540.673 and EN.540.681.
 - Some students may find that they wish to supplement their mathematical background prior to taking these undergraduate courses by taking one, or more, of the following to fill in any gaps they have: AS.110.109 “Calculus II (For Physical Sciences and Engineering)”, AS.110.202 “Calculus III”, AS.110.302 “Differential Equations and Applications”, and/or EN.553.291 “Linear Algebra and Differential Equations”. Please consult with the Director of Masters’ Studies to

plan your course schedule so that you are sure to finish all your degree requirements on time.

Technical Writing Requirement

- Students are required to complete Technical Writing coursework as part of their degree requirements. These courses are offered by the CLE Department. This can be fulfilled in a number of different ways. Students can complete their Technical Writing Requirement by doing any one of the following:
 - Take one of the approved 3-credit Technical Writing Courses offered by the CLE department **in place of** one of their six or ten graduate-level courses, taking this course as one of their electives. The 3-credit options are:
 - EN.663.622 - Professional Writing and Communication for Graduate Students
 - EN.663.645 - Improving Presentation Skills for Graduate Students
 - Take the **two** approved 1.5-credit Technical Writing Courses offered by the CLE department **in place of** one of their six or ten graduate-level courses, taking these courses as one of their electives. The two 1.5-credit courses are:
 - EN.663.640 - Writing Grant and Contract Proposals
 - EN.663.644 - Writing for Clarity
 - Take any of the approved Technical Writing Courses listed above **in addition to** their core and elective coursework.
 - If a student attended JHU for their undergraduate program, they are exempt from the Technical Writing Requirement if they took EN.661.315 - Culture of the Engineering Profession.

Good Academic Standing

- Students must maintain a “B” average (GPA 3.0) in coursework to earn their degree.
- No “D” grade in a ChemBE course can be counted toward their degree requirements.
- In any given semester, receiving a grade of “F”, “D”, or two “C’s” will result in the student being placed on academic probation (“C-”, “C”, and “C+” all count as “C” grades). Once on probation, receiving 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 are able to improve their “D” or “F” grade upon retake or Director-approved substitution. If no “D” or “F” grades were present, the student attains a “B” average in their coursework.

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

- On the degree conferral checklist, courses with a P*/P** grade taken during the semesters are denoted with “* COVID”.
- You may ask your instructors, which may include your undergraduate course instructors, to allow you to switch to P/F instead of letter grade. Please start the discussion with them before you turn in your final assignment (whether it be an exam or a homework) so that they are aware of your intentions to switch to a P/F grade instead of a letter grade (and so they don’t accidentally finalize a grade on SIS that you didn’t expect). It is up to you and your instructor to decide whether you can see your final letter grade before switching to P/F. You cannot switch to P/F once a letter grade has been entered into SIS, by WSE policy.

- For essay-based and design-based MSE students, we will allow up to 2 courses taken during these affected semesters to have a P grade and still meet degree requirements (of your 6 total courses).
- For course-based MSE students, we will allow up to 4 courses taken during these affected semesters to have a P grade and still meet degree requirements, but at least four ChemBE courses must be taken for a letter grade (of your 10 total courses). This way, you can spend your P's entirely on the 4 any-dept electives, but you can only take P/F up to 2 of the 6 that have to be ChemBE.
- Also note that 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).

The policies for the points above would treat Spring 2020 grades as letter grades for the purposes of P counting.

- We recommend that you try to take at most one graduate course P/F each semester, or else you might end up in a tricky situation later.
- Any number of undergraduate courses can be taken P/F during these affected semesters, as these are not factored into your graduate GPA.

MSE Proficiency Requirement

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.

Essay-Based Students

Additional Requirements for Essay-Based and Design-Based Students

- Students must enroll in EN.500.601 - Lab Safety in their first semester.
 - Students who attended JHU for their undergrad program are exempt from this requirement if they took EN.540.490 - Introduction to Chemical Process Safety.
- Students must maintain full-time registration for all semesters. This means that students must always be registered for at least 9 credits. In semesters where students are pursuing research, they will 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.)
- 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.
- 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 who is 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).

Chemical Product Design Track (Design-based MSE)

***The Design-Based MSE option is not being offered for the Academic Year 2022-2023**

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 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 your product to Technology Readiness Level 6 by the end of the program.

Research Advisor Selection Process

Most graduate students 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 who are 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 made available in the first week of the Fall semester and is updated regularly with filled positions as well as with new projects. It is the responsibility of the student to arrange a meeting with individual faculty members who have projects of interest and openings in their lab. The research advisor assignment is made once a student and faculty mutually agree to work together on a project.

Once a match is made, the student should e-mail the MSE Academic Program Coordinator, CC'ing their research advisor, with their project title. (The title can be tentative and is non-binding, so it is free to change up until the essay presentation.)

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.

Essay Presentation

The typical MSE essay presentation is similar to a PhD thesis defense, but without additional Graduate Board Oral (GBO) examinations. Students, in conjunction with their advisor, will assemble a two-person committee to evaluate the MSE research progress. These evaluators are referred to as the student's "readers". 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 how they will present their essays; all essay and signature requirements are the same, regardless of method of presentation:

- a) **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.
- b) **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.

Upon completed presentation of the student's essay, a "Readers Letter" will be signed by the committee members and submitted to the Academic Program Coordinator with the checklist prior to graduation.

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.

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 receipt to the MSE Academic Program Coordinator as part of their graduation materials. The receipt will come in the form of an email titled, "**Your ETD submission is approved**".

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.

- 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

Students pursuing both their undergraduate and masters' degrees in ChemBE at JHU (or who have already received their BS in ChemBE at JHU) should be aware of the department's rules on double-counting courses.

- Up to **two courses** 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 Undesignated 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 with grades of B- or lower cannot be double-counted.
- Note that 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/>

Course Policy 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 both 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”. In these cases, students must still take the full number of required graduate-level credits (18 for essay/design-based students and 30 for course-based students).

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)	
EN.540.6xx	ChemBE Elective (Elective 4)
EN.xxx.6xx	Any-Department Elective (Elective 5)
EN.xxx.6xx	Any-Department Elective (Elective 6*)
EN.540.600	ChemBE Seminar (can be taken any semester)
EN.500.601	Lab Safety
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)
Semester 3 (Fall)	
EN.633.6xx	Technical Writing Elective (*can be Elective 6 if 3 cr eq)
EN.540.801	Graduate Research
Semester 4 (Spring)	
EN.540.801	Graduate Research

Example Course Schedule 2: Essay-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.540.600	ChemBE Seminar (can be taken any semester)
EN.500.601	Lab Safety
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.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)
Semester 4 (Spring)	
EN.540.801	Graduate Research

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)

ChemBE General Graduate Information

ChemBE Graduate Student Conflict Resolution

The Department of Chemical and Biomolecular Engineering tries to provide a supportive environment for its graduate students, but occasionally disagreements and problems occur, and students may need help in resolving an issue. The department recommends several options to help in finding resolution to such issues:

- 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, Paulette Clancy) who are prepared to help and can be contacted for their assistance:
 - o Director of Masters' Studies – Sakul Ratanalert
 - o MSE Academic Program Coordinator – Brett Weinstein
 - o Director of Masters' Admissions – Chao Wang

Students can also reach out for assistance beyond the department – there are several offices on campus that can assist in helping students resolve 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.

Residency Requirement

Students pursuing a 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.

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 people to contact for safety issues are:

1. ChemBE Faculty Safety Officer
Honggang Cui, hcu6@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

Johns Hopkins Policy Information

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

Registration

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 will be responsible for a late fee of \$150-\$300.

Students register over the summer in order 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 Credit Hours

All courses through the Whiting School of Engineering carry credit hours. Graduate Research carries a flexible credit hour assignment, and students should meet with their advisor to discuss the appropriate number of credit hours in which to enroll for Graduate Research, based on effort and time in the lab. Typically, full-time MSE students will register for 9-10 credit hours per semester and fulltime PhD students will register for 20 credit hours per semester. For more information, please visit <https://homewoodgrad.jhu.edu/academics/wse-graduate-credit-hours/>.

Graduate Board

The Graduate Board is responsible for the administration of University-wide policies and procedures for the award of Master of Arts; M.A.; and Doctor of Philosophy, Ph.D.

OIS Office of International Services

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.

Homewood Policies for 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/>

Department Information

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

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

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 at the GSLC Facebook: <https://www.facebook.com/ChemBEGSLC/> or Instagram: https://www.instagram.com/chembe_gslc_jhu/ for updates.

We are always looking for active and motivated representatives from each cohort of MSE students! If you are interested, please contact the GSLC president found at

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

Department Faculty

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/>

Department Staff

Our department staff is listed on our department website:

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

Students may contact the following Department staff for assistance:

MSE Academic Program Coordinator – registration problems, missing grades, access to documents in your application file, assistance understanding departmental and university policies, help with university paperwork, letters for leaving the country, financial hold, advisor holds, GSLC and graduate affairs.

Senior Research Analyst – budgets, policies, payroll questions, tuition/health insurance, expense accounts reimbursement, petty cash voucher, questions about lab budgets, turning in receipts, procurement card or purchasing questions, assistance with SAP.

Administrative Coordinator – reserve space for meetings or events, key requests, mailboxes, deliveries, assistance with copier.

Department Office and Mailing Address

Department of Chemical and Biomolecular Engineering
Maryland Hall 221
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.

The door to the mailroom will be locked after normal business hours; graduate students may request a key to that room, a laboratory, or workspace by filling out a Key Request Form located in 221. Keys may only be given to those students who have either completed the Safety Course, or watched the equivalent DVD and passed the safety test administered by the Administrative Secretary on a weekly basis. A multi-function photocopier is also available for student use in 224C 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.

Useful Contacts

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/>

Graduate Representative Organization (GRO)

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

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>

JHU Career Center

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