



**JOHNS HOPKINS**  
UNIVERSITY  
**Chemical and Biomolecular Engineering**

**Graduate MSE Student  
Handbook 2019-2020**

**(Updated August 2019)**

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## M.S.E. Degree Program

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

1. A research-intensive MSE in which students take 6 courses (3-credit hours see below for more details) and undertake original research. The end product of the research is in the form of an MS Essay. This option typically takes 4 semesters and the intervening summer to complete. It can be shorter for students who have begun working on their research project while an undergraduate or for students doing the Co-op program with INBT.
2. A coursework-only degree in which students take 10 graduate-level courses (3 credit hour, see below for more details). This usually can be completed in 2 or 3 semesters.
3. A Chemical Product Design program. This is a new pilot program in 2019-20.
4. A Master of Science in Engineering Management (MSEM). Students can combine courses in Chemical and Biomolecular Engineering with those in management; see <https://msem.engineering.jhu.edu>. This program is administered by the Center for Leadership Education. dn.

### 1. Master of Science in Engineering (requiring an essay) Checklist

- The student must complete six graduate-level, i.e., 600-level and above, courses approved by the student's research advisor and the Director of the Master's Program. The student and research advisor will select these courses to design a curriculum appropriate for the student's research interests and educational goals.
- These six courses cannot include seminars, independent study, graduate research or special studies. They should be at least 3 credit hours per course (or equivalent). Students are allowed to substitute any combination of 1-2 credit hour courses (not to include seminars, independent study, graduate research, or special studies) for one of their 3 credit hour courses. Students in the Design track cannot count product design courses toward their course requirements.
- At least four of the six courses must be in the Chemical and Biomolecular Engineering Department (540.xxx or 545.xxx). Exceptions to this rule are very rare and must be approved by the Director of the Master's Program. 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 Chemical and Biomolecular Engineering content, is 3 credit hours (or the student intends to use their one allowable substitution on a set of courses that add up to three credit hours), and is consistent with the student's research interests or educational goals.
- Of the four ChemBE courses, 3 must be the MSE core courses:
  - 540.630 Thermodynamics, Statistical Mechanics, and Kinetics (Fall) or 540.671 Advanced Thermodynamics in Practice (Spring). You need approval from the Director of the Master's program or the instructor to take 540.630.
  - 540.652 Advanced Transport Phenomena (Fall), or 540.604 Transport Phenomena in Practice (Spring). You need approval from the Director of the Master's program or the instructor to take 540.652.
  - One of the following: a) 540.615 Interfacial Phenomena with Applications to Nanoscale Systems, b) 540.602 Metabolic Engineering, c) 540.673 Advanced Chemical Reaction Engineering in Practice (Spring), d) 540.632 Project in Design: Pharmacokinetics, e) 540.638 Advanced topics in Pharmacokinetics.

Note: Students without a ChemBE background must consult with the Director of the Master's program or their academic advisor about their course selection. In most cases, they will have to take undergraduate-level courses in process analysis, thermodynamics, and transport phenomena before taking the graduate courses. Students without a ChemBE background must

- also take Advanced Chemical Reaction Engineering in Practice as one of their course core courses.
- Of the (up to) two non-ChemBE courses, students may choose courses, in conjunction with their advisor, from among the many graduate courses offered through Johns Hopkins from technical or non-technical areas.
- Students starting in Fall 2019 or later are required to take 1-2 technical or writing courses offered by the CLE in their second year at JHU. Students who started prior to Fall 2019 are strongly recommended to take a technical writing course in their second year. These courses include: Presentations for Graduate Students, EN 663.622, Improving Presentation Skills for Scientists and Engineers, EN 663.645. Writing Grants and Contracts, EN 663.640 and Writing Articles and Technical Papers, EN. 663,644. In addition students can also enroll in Culture of Engineering.
- Students are allowed to count 400-level courses towards their MSE degree *if* (1) the course is not offered at the 600-level and (2) if the department offering the course considers it to be a graduate-level course in their program. 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 student must also enroll in at least one semester of graduate seminars (540.600/601) throughout their tenure.
- Students must maintain a B average in coursework to complete this degree.
- No D grade in ChemBE courses can be counted toward the requirements. In any given semester, a D, F or two C grades will result in probation (C-, C, and C+ count as a C-grade). Once on probation, any additional C grade will result in termination from the program. A student will remain on academic probation until the courses with the D or F grades have been re-taken for a higher grade or (if no D or F grades were present) the student attains a B average in their coursework.
- Students must remain in good research standing with their research advisor. Failure to do so will result in probation and transfer to the coursework MSE program.
- The student must write an essay based on original research and literature review and present their results at an open seminar attended by the faculty and students. The essay must be approved by the departmental graduate committee, which consists of the graduate research advisor and at least one more faculty member from the Department of Chemical and Biomolecular Engineering. More details on the essay are provided below.
  - In a semester where the student is pursuing research (regardless of other academic coursework), the student must maintain full-time registration.
  - Completion of EN500.601
  - Completion of Responsible Conduct of Research training. For complete information, see [eng.jhu.edu/wse/page/conduct-of-research-training](http://eng.jhu.edu/wse/page/conduct-of-research-training)

\* Many departments consider courses numbered 400- and above to be graduate-level courses. Please obtain verification and approval to take the course before registering.

## 2. Master of Science in Engineering (coursework-only) Checklist

- The student must complete ten graduate-level, *i.e.*, 600-level and above, courses that are approved by the Director of the Master's program. These courses must be worth 3 credit hours per course. The student and the academic advisor will select these courses to design a curriculum appropriate for the student's interest and educational goals.
- Of the four ChemBE courses, three must be MSE core courses:
  - One of the following: a) 540.615 Interfacial Phenomena with Applications to Nanoscale Systems, b) 540.602 Metabolic Engineering, c) 540.673 Advanced Chemical Reaction Engineering

in Practice (Spring), d) 540.632 Project in Design: Pharmacokinetics, e) 540.638 Advanced topics in Pharmacokinetics.

Students must maintain a B average in coursework to complete this degree.

These ten courses cannot include seminars, independent study, graduate research or special studies.

At least six of the ten courses must be in the Chemical and Biomolecular Engineering Department (540.6xx and 545.6xx). Exceptions to this rule must be approved by the Director of the Master's Program. A course from a department other than ChemBE may be allowed to count as one of the six courses only if the course has significant Chemical and Biomolecular Engineering content and is consistent with the student's educational goals and is 3 credit hours. Students are allowed to substitute any combination of 1-2 credit hour courses (not to include seminars, independent study, graduate research, or special studies) for one of their 3 credit hour courses.

Of the six ChemBE courses, 3 must be the core courses:

- 540.630 Thermodynamics, Statistical Mechanics, and Kinetics (Fall 2018) or 540.671 Advanced Thermodynamics in Practice (Fall 2017)
- 540.604 Transport Phenomena in Practice (Spring)
- 540.673 Advanced Chemical Reaction Engineering in Practice (Spring)

Students without a ChemBE background can consult with the Director of the Master's program about the possibility of taking a graduate version of 540.204 Applied Physical Chemistry in the Spring semester if they do not feel prepared for 540.630

Of the (up to) 4 non-ChemBE courses, it is recommended that students take 2 technical and 2 non-technical courses, to be chosen in cooperation with their advisor.

Students are allowed to count 400-level courses towards their MSE degree **if** (1) the course is not offered at the 600-level and (2) if the department offering the course considers it to be a graduate-level course in their program. 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 student must also enroll in at least one semester of graduate seminars (540.600/601) throughout his or her tenure in the Department of Chemical and Biomolecular Engineering at Johns Hopkins University.

Students must have a B average in coursework to complete this degree.

No D grade in ChemBE courses can be counted toward the requirements. In a given semester, a D, F or two C grades will result in probation. Once on probation, an additional C grade will result in the student being terminated from the program. A student will remain on academic probation until the courses with the D or F grades have been re-taken for a higher grade or (if no D or F grades were present) the student attains a B average in their coursework.

### 3. INBT Industry Co-Op Program

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

ChemBE students have the opportunity to choose the Co-Op program as an alternative to the inter-institutional research or the course-based degree. At the end of the Co-Op internship, the student will complete an essay and present their results at an open seminar.

Each student, who is accepted to the program, will be assigned a faculty advisor and a research advisor/mentor at the sponsoring company. The company is expected to develop a list of goals and development objectives for the student. During the 6-month Co-Op period, students will meet with

the faculty academic advisor every 6 weeks for progress updates.

For more information, please go to: <http://inbt.jhu.edu/education/masters/> or contact Camille Mathis at [cmathis@jhu.edu](mailto:cmathis@jhu.edu) or Luke Thorstenson at [lthorst1@jhu.edu](mailto:lthorst1@jhu.edu).

#### 4. Chemical Product Design tracks

This Department is piloting two new options for Master's students. Chemical and Biomolecular Engineering MSE students doing an Essay and students doing an MSEM can choose to focus on Chemical Product Design rather than on traditional engineering science.

- Students in the Essay program have the same course requirements as students doing research, but work in a group of 3 or 4 students on a product design project for 3 to 4 semesters instead of doing research.
- The group collectively writes a patent application and a value proposition for their product in lieu of a traditional research MS Essay.
- Students in the MSEM program take 3 engineering science courses and typically work on their product design project for 3, or 4 semesters.

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

- The first semester will be devoted to exploring how to develop new product ideas and to developing 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.

#### 5. Research Advisor Selection Process (Essay-based MSE)

Most graduate students do not arrive assigned to a faculty research advisor. The selection and assignment process will take place during the first semester. MSE students who are interested in pursuing the Essay track must inform the Director of the Master's program of their interest at the beginning of the Fall semester. A list of available research projects for MSE students will be made available and be 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. The list will be updated as positions are filled. Should a student interested in a lab placement be unable to arrange one by the end of December, the Director of the Master's Program will work with that student to arrange placements where possible. Students without a research advisor at the start of the spring semester of their first year will be enrolled in the coursework-based MSE. MSE students can do their research with any primary ChemBE faculty or with faculty with secondary appointments. If a student wants to pursue a project with a faculty who is not affiliated with the Department, the student must find a ChemBE primary faculty to sponsor the project. Students should consult with the Director of Master's study to find a faculty sponsor.

#### 6. Essay Presentation

The MSE essay presentation is similar to the Ph.D. thesis defense (without the GBO part). 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 will be chosen by the advisor from among the ChemBE faculty (or, in cases approved by the director of the MSE program, a faculty member from another department). The essay should be provided to the advisor at least two weeks prior to the presentation date. It will then be presented 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.

Students should contact the 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 students' graduation checklist must be approved by the Director of the MSE program prior to the essay presentation. Students should send the abstract and the title of the essay to the Academic Program Coordinator at least two weeks before the presentation date.

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

Refer to the *Guidelines for the Preparation of Dissertations and Theses*, which can be found online: <http://www.library.jhu.edu/services/cbo/diss.html>

## **7. M.S.E. Proficiency Requirement**

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

## **8. B.S./M.S.E. Program Policy on Double-Counting**

Students pursuing both their undergraduate and master's degrees 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 Master's degree. This cannot be changed after the fact. If B.S./M.S.E. students take more than two 600-level course and do not need them for the B.S. graduation requirements, they can count them toward the completion of their M.S.E. degree. Courses with grades of B- or lower cannot be doubled-counted. The undergrad student must register for the course with a paper registration slip signed by the instructor and submitted to the registrars. Thus, the ChemBE graduate program's policy on double-counting courses is stricter than the WSE policy found here: [eng.jhu.edu/wse/page/graduate-double-counting/](http://eng.jhu.edu/wse/page/graduate-double-counting/)

## **9. Residency requirement**

Students pursuing a MSE degree are subject to the WSE residency requirement (<https://engineering.jhu.edu/graduate-studies/academic-policies-procedures-graduate/>). 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 bachelor's-master's degree students are exempt, as are those who enter a WSE master's degree program after two or fewer semesters following completion of a JHU undergraduate degree.)

## **10. Steps for Graduation**

- Notify the Academic Program Coordinator **before your final** semester if you intend to graduate; scheduling of essay can take up to 6 weeks and other important materials need to be exchanged.
- Contact OIS if you are an international student. OPT applications must be created 3 months before completion.
- 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 degree.

## ChemBE General Graduate Information

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### 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 could talk to their advisor.
- The student could 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 Departmental Head, Paulette Clancy) who are prepared to help and can be contacted for their assistance:
  - Director, Master's Program – Joelle Frechette
  - Director, Graduate Admissions – Efi Kokkoli

Students can also reach out for assistance beyond the department- there are several offices on the 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: Chao Wang, 410-516-5843, cwang78@jhu.edu

2. Homewood Laboratory Safety Advocate: Daniel R. Kuespert, (410) 516-5525,  
[dkuespert@jhu.edu](mailto: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/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/graduate-studies/>

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### **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, he or she 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 about graduate credit hours, please visit <http://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 the website: <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/>

**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 work space 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](mailto:engineering@jhu.edu) e-mail addresses.

### **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 committee also organizes social and athletic events that bring together faculty, graduate students, and undergraduates on a regular basis. See the GSLC Facebook page for updates:

<http://www.facebook.com/groups/344261771592>

### **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/joint-appointments/>

## Useful Contacts

### Office of the Registrar

<https://studentaffairs.jhu.edu/registrar/>  
75 Garland Hall

### JCard Services (JHU student ID)

<http://www.idcs.jhu.edu/>  
51 Garland Hall

### Student Financial Services

<http://www.jhu.edu/finaid>  
146 Garland Hall

### Student Accounts

<http://www.jhu.edu/studacct>  
31 Garland Hall

### Office of Student Disability Services

<http://web.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/>

### 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/>

### 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: 4105167777  
Security office: 4105164600

### Safety Escort Services

Phone: 4105164600

### JHU Transportation services (including parking)

<http://ts.jhu.edu>

### Barnes & Noble Bookstore

<http://johns-hopkins.bncollege.com>  
JHU Charles Commons

## Certificate of Departmental Approval

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

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

Name: \_\_\_\_\_ JHED ID: \_\_\_\_\_

JHU email address: \_\_\_\_\_ non-JHU email address: \_\_\_\_\_

Faculty Advisor: \_\_\_\_\_

Graduation Date (semester/year): \_\_\_\_\_

Plans after graduation (specific employer or institution if known):  
\_\_\_\_\_

Undergraduate institution: \_\_\_\_\_

Undergraduate major: \_\_\_\_\_

Six graduate level courses (minimum of four in ChemBE 540.6XX) if essay-based Ten graduate level courses (minimum of six in ChemBE 540.6XX) if course-based.

	Course	Course Title	Grade	Sem/Year
One required	545.671	Advanced Thermodynamics in Practice		
	540.630	Thermodynamics, Statistical Mechanics, and Kinetics		
One required	540.652	Advanced Transport Phenomena		
	540.673	Transport Phenomena in Practice		
Min one required	540.604	Advanced Chemical Reaction Engineering in Practice		
	540.602	Metabolic Systems Biotechnology		
	Metabol540.615	Interfacial Phenomena with Applications Systems		
	540.638	Advanced Topics in Pharmacokinetics		
	540.632	Project in Design: Pharmacokinetics		
<i>Use below this line on this chart for electives</i>				


**Minimum of one semester of graduate seminar**

Course No.	Course Title	Grade	Sem/Year

**Essay-based students must complete this box:**

Safety course EN.500.601 (EN.500.401 or EN.540.490 if taken as an undergraduate) and Responsible Conduct of Research

Course No.	Course Title	Grade	Sem/Year

Research presentation date and location: \_\_\_\_\_

\_\_\_\_\_  
Committee member Signature

\_\_\_\_\_  
Date

Written essay, approved by the advisor, and submitted to the ETD

**Essay Title:**

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**Notes:**

- A) All courses must be completed with an average grade of B.
- B) When this checklist has been completed (TYPED, not handwritten), it should be returned to the mailbox of the Academic Program Coordinator.

This is to certify that \_\_\_\_\_ has satisfied all of the academic requirements laid down by the Department for granting a Master of Science in Engineering Degree in the Department of Chemical and Biomolecular Engineering.

\_\_\_\_\_  
Advisor's Signature

\_\_\_\_\_  
Date

## **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/>**

## Notes

## Notes