



JOHNS HOPKINS
UNIVERSITY
Chemical and Biomolecular Engineering

**Graduate MSE Student Handbook
2021 – 2022**

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Table of Contents

Important Contacts	2
Master of Science (MSE) Degree Program	5
All Students' Course Requirements	6
Core Courses	7
Preparatory Courses for Students without Degrees in ChemBE	8
Technical Writing Requirement.....	9
Good Academic Standing	9
COVID-19 P/F Policy (Spring 2020 and Fall 2020).....	9
Essay-Based Students	11
Additional Requirements for Essay-Based and Design-Based Students	11
Alternatives to Conducting Research On-Campus	11
INBT Industry Co-Op Program.....	11
Chemical Product Design Track (Design-based MSE).....	12
Research Advisor Selection Process.....	12
Essay Presentation.....	13
MSE Proficiency Requirement	13
Combined BS/MSE Program and Students with BS in ChemBE from Johns Hopkins	14
Double-Counting Policy	14
Course Policy Exemptions.....	14
Residency Requirement	15
Steps for Graduation	15
Example Course Schedules	16
Essay-Based Students with Degrees in ChemBE.....	16
Essay-Based Students without Degrees in ChemBE.....	16
Course-Based Students with Degrees in ChemBE.....	17
Course-Based Students without Degrees in ChemBE.....	17
ChemBE General Graduate Information	18
ChemBE Graduate Student Conflict Resolution	18
Laboratory Safety	19
Relevant Security and Safety Phone Numbers.....	19
Johns Hopkins Policy Information	20

Registration	20
Graduate Credit Hours.....	20
Graduate Board	20
OIS Office of International Services.....	20
Health Insurance.....	20
Department Information.....	21
Graduate Student Liaison Committee (GSLC).....	21
Department Faculty	21
Department Staff.....	21
Department Office and Mailing Address	22
Mail and Supplies Policies	22
Useful Contacts	23
Certificate of Departmental Approval.....	24
Homewood Policies for Academic Policies and Procedures.....	26

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).

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 the first semester: there is a mandatory Academic Ethics module and quiz embedded in the online orientation which is part of every graduate student's degree requirements and 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 a total of
 - 18 credits (for essay-based and design-based students), typically satisfied by six 3-credit courses,
 - 30 credits (for course-based students), typically satisfied by ten 3-credit courses, of graduate-level (i.e. 600-level and above) courses 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 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 may substitute one of their 3-credit courses with a combination of 1–2-credit courses taken for a letter grade (excluding seminars, independent studies, graduate research, or special studies). This typically applies to courses in taken through the Center for Leadership Education (CLE). (See "Technical Writing Requirement" below.)
 - Students are allowed to count 400-level courses towards their MSE degree only if (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.
- Minimum ChemBE course requirement: At least
 - 4 of the 6 courses (for essay-based and design-based students)
 - 6 of the 10 courses (for course-based students)must be in the Chemical and Biomolecular Engineering Department (EN.540.6xx or EN.545.6xx). Three of these courses are 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 as one of the four courses only if the course has significant ChemBE content, is 3 credits (or if the student intends to use their one allowable substitution on a set of courses that add up to 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 (EN.540.691 – EN.540.694), one per semester for 3–4 semesters. These courses do not count towards the 6 courses.

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 “Advanced 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
 - EN.540.673 “Advanced Chemical Reaction Engineering in Practice”, typically offered in the Fall semester.
 - With approval from the Director of Masters' Studies and the instructor, this course may be substituted for one of the following:
 - EN.540.602 “Metabolic Systems Biotechnology”
 - EN.540.615 “Interfacial Science with Applications to Nanoscale Systems” (not offered AY2021-22)
 - EN.540.632 “Projects in Design: Pharmacokinetics”
 - EN.540.638 “Advanced Topics in Pharmacokinetics and Pharmacodynamics I”
- Substitutions for the core courses are typically granted for students with backgrounds in ChemBE.
 - Between Core 1 and Core 2, only one of these two Cores may be substituted. (Students in the Combined 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 you have chosen our program to start your journey in ChemBE!
- To help you excel in the coursework, we recommend that you take some undergraduate-level courses to better prepare yourself 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. (Then you would take EN.540.671 “Advanced Thermodynamics in Practice” in the Spring, your second semester) **AND**
 - EN.540.203 “Engineering Thermodynamics”, typically offered both Fall and Spring semesters, recommended to be taken after EN.540.202 in your second semester (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. Then you would take EN.540.604 “Advanced Transport Phenomena in Practice in the Spring,” your 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 your first Spring semester. (Then you would take EN.540.673 “Advanced Chemical Reaction Engineering in Practice” in the Fall, your third 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.
 - 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 must take at least one technical writing elective (at least 1 credit) offered by the CLE at JHU. Often, this is taken in addition to the six or ten graduate-level courses, but students may choose to take 3 credits of writing as one of their any-department electives (one 3-credit course or two 1.5-credit courses, typically). These courses include
 - EN.663.622 Presentations for Graduate Students
 - EN.663.640 Writing Grants and Contracts
 - EN.663.644 Writing Articles and Technical Papers
 - EN.663.645 Improving Presentation Skills for Scientists and Engineers
 - Students who were Hopkins undergraduates are exempt from this requirement if they took 661.315 Culture of the Engineering Profession. (They must still take the full number of graduate-level credits, 18 or 30.)

Good Academic Standing

- Students must maintain a B average (GPA 3.0) in coursework to complete this degree.
- No D grade in ChemBE courses can be counted toward the requirements.
- In any given semester, an F, D, or two C grades will result in probation (C-, C, and C+ all count as C grades). Once on probation, any additional C+ grade or below will result in termination from the program. A student will remain on academic probation until the courses with the D or F have been retaken for a higher grade or, if no D or F grades were present, the student attains a B average in their coursework.

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

- On the degree conferral checklist, courses with a 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.

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 were Hopkins undergraduates are exempt from this requirement if they took EN.540.490 Introduction to Chemical Process Safety.
- 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/>.
- Students must maintain full-time registration for all semesters. In semesters where students are pursuing research, they may need to register for their advisor's research course (e.g. EN.540.801(xx)) for a number of credits equal to the difference between 9 and the number of other courses they are taking. (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 more 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 Hopkins 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 every six weeks for 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.

For more information, please visit <https://inbt.jhu.edu/masters/> or contact Camille Mathis (cmathis@jhu.edu).

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 track work in a group of 3–4 students on a product design project for 3–4 semesters instead of doing 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.

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 who is not affiliated with the department, the student must find a primary ChemBE faculty 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 the PhD thesis defense, 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. One member of the committee will be the student's advisor and the other ("second reader") will be chosen by the advisor and student among faculty (At least one of the two committee members should be affiliated with the ChemBE department). The essay should be provided to the advisor and second reader at least two weeks prior to the presentation date. The student will then present their work at an open seminar attended by the committee members, which will be publicized to the department. A reader's report will be signed by the advisor and submitted with the checklist prior to graduation. There is no closed examination period after the essay presentation.

A student, with their advisor's permission, may choose to substitute the standard MSE presentation with participation in **MSE Day**, a symposium held at the end of the Spring semester in which MSE students give 20-min presentations to other participants and attending faculty, followed by a 10-min period for questions. Both the advisor and second reader are expected to attend this presentation, and all essay and signature requirements are still the same, regardless of method of presentation.

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. The coursework portion of the student's graduation checklist must be approved by the Director of Masters' Studies prior to the essay presentation. Students should send the abstract and title of the 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.

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.

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 have instructor approval.
- Students with Combined BS/MSE status do not need instructor approval, but still need to meet prerequisites prior to taking graduate-level courses.

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 does 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 can be counted for both 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 and 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. Students need not use one of their two double-counted courses on these courses. They must still take the full number of graduate-level credits (18 for essay- and design-based students and 30 for course-based students).

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 those who enter a WSE Masters' degree program after two or fewer semesters following completion of a JHU undergraduate 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

Essay-Based Students with Degrees in ChemBE

Semester	Course No.	Course Name
Fall (Sem 1)	EN.540.673	Adv Chemical Reaction Engineering in Practice (Core 3)
	EN.540.6xx	ChemBE Elective (Elective 4)
	EN.xxx.6xx	Any-Department Elective (Elective 5)
	EN.540.600	ChemBE Seminar (can be taken any semester)
	EN.500.601	Lab Safety
Spring (Sem 2)	EN.540.671	Advanced Thermodynamics in Practice (Core 1)
	EN.540.604	Advanced Transport Phenomena in Practice (Core 2)
	EN.xxx.6xx	Any-Department Elective (Elective 6*)
Fall (Sem 3)	EN.633.6xx	Technical Writing Elective (*can be Elective 6 if 3 cr eq)
	EN.540.801	Graduate Research
Spring (Sem 4)	EN.540.801	Graduate Research

Essay-Based Students without Degrees in ChemBE

Semester	Course No.	Course Name
Fall (Sem 1)	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
Spring (Sem 2)	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)
Fall (Sem 3)	EN.540.673	Adv Chemical Reaction Engineering in Practice (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)
Spring (Sem 4)	EN.540.801	Graduate Research

Course-Based Students with Degrees in ChemBE

Semester	Course No.	Course Name
Fall (Sem 1)	EN.540.673	Adv Chemical Reaction Engineering in Practice (Core 3)
	EN.540.6xx	ChemBE Elective (Elective 4)
	EN.540.6xx	ChemBE Elective (Elective 5)
	EN.xxx.6xx	Any-Department Elective (Elective 7)
	EN.540.600	ChemBE Seminar (can be taken any semester)
Spring (Sem 2)	EN.540.671	Advanced Thermodynamics in Practice (Core 1)
	EN.540.604	Advanced Transport Phenomena in Practice (Core 2)
	EN.xxx.6xx	Any-Department Elective (Elective 8)
	EN.xxx.6xx	Any-Department Elective (Elective 9)
Fall (Sem 3)	EN.540.6xx	ChemBE Elective (Elective 6)
	EN.xxx.6xx	Any-Department Elective (Elective 10*)
	EN.633.6xx	Technical Writing Elective (*can be Elective 10 if 3 cr eq)

Course-Based Students without Degrees in ChemBE

Semester	Course No.	Course Name
Fall (Sem 1)	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)
Spring (Sem 2)	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)
Fall (Sem 3)	EN.540.673	Adv Chemical Reaction Engineering in Practice (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)
Spring (Sem 4)	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:
 - Director of Masters' Studies – Sakul Ratanalert
 - 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.

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 concurrent BS/MSE students 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 will be conducted by the departmental faculty safety officer and university safety officer, respectively. 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/>.

Health Insurance

All graduate students are required to carry sufficient health insurance. The University offers a low-cost health insurance plan for and the Department covers 100% of the expense for all PhD students. Masters are offered a reduced cost of \$250.

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.

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:

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 Secretary – reserve space for lab meetings, 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/>

Certificate of Departmental Approval

Master of Science in Engineering Degree Program in Chemical and Biomolecular Engineering

Degree Type (mark one): Essay-based Course-based Design-based

Name: _____ JHED ID: _____

JHU e-mail address: _____ non-JHU e-mail address: _____

Faculty Advisor: _____ Graduation Date (semester/year): _____

Plans after graduation (specific employer or institute if known. Indicate “Looking for [job in industry / PhD program / other]” if you are still searching.)

Undergraduate institution: _____ Undergraduate major: _____

Six graduate-level courses (min of four in ChemBE 540.6XX) if essay-based or design-based.

Ten graduate-level courses (min of six in ChemBE 540.6XX) if course-based.

On right, - Indicate number of credits if course is not 3 credits.

- Mark “D” if course is double-counted with BS degree at JHU. (Attach undergraduate transcript.)

- Mark “T” if course is transferred from another institution. (Attach transcript from institution.)

	Course No.	Course Title	Grade	Sem/Yr	
Core 1: One req	EN.540.671	Advanced Thermodynamics in Practice			
	EN.540.630	Thermodynamics & Statistical Mechanics			
Core 2: One req	EN.540.604	Adv Transport Phenomena in Practice			
	EN.540.652	Advanced Transport Phenomena			
Core 3: Min one required	EN.540.673	Adv Chemical Reaction Eng in Practice			
	EN.540.602	Metabolic Systems Biotechnology			
	EN.540.615	Interfacial Science w/ App to Nano Syst			
	EN.540.632	Projects in Design: Pharmacokinetics			
	EN.540.638	Adv Topics in Pharmacokinetics and Pharmacodynamics I			
<i>Technical writing?</i>	<i>Use below this line for electives and Product Design courses. List ChemBE courses first. Indicate on left if the course satisfies the technical writing req. (EN.661.315 satisfies if taken as an undergraduate and does not count towards the two allowed double-counted courses. Attach undergraduate transcript if so.)</i>				

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/>