



RICE UNIVERSITY

School of Engineering

*Department of Bioengineering*

Graduate Student Handbook  
Effective August 16, 2020

## Approvals

---

**Gang, Bao, PhD**

Date

Department Chair &  
Foyt Family Professor of Bioengineering  
Professor of Chemistry  
CPRIT Scholar in Cancer Research

---

**Michael Diehl, PhD**

Date

Associate Professor of Bioengineering & Chemistry  
Director of Bioengineering Graduate Studies  
Chair, PhD Affairs Committee

---

**K Jane Grande-Allen, PhD**

Date

Isabel C. Cameron Professor of Bioengineering  
Co-Chair, Professional Masters Affairs

---

**Tomasz Tkaczyk, PhD**

Date

Professor of Bioengineering & Electrical and Computer Engineering  
Co-Chair, Professional Masters Affairs

---

**Matthew Wettergreen, PhD**

Date

Associate Teaching Professor at the Oshman Engineering Kitchen (OEDK)  
Director of the Global Medical Innovations (GMI) Program

## TABLE OF CONTENTS

---

<b>Purpose of Handbook .....</b>	<b>5</b>
<b>Graduate Programs.....</b>	<b>6</b>
<b>General Guidelines (Relevant to all Graduate Students .....</b>	<b>7</b>
Student Responsibilities.....	7
Standards of Conduct & Honor Code.....	7
Deadlines .....	7
Residency and Enrollment Requirements .....	7
Non-course Training .....	8
Transfer Credit .....	8
Prerequisite Requirements .....	9
Course Registration.....	10
Academic Standing.....	11
Grading Procedures .....	11
Interruption of Studies.....	11
Dispute Resolution.....	11
Grievances .....	12
Problem Resolutions.....	12
Outside Employment .....	13
Transfer Between Programs .....	13
Transferring Departments .....	14
Second Degree Program .....	14
Ethical Concerns.....	14
Equal Opportunity Notice .....	13
<b>Program Guidelines: Doctor of Philosophy (PhD)</b>	
Introduction and Program Learning Outcomes .....	15
Research and Scholarly Activities .....	15
PhD Curriculum Requirements .....	15
Academic Requirements.....	16
Academic Waivers.....	17
Specific Requirements for MD/PhD Students.....	17
First Semester Advisor .....	17
Lab Rotation and Choosing a Thesis Advisor .....	18
Waiver Rotations .....	19
Financial Support .....	19
Non-Scheduled Absences .....	20
Holiday and Vacation Time .....	21
Teaching Requirement.....	22
Thesis Committee and Proposal .....	23
Internship Opportunity .....	25
Presentation of Research.....	26
Progress Review and Evaluations .....	26
Satisfactory Performance .....	27

Changing Advisor/Lab During PhD Studies .....	27
Probationary Status/Possible Dismissal Due to Academic Grades .....	27
Probation/Dismissal for Inadequate Progress in Program .....	28
Change in Advisor for Reason Other than Inadequate Progress in Research.....	28
Approval of Candidacy .....	29
Oral Examination in Defense of Thesis .....	29
Acceptance of Thesis .....	30
Degree Conferral and Commencement.....	30
August and December Degree Candidates .....	30

**Professional Masters Degree (MBE) General Guidelines**

Introduction .....	31
Requirements .....	31
Areas of Specialization.....	31

**Professional Masters Degree (MBD) – Bioengineering Applied Bioengineering**

Program Learning Outcomes for the MBE Degree, Applied Bioengineering.....	32
Transfer of Credits to Graduate Degree .....	32
Satisfactory Progress .....	32
Academic Guidance .....	33
Time to Degree .....	33
Graduation .....	33

**MBE Applied Bioengineering Specialization (Course-Based Concentration)..... 34**

Requirements .....	34
BIOE 506 Graduate Independent Study.....	35

**Applied Bioengineering Specialization (Research-Based Concentration ..... 36**

Requirements .....	36
Course Requirement Specifics .....	36
Research Aspects .....	37

**Professional Master’s Degree – Global Medical Innovation Track**

Overview .....	38
Program Learning Outcomes for the Global Medical Innovation Track .....	38
Requirements for the Global Medical Innovation Track .....	38

Table 1 Approved Bioengineering Courses.....	40
--	----

**Master of Science (Thesis Based)..... 41**

## Purpose of Handbook

---

This handbook outlines the policies and procedures of the Department of Bioengineering (BIOE) graduate programs. Topics covered include expectations, new and current student information, registration, finances, degree requirements, campus resources, institutional processes, and graduation information. Note: Some of these policies may be changed or adjusted by the department to adapt to the COVID19 pandemic. Such changes will be handled by the Graduate Director, The Graduate Academic Affairs Committee, and the Department Chair.

The policies outlined in this document apply to all of the academic programs supported by the department including the PhD, MD/PhD, MS, and MBE (Applied Bioengineering and Global Medical Innovation tracks). This handbook supplements the *General Announcements*, the policies and procedures of the Office of Graduate and Postdoctoral Studies and other Rice policies relevant to graduate students. It is the student's responsibility to be familiar with the rules, procedures, and requirements of the Bioengineering Department and the sources mentioned above. In cases where there is conflicting information, university-wide regulations take precedence over department-wide regulations, which take precedence over research group-wide regulations. It is ultimately the student's responsibility to know and follow all policies and timelines to allow for a timely graduation. When in doubt, the student should seek help first at the graduate program (department) level (academic program administrator, director/chair of their specific program, director of graduate studies, and/or department chair) and then at the central administration level (Office of Graduate and Postdoctoral Studies).

In case of error, omission, or conflict, policies of the Rice *General Announcements* supersede those stated within this handbook. If the policies of the program change during a student's tenure at Rice University, the student may elect to continue studies under the complete set of policies in place at the time of matriculation or may choose to follow the updated policies in full. A student may not combine or delete regulations from the two sets of policies. If a student elects to follow updated policies in lieu of the policies of the year he or she matriculated, the Academic Program Administrator should be notified so the student's record can be updated.

In rare cases, the faculty may apply a new regulation to all students who have not passed a specific milestone (e.g., candidacy) in their program if such a change will not materially affect the progress of the students. Students will be notified of such revisions. The Graduate Academic Affairs Committee reserves the right to correct grammatical or typographical errors in these policies at any time without notifying students.

## Graduate Programs

---

The department offers the following degrees:

Professional Masters in Bioengineering

Applied Bioengineering Track: Students are accepted for fall and spring admission  
 Global Medical Innovation Track: Students are accepted for fall admission only

Master of Science in Bioengineering

Students are only considered for and admitted to the doctoral level program. The Masters of Science degree in Bioengineering is offered only under special circumstances and when it is in the doctoral student's best interest to not continue in the doctoral program

PhD in Bioengineering

Student is accepted for fall admission only.

Doctor of Medicine/Doctor Philosophy (MD/PhD)

Students must be accepted into the MSTP program at Baylor College of Medicine prior to being accepted into the Bioengineering PhD program.

<u>Program</u>	<u>Enrollment</u>	<u>Est. Time to Completion</u>
<u>Master in Bioengineering, Applied Bioengineering, (Course Based Concentration) (MBE-APL)</u>	Fall & Spring Semesters	12-18 Months
Master in Bioengineering Research Based Concentration (MBE-RCH)	Fall & Spring Semesters	18-24 Months
Master in Bioengineering Global Medical Innovation (MBE-GMI)	Fall Semester Only	12 Months, including summer internship prior to fall enrollment
Master of Science in Bioengineering	Department permission only and only to PhD students with special circumstances	Varies, depending on when student transitioned to MS program
Doctor of Philosophy in Bioengineering	Fall Only	Varies, 4 ½ to 5 years

## General Guidelines (Applies to All Graduate Students)

---

### **Student Responsibilities**

Students are responsible for meeting all university and program requirements for their chosen program. In addition to agreeing with the regulations stated in this handbook, students must agree with the General Announcements (<http://ga.rice.edu/>)

### **Standards of Conduct & Honor Code**

Students are expected to live up to the high standards Rice sets for its community members, as described in the Code of Student Conduct. Graduate students should follow the Code of Student Conduct at all times. Information on the Code of Conduct can be found at: <https://sjp.rice.edu/code-of-student-conduct>. Bioengineering graduate students are bound by the Honor Code. Information regarding the honor code can be found at <https://gradhonor.rice.edu/>.

### **Deadlines**

Students must observe all deadlines listed in the Academic Calendar, General Announcements, and program guidelines. Although efforts will be made to alert students to deadlines, it is ultimately the student's responsibility to know pertinent deadlines.

### **Residency and Enrollment Requirements**

<b>Program</b>	<b>Residency</b>	<b>Type Study</b>
PhD Program	4 full time semesters (Fall & Spring)	Full Time Study 9 credit hours
Masters of Science	1 full time semester (Fall or spring)	Full Time study 9 credit hours
Masters in Bioengineering (Applied Bioengineering)	1 semester of full or part time study (Fall or Spring)	Full or part time study Part-time requires minimum of 3 credit hours
Masters in Bioengineering (Global Medical Innovation)	1 semester of full time study & internship during summer or spring	Full time study 9 credit hours Internship must be 6 credit hours.

### **Continuous Enrollment**

Students are expected to maintain continuous enrollment as required by their program unless an official leave of absence has been granted. Failure to register without a leave of absence granted by the Dean of Graduate and Postdoctoral Studies constitutes *de facto* withdrawal.

If a student withdraws and later wishes to resume study, reapplication is required. Readmission is given only on the recommendation of the department and with the approval of the Dean of Graduate and Postdoctoral Studies.

### International Students

International students must consult with the Office of International Students and Scholars (OISS) about the possible impact on their visa status if dropping below a full- time status.

### **Non-course Training**

Graduate students are expected to complete specific non-course training courses required by the university. These training courses must be completed no later than September 30, 2020.

Training	Link
Lab Safety Training	<a href="https://graduate.rice.edu/applicants/after-admission/training">https://graduate.rice.edu/applicants/after-admission/training</a>
Preventing Sexual Harassment	<a href="https://graduate.rice.edu/applicants/after-admission/training">https://graduate.rice.edu/applicants/after-admission/training</a>
Responsible Conduct in Research	<a href="https://graduate.rice.edu/applicants/after-admission/training">https://graduate.rice.edu/applicants/after-admission/training</a>

### **Transfer Credit**

Students may apply for transfer credit for graduate-level courses taken at Rice or other institutions. There is no specific deadline for transferring credits, however, students are encouraged to request transfer credit at the beginning of their graduate program in order to determine their remaining requirements.

Courses taken at another accredited college or university are not automatically approved for transfer credit. Transfer credit is only granted with the approval of the appropriate Committee. Students must submit a petition to the following:

- PhD students: Graduate Academic Affairs Committee
- MBE, Applied Bioengineering track: Master’s Affairs Committee
- MBE, Global Medical Innovation track: Master’s Affairs Committee

### General Guidelines

- Courses must be from a regionally accredited U.S. institution or an international Institution officially recognized by that country’s Ministry of Education or equivalent.
- A student must have made a grade of B- or equivalent in the course to petition for it to transfer to their graduate program transcript.
- The number and type of credits that may be transferred differ from program to program. Refer to the section on transfer of credits in the program specific guidelines to determine how many and what type of credits an individual program allows. The following apply:
- No course can be used to satisfy both an undergraduate and graduate degree requirement.
- The courses to be transferred must be chosen from those that normally satisfy requirements for an advanced degree.
- Each case must be individually approved by the Graduate Academic Affairs Committee or the Master’s Admission and Affairs Committee based on the work done.
- Students may not count a course if the course is substantially the same as one already counted toward the degree requirements. The decision as to whether a course is “substantially the same” will be made by the appropriate committee. (Graduate Academic Affairs Committee or Masters Admission and Affairs Committee).
- Students with Advanced Degree  
If a student is entering Rice with a master’s degree he or she may petition, the appropriate committee to receive credit for graduate courses taken.

## **Prerequisite Requirements**

If a student does not have evidence on their undergraduate transcript that they have received credit for the required prerequisite courses, the student must take these courses in addition to their program curricula. MBE students must take prerequisite courses prior to graduating with an MBE degree. PhD students are encouraged to take prerequisite courses during their first semester, and must do so within the first two years of study.

Required Prerequisites include:

- Fundamentals of Systems Physiology (suggested: BIOE 322, BIOE 302 and BIOE 381)
- Cell or Physical Biology (suggested: BIOC 341 and Physical Biology 502)
- Statistics (any 400 level or above statistics course is acceptable. Students who take a 500 or above statistics course may use this course to satisfy both the prerequisite and degree requirement.
- PhD students are encouraged to take BIOE 539 to satisfy both the prerequisite and the degree requirement for a MATH/STAT/CAMM course.

For the purposes of meeting a prerequisite requirement, prerequisite courses other than bioengineering courses may be taken for a standard letter grade or pass/fail. If a course is taken pass/fail the work is graded using the standard letter grading system during the course of the semester. Students will receive a grade of “pass” if they earn a grade of A, B, C, or D. If the student earns a grade of F, this appears on their transcript as an “F” and counts toward the semester and cumulative GPA. University policy does not allow graduate students to take a course offered by their home department on a pass/fail basis. All BIOE courses must be taken for a standard letter grade regardless of the reason for taking the course.

## **Course Registration**

University policy requires students to maintain student status throughout their career at Rice University.

- PhD students are expected to register for the fall, spring, and summer semesters. Students who have completed all class-room based courses should register for Graduate Research (BIOE 500) for a minimum of nine credit hours in the fall and spring semesters and a minimum of six credit hours during the summer semester. Students who are registered for fewer than nine hours in fall and spring, or fewer than six hours in summer will not be eligible for a student stipend. Students who do not receive a stipend are responsible for payment of their tuition.
- Students in the MBE Applied Bioengineering track are not required to register during the summer.
- Students in the MBE Global Medical Innovation track are expected to register for BIOE 600 (internship) the summer prior to their first full (fall) semester.
- All students are responsible for registering for courses and reviewing and confirming course selection is correct based on their degree requirements. Registering for courses is done through ESTHER. Instruction can be found at [https://registrar.rice.edu/students/reg\\_instructions/](https://registrar.rice.edu/students/reg_instructions/).
- Courses Requiring Special Registration

There are instances when students are not allowed to register via ESTHER. Examples include:

- closed courses that have reached their maximum enrollment,
- closed courses requiring departmental or instructor permission,
- prerequisite override,
- audit,
- late add
- late dropping a course
- In such instances, the student is required to submit a Special Registration Form. The Special Registration form can be found at [http://registrar.rice.edu/online\\_forms/](http://registrar.rice.edu/online_forms/).

- Double-Booking/Overlapping Courses  
Double booking or overlapping of courses is prohibited by the department. In the case of PhD students, if teaching assistant duties, another course, or other unavoidable circumstances conflict with colloquia (BIOE 699/698) the student should delay colloquia registration until the following semester.
- Inter-institutional Courses  
Under certain circumstances, inter-institutional courses may be taken at participating institutions including Baylor College of Medicine, University of Texas Health Science Center at Houston, University of Texas Medical Branch at Galveston, and the University of Houston. The inter-institutional graduate student registration form and instructions required for these courses can be found at [http://registrar.rice.edu/online\\_forms/](http://registrar.rice.edu/online_forms/).
  - Due to the requirement that students be full-time when taking inter-institutional courses, MBE students may only take inter-institutional courses during the fall and spring semesters and only when enrolled full time.
  - Students should avoid taking inter-institutional classes their last semester since semesters at other institutions may end on a later date than the class and course grade deadline for Rice. In such a case the student taking the course the last semester may not receive their grade in time for it to count towards their degree.
  - International students who wish to take inter-institutional courses must consult with the Office of International Students and Scholars (OISS) regarding additional paperwork required.
  - Dropping Courses after the Official Drop Deadline
  - Graduate and Postdoctoral Studies approves dropping a course after the published deadline only when a student can make a convincing case that he or she encountered insurmountable problems that they made a conscientious effort to resolve.
  - Requests to drop courses after the published deadline set by the Office of the Registrar must be submitted using a Special Registration Form.
  - The Special Registration Form must be signed by the course instructor.
  - Once signed by the course instructor and the student's advisor, the form must be submitted to the Office of Graduate and Postdoctoral Studies for final approval.
  - Because approval to "late drop" a course is rare and is not guaranteed, a student should continue to attend the course until a final ruling is made.

## **Academic Standing**

In order to remain eligible to continue in a degree program and/or receive various types of financial assistance, a student must maintain good academic standing and be making satisfactory progress toward their degree. The following are minimum requirements:

- Maintain the established grade point average (GPA) for the program in which the student is enrolled. If a student's GPA is below the established requirement, the student will be placed on academic probation. If a student's cumulative GPA falls below the minimum GPA for the program for two consecutive semesters, the student may be dismissed from the program.
- If the student's GPA falls below 2.33 for two consecutive semesters, excluding the summer semester, the student will be immediately dismissed without further warning in accordance with University policy.
- Courses for which a student receives a grade lower than B- (2.67) will not be counted toward degree requirements. The course can be retaken to achieve a higher grade and credit toward degree requirements; however, the original grade earned will also remain on the student's transcript and be counted toward the student's GPA.

- Incomplete grades must be completed in accordance with the University policy on incompletes as detailed in the *General Announcements* (<https://ga.rice.edu/>).
- The completion of all degree requirements must take place within the time limits established by the department and in accordance with University policy.
- Deviation from any of the above requirements constitutes evidence that the student is making inadequate degree progress and is no longer in good academic standing. The student will be officially notified of his or her status and program specific procedures will be followed regarding corrective action or dismissal.

## **Grading Procedures**

Instructors are required to report a grade for all students whose names appear on the class roster. In most courses, conventional symbols (from A to F) are used. Some courses are offered as pass/fail or satisfactory/unsatisfactory. Information on grading standards is found at <https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/#text>. Detailed instructions on how to calculate GPA can be found at [https://registrar.rice.edu/students/gpa\\_calculation](https://registrar.rice.edu/students/gpa_calculation).

## **Interruption of Studies**

There are two types of interruptions in study: short-term releases and separations. Both releases and separations may be either voluntary or involuntary. Separations are periods of no enrollment and require specific reinstatement or readmission processes.

Voluntary leaves include short-term medical and parental release, leave of absence, non- medical withdrawal, and medical withdrawal. Involuntary student leaves include non- voluntary medical withdrawal and disciplinary withdrawal. Details of each can be found at <https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/#text>.

More information is available at <https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/>.

## **Dispute Resolution**

### **Petitions and Appeals**

Graduate students may petition for exceptions to academic requirements, regulations, and judgments. A course requirement is an example of an academic requirement. Allowed time to degree is an example of an academic regulation. Course grades and dismissals from programs are examples of academic judgments. If a petition is denied, one level of appeal is allowed.

### **Petitions**

Petitions should include the circumstances that may qualify the student for an exception as well any supporting documentation or endorsements. In general, petitions will be handled at the lowest appropriate level. Additional information on petitions can be found at <https://ga.rice.edu/graduate-students/rights-responsibilities/dispute-resolution/>.

- Appeals
- If a petition is denied, a student (or other parties affected by the decision) is allowed only one level of appeal. In general, the appeal process will be resolved at the lowest level possible.

- When the petition is decided at the graduate program or department level, the appeal must be submitted to the Office of Graduate and Postdoctoral Studies.
- When the petition is decided at a school level, the appeal must be handled by the Office of Graduate and Postdoctoral Studies.
- When the petition is decided by the Office of Graduate and Postdoctoral Studies, the appellant may submit an appeal to the Provost.
- An appeal must be submitted within 15 days from receipt of the decision that is being appealed. Late appeals will be dismissed, except for unusual situations when a delay is justified. Appeals must be acknowledged in writing immediately upon their receipt by the receiving unit. Email communication is considered to be “in writing.”

Guidelines for Petitions and Appeals can be found at <https://ga.rice.edu/graduate-students/rights-responsibilities/dispute-resolution/>

## **Grievances**

Grievances are different from petitions and appeals. Petitions and appeals involve exceptions to academic requirements, regulations, and judgments. A grievance is a complaint regarding inappropriate conduct by other students, faculty members, or staff. Inappropriate conduct encompasses both inappropriate personal conduct, such as sexual harassment, as well as inappropriate official conduct, such as violation of University policies. Specific policies exist to address grievances based on discrimination or sexual harassment and these policies must be followed in situations involving these issues. Grievances against another student may be raised with the director of student judicial programs and addressed under the Code of Student Conduct. In other cases, a student may present a grievance in writing at the lowest appropriate level, typically the graduate program or school. If a satisfactory resolution is not obtained at that level, the student may appeal the outcome of the grievance by presenting the problem at the next administrative level: The Office of Graduate and Postdoctoral Studies, followed by the provost, or president. Grievances against non-faculty staff members may also be brought to the [employee relations director in Rice’s Human Resources office](#).

The procedures for handling grievances are analogous to those for handling petitions and appeals. Students submitting grievances must so indicate in their submissions.

## **Problem Resolution**

It is the responsibility of the graduate program to provide an appropriate educational environment for all graduate students. During the course of graduate studies, problems that do not fall under the category of grievances, described above, may arise in the relationship between a graduate student and his/her program or his/her advisor. Students should attempt to resolve such problems by informing the appropriate faculty members and working together to resolve the problem. When attempts to resolve the problem informally are unsuccessful, the following problem-resolution procedure will be used:

- The student will submit the problem in writing to the graduate program chair, who will then attempt to resolve it.
- If the student remains unsatisfied, the problem will be presented to a committee of the program for resolution. This committee will be a standing committee and not the student’s own thesis committee. Both the student and the program chair will submit a written record of their views to this committee.

- If the student remains unsatisfied, the problem will be referred to the Office of Graduate and Postdoctoral Studies. A written report of proceedings at stage 2 will be presented to the dean of graduate and postdoctoral studies, along with all other written materials generated during the investigation. The dean may, at her or his discretion, handle these in a similar manner by enlisting the assistance of a subcommittee of the Graduate Council, which will submit its report to the chair of the Council and to the dean of graduate and postdoctoral studies. The decision of dean of graduate and postdoctoral studies is considered final.
- The time frame for handling problem resolution is similar to that for handling petitions, appeals, and grievances. Students may seek guidance on any of these procedures through discussions **with the Office of Graduate and Postdoctoral Studies**.
- After Rice's grievance process has been exhausted and documented, students may also pursue an external complaints process. ( <https://ga.rice.edu/important-notice/complaints-process/>).

## **Outside Employment**

MBE Students are not required to receive approval for outside employment. Students are cautioned to balance their employment and academic activities to assure they can meet academic responsibilities.

PhD and Master's Thesis Students receiving a stipend may accept employment only with the approval of their graduate program. Due to the expectation that a student's time will be focused on their graduate studies/responsibilities, outside employment (any employment outside Rice, including that in industry, government, healthcare and academia, except internships) is rarely approved. A student making a request to accept employment must have the written approval of their advisor and petition the Graduate Academic Affairs Committee for final approval.

International Students wishing to accept employment must not only meet the above requirements but also consult the Office of International Students and Scholars about the possible impact working full or part-time will have on their visa status.

## **Transfer Between Programs**

Graduate students at Rice are admitted into a specific graduate program. Admissions criteria are program specific; therefore, students who wish to transfer between graduate programs must follow the guidelines listed below.

### Transferring from Research/Thesis to a Professional/Non-Thesis Program

Students who wish to change from a thesis program to a professional/non-thesis degree program must petition their department in writing. Upon recommendation of the department and approval by the dean's office, the request is sent to the Office of Graduate and Postdoctoral Studies for consideration and final approval. If approved,

students who received tuition waivers while enrolled in the thesis program will be expected to repay the tuition before their professional degrees are awarded.

### Transferring from Non-Thesis to Research/Thesis Program Within the Department

Non-Thesis degree programs terminate when the degree is awarded. Students who wish to continue graduate study after completing a non-thesis degree program must apply for admission into the research/thesis degree program. Upon recommendation of the department, the request for admission is sent to the Office of Graduate and Postdoctoral Studies for consideration and final approval. Some students may become eligible for tuition waivers in subsequent semesters. Tuition waivers will not be awarded retroactively.

### Transferring to Master's Program (Non-Thesis or Thesis) as a Result of Dismissal from Doctoral Program

A graduate program may offer a non-thesis or thesis master's opportunity to students who are being dismissed from a doctoral program. If the student accepts the master's opportunity, the graduate program would follow internal procedures and notify

the Office of Graduate and Postdoctoral Studies of the change in degree program. Tuition will not be charged retroactively for courses already completed. If the student declines the master's opportunity, the student will be dismissed without a degree awarded.

Students who are dismissed from a doctoral program are not eligible for admission to other doctoral programs at Rice.

### **Transferring Departments**

Students who wish to change their graduate program to a graduate program in another department must apply for admission to the new department's degree program, stating that they are currently a graduate student in another program at Rice. The application must be vetted through the regular admissions process. In addition to admission to the new department, applications for a transfer must also be approved by the Dean of Graduate and Postdoctoral Studies.

### **Second Degree Program**

Graduate students may enroll in a second-degree program only with the approval of their home academic department.

### **Ethical Concerns**

Rice University pursues excellence at all levels and strives to practice the highest standards of ethical conduct. Rice students are encouraged, as are all community members, to communicate ethical concerns or questions to officials in their schools or departments, to the dean of undergraduates, or to the dean of graduate and postdoctoral studies. They may also contact the offices of Human Resources, Internal Audit, General Counsel, Equal Employment Opportunity Programs/Affirmative Action, or Risk Management, all of which are listed in the university directory and on its website.

The University also provides an ethics reporting mechanism through the EthicsPoint website (a third-party agent) that allows students and other community members a simple way to report activities that may involve potential criminal conduct, ethical breaches, or violations of university policies. (Go to <https://www.rice.edu/ethics>.) Persons making reports through EthicsPoint may elect not to provide their names when making a complaint or raising a concern. Rice treats the investigation of any report as a confidential matter. Reports submitted to EthicsPoint are forwarded to the proper university officials for appropriate action. No person will be subjected to retaliation or reprisal who, in good faith, makes a report or inquiry, or who seeks guidance on dealing with potential or suspected improper behavior.

### **Equal Opportunity Notice**

Rice University is committed to equal opportunity in education and employment. It is the policy of Rice University to attract qualified individuals of diverse backgrounds to its faculty, staff, and student body. Rice University does not discriminate against any individual on the basis of race, color, religion, sex, sexual orientation, gender identity, national or ethnic origin, ancestry, age, genetic information, disability, or veteran status in its admissions, educational programs, or employment. In employment, the university seeks to recruit, hire, and advance qualified candidates, including women, members of underrepresented minority groups, individuals with disabilities, and protected classes of military veterans specified by law.

## Program Guidelines Doctor of Philosophy

---

### **Introduction**

The Rice University Bioengineering PhD program is a comprehensive program providing a fundamental understanding of the life and medical sciences, advanced analytical and engineering capabilities, and translational research. With this educational background, the student will be well prepared to participate in independent or collaborative research and development endeavors in industry or academia.

### **Program Learning Outcomes for the PhD Degree Program in Bioengineering**

Upon completing the PhD degree in Bioengineering, the student will be able to:  
acquire a graduate-level understanding of foundations in Bioengineering and apply this material across a variety of sub-disciplines,  
integrate knowledge from different sources to solve a defined Bioengineering problem,  
acquire deep knowledge in a sub-discipline in which they will pursue their dissertation, and  
demonstrate professional skills in both oral and written communication.

### **Research and Scholarly Activities**

Research and other scholarly activities of all students must conform to Rice University policies. It is recommended that students familiarize themselves with the policies listed below before embarking on research or other scholarly activities. The student should become familiar with the following:

- Policy 324-00 (Research Misconduct),
- Policy 326-98 (Human Health and Safety in the Performance of Research),
- Policy 333 (Software Policies), and
- Policy 334 (Copyright Policy).

### **PhD Curriculum Requirements**

Students pursuing the PhD degree in the field of Bioengineering must complete the following to satisfy degree requirements:

- A minimum of 90 credit hours,
- foundation courses,
- acquire additional required credit hours needed for graduation by registering for Graduate Research (BIOE 500), during the terms they are engaged in research,
- maintain a minimum GPA of 3.2.
- complete a minimum of 30 credit hours from foundation, supporting, and advanced courses with high level or above). Of these 30 hours, a minimum of 15 must be designated as BIOE classes, and
- count toward the 30 required semester hours.
- 3 of the 4 of the following foundation courses
  - BIOE 516: Mechanics, Transport & Cellular Signaling
  - BIOE 517: Instrumentation & Molecular Analysis
  - BIOE 518: Introduction to Computational Biology
  - BIOE 519: Biomaterials
- UNIV 594: Training in Responsible Conduct

- BIOE 633: Life Sciences Entrepreneurship **or** BIOE 690 Professional Development for Bioengineering (Students should not take BIOE 690 during their first year of study. This course is intended to be taken by students in their 2<sup>nd</sup> year or above.)
- BIOE 539, Applied Statistics for Bioengineering and Biotechnology **or** a 400 level Mathematics, Statistics, or Computational & Applied Math course.
- In addition to the above requirements, the student must also meet prerequisite requirements,
- fulfill teaching requirements,
- submit and successfully defend a thesis proposal that provides evidence of their ability to carry out original research in a specialized area of bioengineering before the beginning of their fifth semester in residence, and defend the thesis in a public oral examination.

### Advanced Topic Courses

A large array of advanced specialty courses is available to BIOE graduate students. Each student should, in consultation with his or her advisor, select the courses most appropriate for his or her research. Advanced topic courses may be used to meet the 30 semester hours of graduate level courses.

### Specialization Track

Student may elect a specialization track during their graduate studies. To fulfill the requirements of the track, students must take three (3) supporting courses in the area of interest. Students should consult with their advisor regarding appropriate courses to support their chosen track. Five major tracks that reflect interests within the Bioengineering Department are recognized:

Synthetic Biology and Genome Engineering

Microfabrication, Microfluidics, and Design

Quantitative, Computational, and Theoretical Bioengineering

Biomedical Imaging, Optics, and Diagnostics

Biomaterials, Tissue Engineering, Mechanobiology, and Biophysics

## **Academic Requirements**

The university minimum requirement for the doctorate degree is 90 semester hours beyond the bachelor's degree. The student is responsible for completing the various phases of the graduate program within the prescribed time limitations.

Student must earn a grade of B- (2.67) or above in all course work counted toward their coursework requirements. Courses in which the student receives a grade below a B- (2.67) may not be used to fulfill degree requirements.

- The student's overall GPA must be 3.2.
- A graduate student's thesis advisor or thesis committee may require further course work if it is considered essential to the student's thesis research.
- During the first semester in residence, the student must take a minimum of twelve semester hours including three advanced courses (9 semester hours) for a standard letter grade. (Courses taken on a "pass/fail" or "satisfactory/unsatisfactory" basis do not count toward this 9-semester hour requirement.)
- After the first semester, departmental policy requires that the student be registered for a minimum of 12 credit hours in fall and spring. If hours are needed in addition to course work, the student should register for 1 – 15 semester hours of BIOE 500 per semester during the terms he or she is engaged in research. Although it is recognized that hours in the lab must be estimated, in general, a student should spend a total of three hours per week for each one hour of credit in which they registered.
- The student must register for a minimum of six semester hours of BIOE 500 during the summer semester to be eligible for a stipend.

- Students are expected to fulfill the research requirements defined by their advisor to earn a “satisfactory” grade in BIOE 500 (Graduate Research).
- Most formal courses should be completed in the first year of residence to allow the student to commence thesis research on a full-time basis by the end of the second semester.
- If the student received credit for graduate courses taken during prior studies or if they are a MD/PhD student he or she may petition the Graduate Academic Affairs Committee (GAAC) to relax the requirement for registering for nine hours of advanced courses during the first semester.
- **MD/PhD students** must register for one of the Rigor and Reproducibility Seminars offered by the Gulf Coast Consortia. Information can be found at <https://www.gulfcoastconsortia.org/home/research/research-and-reproducibility-resource-page/>.

### **Academic Waivers**

In specific instances, the Graduate Academic Affairs Committee may waive a course. If a course is waived, the equivalent number of hours will reduce the required 30 semester hours on an hour-by-hour basis. However, waived courses do not reduce the 15 hours of BIOE courses required. Students must still meet the minimum requirements of completing 18 hours at Rice including 15 hours of BIOE courses as part of their degree requirements.

If a BIOE course is waived, another BIOE course must be taken to meet the 15-hour requirement. Waivers are considered on a case-by-case basis.

### **Specific Requirements for MD/PhD Students**

MD/PhD students must meet the following program-specific requirements:

- Minimum university requirement of 90 semester hours including research hours.
- Must meet with their advisor and committee at least once per year
- May waive 12 semester hours including research hours based on their work during their medical school training.
- Students must officially request this waiver by submitting a petition to the Graduate Academic Affairs Committee.
- Waived credit hours will reduce the required 30 semester hours on an hour-by-hour basis.
- MD/PhD student must still take 15 credit hours of 500 level or above BIOE courses

### **First Semester Advisor**

During the first semester, students will be advised by the Director of Graduate Studies and the Graduate Academic Affairs Committee. Once a student officially joins a lab, his or her advisor will take over the primary advising role.

## **Lab Rotations and Choosing a Thesis Advisor**

### **Student Rotation and Matching Process**

The key for successful PhD graduate students is the relationship with their graduate research advisor. To facilitate learning about various research projects and lab environments, students are required to participate in lab rotations. The purpose of lab rotations is to:

- assist first-year student, in choosing an advisor and a lab for conducting thesis research,
- provide an opportunity for the student to explore research options other than their declared areas of interest, and
- encourage cohesion within the department.

Rotations will be carried out via a virtual format this current year due to the COVID19 pandemic. The process and guidelines for arranging and participating in rotations, as the final matching process will be administered by the Graduate Program Director.

To facilitate and optimize the rotation experience for both students and faculty, it is important that

the student and the potential advisor meet prior to the start of a rotation to discuss expectations, goals, requirements, and laboratory guidelines,

- the student's responsibility to arrange to meet with the advisor to discuss what is expected during the rotation period. During this meeting, the advisor should make clear his or her expectations for the rotation.
- expected that the student spends approximately ten (10) hours interacting with members of a prospective lab per week for each rotation.
- Students are expected to rotate with advisors within the Department of Bioengineering; however, a student may choose to complete one rotation outside the Bioengineering department. The mentor for this rotation must be a faculty member whose primary appointment is in a department at Rice University or, if at an institution external to Rice, the faculty member must hold an adjunct faculty position with the Department of Bioengineering. Students interested in joining a laboratory external to Rice will be required to arrange for a Bioengineering department faculty member to agree to serve as a Co-advisor. This arrangement should ideally be made prior or during the early stages of a rotation. \*A student is strongly encouraged to notify the Director of Graduate Studies when planning to pursue and external rotation.
- Students must actively engage in the lab during the rotation period. Suggested activities include attending lab meetings, interacting with graduate students and post-docs, and discussing research with the faculty member.
- Students are permitted to rotate with multiple laboratories simultaneously when rotations are implemented via a virtual format.
- All students should register for BIOE 504. Rotation and matching processes will be administered through this course.

### **Waiver of Rotations**

A student must complete three (3) rotations unless he or she is in one of the following categories:

The student was recruited on behalf of a specific faculty member with this stipulated in the official admission offer letter

The student is a MD/PhD student who has selected a thesis advisor in the Department of Bioengineering and started his or her thesis research.

The student is a MD/PhD student who has not selected a thesis advisor, in which case they are required to complete two rotations.

A waiver form should be completed and submitted to the BIOE academic program administrator for processing.

Unofficial agreements made between a student and any advisor does not exempt the student from completing the three required rotations.

### **Financial Support**

Financial support is dependent upon satisfactory performance, reasonable progress towards degree requirements, and the availability of funds. Stipends are subject to all the usual federal taxes.

For purpose of meeting guidelines for financial support, the students are considered a full-time student when she or he is enrolled in 9 credit hours. The department will fund a student during the rotations and matching process of study (3.5 months). Accordingly, advisors become responsible for a student's financial support on December 1, 2020. Advisors are expected to pay 100% of the student's stipend unless the stipend is funded by an external fellowship, scholarship, training grant, or other source of funding which covers all or a portion of the stipend.

Students are required to notify the Department of Bioengineering of any external fellowships or scholarships they receive immediately upon receiving the award, including awards received prior to matriculation.

### **Support Limitations**

- The normal limit of financial support for graduate students is ten semesters (excluding summers). If a student anticipates taking longer than 10 semesters for completion of the PhD degree he or she must consult with their advisor. The advisor may require the student to submit an additional progress report including a summary of work accomplished since the presentation of the thesis proposal, specific information on research work remaining to be done and estimated time to completion.
- The advisor, in consultation with the thesis committee, shall consider factors including the student's progress, exceptional circumstances which justify continued funding, and the availability of funding when deciding regarding whether the student's funding should be continued for a specific period. Continued support shall be reevaluated annually or more often as appropriate.

### **External Fellowships/Awards**

- Students are encouraged to seek external fellowships and awards. The Office of Proposal Development (<http://opd.rice.edu>) offers an extensive array of proposal development services when developing and writing proposals for federal agencies and other entities to seek funding for research projects. Students are encouraged to take advantage of their services.
- If a student receives an external award, the following apply:
- If the total amount of the fellowship, including stipend, insurance, etc. is below the current stipend offered by the Department of Bioengineering, the student's fellowship is supplemented to equal the current Rice stipend level, and the student's is provided an additional \$4000 bonus stipend for the

period of the fellowship.

- These bonuses are paid by the department during the first semester (3.5 months) of study. The advisor is responsible for the bonus payment once a student is assigned officially to the laboratory, or for students who receive awards after the first semester, on the date the fellowship/scholarship becomes effective. The fellowship/scholarship must be competitive, and designated for the graduate stipend.
- Bioengineering has an expectation that students will receive the \$4000 bonus from their advisor; however, since the annual bonus is paid by the student's advisor and not the Department of Bioengineering, the department cannot guarantee a student will receive the \$4000 bonus if the student's advisor's primary appointment is not in Bioengineering. Students should discuss this bonus with their advisor when applying for fellowships.

If the total amount of the fellowship, including stipend, insurance, etc. is above the current stipend offered by the Department of Bioengineering, the student's fellowship is supplemented by an additional \$4000 annual bonus during the period of the fellowship.

- This \$4000 annual supplemental stipend is offered regardless of the amount of the stipend provided by the external funding.
- If a student's fellowship/scholarship ends or is revoked during the student's studies at Rice, assuming the student is achieving satisfactory performance, reasonably progressing toward their degree, and funds are available, the student will receive financial support (department stipend and associate tuition waiver) at the level provided by the Department of Bioengineering at the time. The student will no longer receive the \$4000 bonus stipend. If after the first semester, the advisor will become responsible for the stipend immediately upon the termination of the fellowship.

#### Training Grants

- If a student is awarded a training grant for an amount below the current level of support offered by the Department of Bioengineering, the student's grant is supplemented to equal the current stipend level. This supplement is paid by the department during the first semester of study. The advisor becomes responsible at the beginning of the second semester of study, or for students who receive training grants after the first semester, on the date the training grant becomes effective. Students with external advisors should make their advisors aware of this policy when joining the lab or applying for training grants.
- If the student's training grant ends or is revoked during the student's studies at Rice, assuming the student is achieving satisfactory performance, reasonably progressing toward their degree, and funds are available, the student will receive financial support (department stipend and associate tuition waiver) at the level provided by the Department of Bioengineering at the time. The department will pay the stipend if the student is in the first 3.5 months of study; the advisor is responsible after this period.
- Termination of financial support of a graduate student requires that the student be notified of the termination 15 days prior to the cancellation of support. Such a notice is distinct from any earlier warning, which lets the student know of the possibility of support termination. All termination of support notices, as well as warnings of possible termination, must be in writing, with a copy sent to the Office of Graduate and Postdoctoral Studies.

#### **Non-Scheduled Absences**

Active participation in required academic activities, including laboratory work, is a basic condition of financial support. Absences, other than medical and family emergencies, must be approved by the student's advisor in advance. In the case of medical or family emergencies, notification is expected in as timely a manner as possible depending upon the specific situation. If a student is not present and carrying out required academic activities for more than one week, without approval of the absence, the student will receive an immediate

written warning. If a student is absent from required academic activities for a contiguous two weeks without permission and without mitigating circumstances the student may be judged as making inadequate academic progress and are subject to termination of financial support.

Extenuating Circumstances: There may be circumstances where a student's advisor may not have adequate funding to support his or her stipend or supplemental funding. In such situations, issues will be resolved on a case-by-case basis in consultation with the Chair of the Department of Bioengineering.

## **Holiday and Vacation Time**

- During the first semester of study, all graduate students observe the holidays listed in the Academic Calendar.
- Beginning the first day of the second semester, PhD students engaged in research receive ten (10) working days of vacation time. (Working days are defined as Monday-Friday. Vacation time is based on the academic year calendar (August 16 to August 15).
- Students should adhere to their lab's specific policy for requesting and documenting vacation time. In general, students should request time off a minimum of two weeks prior to the requested days. Although all reasonable requests should be granted, it is at the
- discretion of the student's advisor to approve specific requests.
- In addition to vacation time, students are allowed designated staff holidays (found at <https://people.rice.edu/benefits-rewards/holidays/>), including winter break when the university is officially closed. Since Rice is not officially closed during spring break, students will not automatically receive spring break as time off. All requests for paid time off during spring break must be approved in advance by the student's advisor.
- In cases of extreme weather or other emergency, the University may officially close. During such emergency situations, students should follow the same instructions as those given to staff.
- Extraordinary circumstances that deviate from this vacation policy as noted above are considered on a case-by-case basis and approval is at the discretion of the student's advisor.

## **Teaching Requirement**

Teaching is a graduate degree requirement. Students may be asked to spend the equivalent of eight (8) hours per week on teaching assignments. The following stipulations apply:

Teaching assignments may involve tutoring, leading recitation sections, grading papers, or supervising work in an undergraduate laboratory.

Students are required to fulfill three (3) teaching assignments. Students who have completed three TA assignments but wish to TA or have been required to TA by a faculty member for more than three assignments may do so only in exceptional circumstances and with the approval of the Bioengineering Director of Graduate Studies.

Students will not have teaching responsibilities during their first semester in residence, and usually not during their second. However, students are expected to complete their teaching assignment during the third through fifth semesters.

In cases where TA responsibilities conflict with a required course or the Bioengineering Colloquia (BIOE 698/699) the course or colloquia should be postponed for the semester.

If the student is planning to pursue an academic career she or he is encouraged to request more involved teaching assignments. Such requests should be made to the Bioengineering Director of Graduate Studies prior to the end of the semester directly preceding the TA assignment.

## Teaching Assistant Training

- At Rice University, teaching assistants (TAs) play an important role in the success of many of the university's courses. Each year, the [Center for Teaching Excellence](#) hosts training sessions to provide TAs with the basic information necessary to perform their work in these roles responsibly. We spend most of the session introducing the federal regulations and institutional policies that govern this work (ADA, FERPA, Title IX, Amorous Relations, and the Honor Code), but end with some quick tips for grading and working with students in office hours. For the fall semester, Graduate Student Teaching Assistant Training will be hosted online, in an asynchronous format.
- Normally, TA training is taken before the first TA or teaching appointment; those who would like a refresher are welcome to join. Graduate instructors of record and postdoctoral scholars are encouraged to attend as well!
- Details and registration can be found at <https://cte.rice.edu/upcomingevents/2020/8/graduate-student-ta-training>

## TA Best Practices

- Teaching assistant positions will be filled according to specific requirements of the course as defined by the instructor and qualifications of the student.
- Registering for courses which conflict with a TA assignment after the assignment is finalized is not permissible.
- Students will generally not be assigned more than one TA assignment during a semester. Rare exceptions will be approved in advance by the Director of Graduate Studies.
- Students will not TA a course in which they are currently enrolled.
- TAs will meet with the course instructor prior to the beginning of the teaching assignment to discuss expectations and deadlines.
- TAs is expected to attend scheduled classes for the course in which they are serving as a TA unless specified otherwise by the instructor.
- The number of hours required for teaching assignments varies depending on the course. TAs should expect to devote approximately eight (8) hours per week to TA responsibilities.
- TA responsibilities vary depending upon the class. TAs is expected to fulfill all reasonable requests made by the instructor. Serious conflicts should be discussed with the Director of Graduate Studies.
- TAs is expected to work collaboratively with other TAs and graders as necessary.
- All TAs must attend the TA workshop organized by the Office of the Dean prior to their first TA assignment.
- All TAs must attend the department orientation for TAs.
- Instructors will provide TAs sufficient instructions at the beginning of the TA assignment to assure the TA is aware of the instructor's expectations. TAs are expected to commit to be on time for all TA-run sessions.

- The TA is responsible for grading and returning assignments to the students promptly
- Students should be given sufficient time to pick up assignments.
- Assignments must never be discarded during the semester.
- If a graded assignment is not picked up promptly, the TA should continue to make efforts to return the assignment to the student.
- Assignments not picked up by the end of the semester should be given to the instructor.
- TA Honor Code
- TAs should follow the appropriate code of conduct. This includes acting in a trustworthy and responsible manner, treating others with respect, treating students fairly, and limiting their interactions and relationships with students in the class to a professional nature while serving as a TA.
- Teaching assistants are responsible for knowing the contents of the *Honor Code TA Handbook*. This publication can be found at <http://honor.rice.edu/ta-handbook/>. TAs should refer to the handbook in cases of suspected violations of the Honor Code and are expected to follow the appropriate procedures in such cases.
- It is the TA's responsibility to disclose any possible conflicts of interest to the instructor. This includes, but is not limited to, disclosure of personal relationships with members of the class. When in doubt about a possible conflict of interest, the TA should discuss the specific situation with the instructor.

## Thesis Committee and Proposal

The Department of Bioengineering does not require a qualifying exam. Successful presentation of a thesis proposal is required in lieu of such an exam. A student must have completed the following before the beginning of the fifth semester in residence (excluding summer semesters):

- select a thesis committee
- prepare a thesis proposal, and
- Defend the thesis proposal to their thesis committee.
- Thesis Committee Members
- Requirements for the composition of the thesis committee can be found at <https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-doctoral-degrees/#text>

Candidates are responsible for keeping the members of their committee informed about the nature and progress of their research. They also must establish a schedule for thesis completion and review. The members of the committee, in turn, should review the thesis in a timely manner, approving a preliminary form of the thesis before scheduling the oral examination.

### Written Thesis Proposal

Students must pass a thesis proposal prior to the beginning of their fifth semester (excluding summers). The thesis proposal is a written summary of research progress up to the point of the date of the proposal and future research plans. The proposal defense should be viewed as an opportunity for the student and his or her committee to assess the student's progress and knowledge of the research field, and to assure the student has developed a coherent research plan, and to provide the student with input from the members of the committee in time to incorporate useful suggestions in the thesis research.

**Thesis Proposal Format:** The document should contain (at minimum) the following sections:

Section	Recommended Length
Abstract <sup>a</sup>	Not to exceed 250 words
Overview of motivation, problem statements, and specific aims <sup>a</sup>	3 pages
Background with literature survey	10-20 pages
Research plans and methodology:	
Specific Aims <sup>a,b</sup>	3-4 pages per specific aim
Methods <sup>c</sup>	5-10 pages
Preliminary Results <sup>c</sup>	2-10 pages
Summary and proposed time-line for completion of the research <sup>a</sup>	1 page

<sup>a</sup>These section lengths are generally consistent with the amount of text in an NIH F30/F31 predoctoral fellowship application.

<sup>b</sup>Each Specific Aim should ideally contain the motivation, hypotheses, overview of approach/study design, success criteria, and possible pitfalls/alternative approaches within the recommended 3-4 pages

<sup>c</sup>The methods and preliminary results can be sections separate from the Aims or worked into each aim as appropriate.

The above section lengths are just recommendations. On average, this will result in approximately 40-50 pages total (double spaced text with 1-inch margins), but students should discuss the envisioned length and breadth of the thesis proposal with their advisor. The advisor may, within reason, require additional information be included. Portions of manuscripts or reports to sponsors (if available) can be incorporated in the thesis proposal.

The thesis proposal must be distributed to the members of the thesis committee at least one week prior to the scheduled presentation. A copy of the thesis proposal should also be sent to the academic program administrator for inclusion in the student's record.

### **Oral Thesis Proposal Defense**

All members of the thesis committee should be physically present at the oral defense. In rare circumstances, where a member cannot be physically present, he or she may participate via technologies such as videoconference or Skype. In such circumstances, the student must receive prior approval from his or her advisor. A student must indicate on her or his thesis proposal form any committee member who participated in a thesis defense via electronic means. The student must also obtain the signature of any members who participate via electronic means prior to submitting the completed thesis proposal form.

- Thesis Proposal Committee Decision
- The Thesis Committee may make one of three decisions regarding the thesis proposal, "pass without reservations," "pass with reservations." or "fail."
- Pass without Reservations: The student will continue research based upon their thesis proposal
- Pass with Reservations: Committee members must, within one week, provide the student an explanation of deficiencies and a written and reasonable time frame for the student to correct identified deficiencies. If the student to correct deficiencies within the established time frame, he or she will be required to redefend the entire proposal or be subject to dismissal from the program.
- Fail: If a student fails the thesis proposal, the committee may, by unanimous vote, allow the student to redefend within a reasonable time frame. Students are allowed to redefend only one. If a student fails the thesis proposal defense proposal a second time, he or she is subject to dismissal from the program.

- In extraordinary circumstances, exceptions to this rule may be appealed via petition. The advisor must be notified and the petition must be submitted to the Graduate Academic Affairs Committee for consideration within 15 days of the oral thesis proposal

### **Internship Opportunity**

- In addition to course work for the PhD, students are encouraged to participate in an optional three to six-month internship experience. Well received by bioengineering graduate students, the internship provides an opportunity to gain real-world exposure, grow their professional network, and learn new techniques and tools to apply to their research or gain substantial teaching experience.
- Students may choose to intern in industry, clinical labs, government national labs, international labs, or teaching institutions. The internship training is managed through collaborative interaction between the advisor, the host, and the bioengineering program. Students must notify their advisor of potential internship opportunities in a timely manner, preferably before the beginning of semester(s) in which the student plans to participate in an internship opportunity
- Generally, students will not receive a graduate student stipend while participating in the internship. Students should discuss details of financial arrangements with their advisor and have such details finalized prior to the internship. The student must also determine how the financial arrangement would impact the intellectual property that they generate while they are on internship.
- The BIOE Academic Program Administrator should be notified no less than three weeks prior to the beginning of the internship in order to assure time to make necessary revisions to payroll. If appropriate notice is not received in time to adjust the student's stipend, the student will be responsible for repaying any overpayment they may receive. The student should provide documentation (offer letter, evaluation) of the internship so that the internship can be properly documented in their student record.
- Decisions regarding stipends from external fellowships during an internship are based upon the requirements of the fellowship/training grant and is made on a case-by-case basis. If the student has received an external fellowship or training grant, it is their responsibility to assure that the internship does not conflict with guidelines and requirements of the fellowship or grant. The student must register for BIOE 500 during the time period they are completing the internship in order to maintain continuous enrollment.
- It may not always be possible for PhD students to perform an internship due to various factors beyond their control, such as timing of their research trajectory, research funding matters, external fellowship constraints, or other reasons. If a student is interested in an internship but it cannot be arranged for some reason, the student should reflect upon what they hope to gain through an internship, and discuss those goals with their advisor. If the student's goals are networking and learning new techniques, for example, their advisor may be able to arrange for other opportunities for those activities, such as a research collaboration or involvement with the most relevant professional society.

## Presentation of Research

- Students are expected to present their research in an official forum at least annually
- Presentation will ideally be in the form of a research talk at a local, national or international conference.
- Students will also have an opportunity to present during the BIOE GSA “Breakfast Club” or at the annual Graduate Student Symposium.
- Poster presentations do not fulfill this requirement.
- Other opportunities for students to present research may be approved on a case-by-case basis.
- Students should inform their advisor if they have not been given an opportunity to present their research so that additional opportunities can be arranged.
- Students should document presentations as part of their progress report.

## Progress Review and Evaluation

- Advisor/Committee Meetings
- First Two Years: A student must meet with their advisor as deemed necessary by the advisor.
- After the Thesis Committee Chosen: Once a student has finalized the members of their thesis committee, the committee and advisor should meet with the student on an annual basis or more often as deemed appropriate by their advisor or thesis committee. Documentation of meetings must be included in the student’s semi-annual progress report.
- **MD/PhD students** must meet with their thesis committee a minimum of once per year. MD/PhD students who do not fulfill this requirement may put their status with the MSTP program in jeopardy. Documentation of all meetings must be included in the student’s semi-annual progress report.

## Semi-Annual Progress Reviews

- Submission of progress reports is one criterion used to determine satisfactory performance. The purpose of the progress review is to ensure that the student and his or her advisor are communicating regularly regarding the progress on thesis research and the student’s development. Students are required to submit semiannual progress reports during the entirety of their graduate studies.
- Reports are submitted on a calendar year basis and cover the time frames, January-June and July-December.
- First year students are expected to complete a progress report for their first semester covering the time frame from August 15 to December 31.
- Students must submit their progress reports using a standardized review form. These forms must be completed and submitted by January 31 (July -December) and July 31 (January-June)
- It is the student’s responsibility to coordinate with their advisor to assure the progress report is submitted by the deadline.
- The student must send each member of their committee a copy of the completed progress report.
- An advisor or the committee members may feel it is necessary to meet with the student to further discuss a student’s progress. The advisor should document recommendations and a time line to meet recommended milestones in the progress review form and discuss these requirements with the student.
- The Graduate Academic Affairs Committee (GAAC) or the BIOE Director of Graduate Studies will review the progress reports of individual students on a case-by-case basis as deemed necessary.
- **MD/PhD students** must provide their thesis committee with a copy of their progress review report. If an MD/PhD student fails to provide their committee with a copy of their progress review report they may put their standing in the MSTP MD/PhD program in jeopardy.

## **Satisfactory Performance**

- Students are expected to make continuous and satisfactory progress towards fulfilling their degree requirements. Satisfactory progress includes the following:
- Minimum of nine (9) semester hours of graduate level courses, graded using a standard letter grading scale by the end of the first semester in residence,
- Once a student is assigned to a laboratory and advisor, the student should work on their thesis research on a full-time basis,
- present an annual oral presentation of their research beginning the second academic year of residence and each year thereafter,
- submit progress review reports by the published deadlines,
- submit the written copy of the thesis proposal and successfully defend their thesis proposal in an oral presentation before the beginning of their fifth semester in residence (excluding summer semesters),
- petition for doctoral candidacy prior to the beginning of the ninth semester,
- maintain a grade point average (GPA) of 3.2 or better, and
- make continuous progress in research.

## **Changing Advisor/Lab During PhD Studies**

Once a PhD student is accepted by the advisor, she/he is expected to do thesis research with the same advisor until a PhD degree is awarded. If a student decides to switch to a different thesis advisor, she/he must inform the advisor and submit a written request to the Director of Graduate Studies with detailed justification. The student is responsible for finding the new advisor and should arrange to switch between laboratories at the end of a semester. Switching laboratories mid semester requires approval from the Director of Graduate Studies or the Graduate Academic Affairs Committee.

## **Probationary Status/Possible Dismissal Due to Academic Grades**

- If a student's cumulative GPA falls below 3.2 the student will be placed on probationary status. The period of probation extends to the end of the next semester (excluding summer) in which the student is enrolled. Satisfactory/unsatisfactory grades cannot be used to end probationary status.
- Once a student is placed on probationary status he or she has one semester (excluding summer semester) to improve their grades. If their GPA remains below 3.2 for two consecutive semesters, their advisor has the prerogative to immediately dismiss the student from their lab or suspend the student's stipend until their GPA is once again at the 3.2 threshold. When a student's stipend is suspended, the student may become responsible for tuition costs until their cumulative GPA is once again above 3.2.
- If an advisor dismisses a student from their lab and the student cannot find a new advisor, the student will be dismissed from the program according to the policies in section XVII.
- If a student is considered for dismissal from the program, the Graduate Academic Affairs Committee, the thesis advisor, and the Director of Graduate Study will consider all the factors that may have affected the student's performance before reaching such a decision. The Department Chair will be advised of all potential action prior to a final decision.
- If a student's GPA falls below 2.33 for two consecutive semesters, he or she will be immediately dismissed from the program without further warning in accordance with University Policy. (Students will be notified of their status once final grades have been received and posted in their record.)

### **Probation/Dismissal for Inadequate Progress in Program**

The graduate program consists of two parts:

- Stage 1: (Pre-Candidacy) Students should demonstrate adequate academic progress by complying with the requirements and milestones of the program (e.g. acceptable academic grades, thesis proposal, research progress, and achievement of candidacy on time.)
- Stage 2 (Post-Candidacy) Students have completed “all but dissertation” (ABD). Students should conduct research and write and defend their thesis.
- When a student is judged not to be making adequate progress, the following procedure is followed:
- The student will be given written notice of their lack of progress by their advisor. This notice will include:
  - Notification the student is placed on probation,
  - The probation period will be no less than 21 working days (three weeks),
  - An explanation of the student’s deficiencies and a clear explanation of what is must be accomplished within a specified time period to correct deficiencies and in order to return to good standing.

**The initial notification of probation must be sent by the end of the 5<sup>th</sup> week of a semester for the dismissal process to be carried out in that same semester.**

- The student will be reevaluated at the end of the initial probationary period. If the student’s advisor determines the student has made adequate progress towards correcting deficiencies, the advisor will notify the student that he or she has returned to good standing and is no longer being considered for dismissal.
- If, at the time of the first reevaluation, the student is determined to not to have made adequate progress towards correcting deficiencies, the student will be given a second written notice stating deficiencies that must still be met and the probationary period extended for no less than 21 additional working days (3 weeks). This notification may include, at the discretion of the advisor, a statement that the student can be immediately dismissed and financial support terminated at the end of the second probationary period if deficiencies have not been resolved.
- If, at the time of the second reevaluation, the student is determined not to have made adequate progress towards correcting the stated deficiencies and the advisor is convinced that the study is unable to achieve adequate progress despite intervention or additional time, the advisor may dismiss the student from his or her research group.
- Students are encouraged to explore the possibility of joining a different research group and seek other potential advisors, should corrective action not be successful and the student is dismissed from his/her current research group. A student will have no more than four weeks after their dismissal to find a new research group. A student will be dismissed from the program if she or he is unable to find a new advisor during this period. Notice of this dismissal must be provided to the student at least 15 days prior to the final termination.
- The student’s prior advisor is not obligated to provide office space or supportive measures after dismissal from his or her group.
- The final decision to dismiss a student is officially determined by the BIOE Director of Graduate Studies and the Graduate Academic Affairs Committee.
- Advisors are ultimately responsible for determining a grade for BIOE 500 (Graduate Research) based on the student’s performance. However, a student should anticipate she or he will receive a grade of unsatisfactory in BIOE 500 if the deficiencies in the
- warning letter that resulted in the student’s probation are not met. If the student is dismissed from the research group, the student should also expect an unsatisfactory grade in BIOE 500.

**Opportunity to Join a Different Research Group:**

- When placed on probation, students are given an opportunity to find another advisor during the

probationary period.

- The student may change advisors if accepted into another research group.
- If a student is unable to find another advisor, the student will be dismissed from the graduate program.
- A student may not change advisors more than once and may not have a total of more than two advisors, including their initial advisor, during their career as a graduate student.

A student may petition for the dismissal to be revoked, therefore a dismissal will be held in abeyance until the petition and appeal process is concluded.

The advisor/department is not required to financially support the student during the appeal process. The student must appeal within 15 days of being advised of their dismissal. The appeal process takes approximately 30 days.

A student is not eligible to return to Rice following a dismissal from a graduate program.

### **Approval of Candidacy**

- Candidacy marks a midpoint in the course of graduate education. Achieving candidacy for the PhD signals that a graduate student has:
  - completed required course work,
  - passed required exams to demonstrate his/her comprehensive grasp of the subject area,
  - demonstrated the ability for clear oral and written communication, and
  - shown the ability to carry on scholarly work in his/her subject area.
- Requirements for achieving candidacy for the doctoral degree are determined at the departmental level.
- The department is authorized to grant waivers or substitutions of specific course requirements, but not to make exceptions to university requirements.
- Students enrolled in research degree programs submit their petitions for candidacy for a doctoral degree through the department.
- Complete sections 1, 3, and 4 of the "Petition for Approval of Candidacy for a Doctoral Degree (C-2) form.
- Students do not need to provide attachments requested in section 2. This will be completed by the department.
- Submit form to the academic program administrator who will complete sections 2 and 5 and electronically submit the document.

### **Extension for Time to Candidacy**

- Students who are unable to meet the university time boundary for candidacy may petition the dean of graduate and postdoctoral studies or his/her designee for an extension of time to candidacy.
- Students who exceed their time boundaries without an approved extension request will be charged a fee of \$125 for reinstatement to good standing.
- Students who exceed their time boundaries and do not receive an extension to their time to candidacy are subject to immediate dismissal by the Office of Graduate and Postdoctoral Studies.

### **Oral Examination in Defense of Thesis**

The public oral defense of a thesis is intended to be an examination of a completed body of work and should be scheduled only when the thesis is essentially completed. Students may take the final oral examination in defense of their thesis only after the dean of graduate and postdoctoral studies approves their candidacy.

Detailed instructions for thesis defense can be found at: <https://graduate.rice.edu/current-students/defense>.

### **Acceptance of Thesis and Thesis Submission**

Candidates who successfully pass the oral examination in defense of the thesis must submit the thesis to the Office of Graduate and Postdoctoral Studies no later than six months from the date of the examination. If the thesis is not submitted by the end of the six-month period, the “pass” will be revoked and an additional oral defense will need to be scheduled.

Detailed instructions for thesis defense can be found at: <https://graduate.rice.edu/current-students/candidacy-defense/thesis-submission>.

### **Degree Conferral and Commencement**

Degrees are conferred in the spring (May), summer (August) and winter (December). Commencement takes place in the spring. Commencement is held once each year in May.

### **August and December Degree Candidates**

The degree conferral date for mid-year degrees will be August 31 and December 30 of each calendar year. The faculty will vote in late September to confer August degrees. The faculty will vote in January to confer December degrees. After that time, an [official transcript](#) will be available from the Registrar's Office. Occasionally a degree recipient may require an official document confirming their Rice degree. In these instances, a Rice University degree recipient may request a miniature [facsimile diploma](#) on letter-sized paper. Diplomas from the December degree conferral are expected to be available in the spring.

## **PROFESSIONAL MASTERS DEGREE (MBE)**

### **General Guidelines (Applicable to All MBE Students)**

#### **Introduction**

The Master of Bioengineering Applied Bioengineering specialization is a non-thesis degree that provides a student with greater depth in bioengineering training to advance their career objectives. The Applied Bioengineering track gives the flexibility for students to craft their own curriculum depending on their interests and career goals. The Bioengineering Department offers graduate-level courses in the following: Biomaterials, Tissue Engineering, Mechanobiology & Biophysics; Biomedical Imaging, Optics & Diagnostics; Microfabrication, Microfluidics & Design; Synthetic Biology & Genome Engineering; Quantitative, Computational & Theoretical Bioengineering.

#### **Requirements for the MBE Degree**

The MBE degree is a non-thesis master's degree. For general university requirements please see [Non-Thesis Master's Degrees](#).

A minimum of 30 credit hours to satisfy major requirements.

A minimum grade of a B- (2.67 grade points) for all required courses applied toward the MBE degree requirements.

One specialization: Applied Bioengineering and Global Medical Innovation

#### **Areas of Specialization in the Master of Bioengineering programs:**

- Applied Bioengineering: designed as a flexible degree for students who will pursue careers in research, medicine, or related fields. The Applied Bioengineering specialization offers to areas on concentration, 1) course-based and 2) research-based.
- Global Medical Innovation: designed specifically for students who will pursue a career in the global medical technology industry. As the medical technology industry becomes increasingly global with an emphasis in cost-effective health care solutions and clinical outcomes, Rice University seeks to prepare engineers for this new and changing environment. This track of the MBE degree is designed to prepare engineers for careers in medical technology through education in innovation, emerging-market design projects and internships. The Rice MBE track in Global Medical Innovation program specifically targets students who have an undergraduate degree in engineering (mechanical, electrical, chemical, or bioengineering/medical) or a related field, and who are interested in pursuing a career in the private, public, or non-profit sectors of medical technology.

Both specializations have the same prerequisites, though applicants will be evaluated considering the different purposes of each track. More information about each of these specializations can be found below. Curriculum must be approved by the Graduate Academic Affairs Committee and the Bioengineering Department. This is done on a case-by-case basis.

## **Program Learning Outcomes for the MBE Degree, Applied Bioengineering**

Upon completing the MBE degree, students pursuing the Applied Bioengineering specialization requirements will be able to: Apply and integrate advanced knowledge of Bioengineering topics in at least one of the following areas: Biomaterials,

- Tissue Engineering, Mechanobiology & Biophysics;
- Biomedical Imaging, Optics & Diagnostics;
- Microfabrication, Microfluidics & Design;
- Synthetic Biology & Genome Engineering; Quantitative,
- Computational & Theoretical Bioengineering.
- Apply knowledge from engineering and other disciplines to identify, formulate, and solve novel and complex problems that require advanced knowledge in bioengineering.
- Apply knowledge from engineering and other disciplines to identify, formulate, and solve novel and complex problems that require advanced knowledge in bioengineering.
- Select and apply quantitative analytic techniques to analyze bioengineering data.
- Gain admission to a graduate or professional program, if students want to pursue further education.

### **Transfer of Credits to Graduate Degree**

- A minimum of 24 of the 30 credits must be taken at Rice. Students may transfer a maximum of six (6) credits from a different institution. The following apply:
- The course must be chosen from those that normally satisfy requirements for an advanced degree. No course can be used to satisfy both an undergraduate and graduate degree requirement.
- If a student completed their undergraduate degree at Rice within the last three years they may petition the Master's Committee to allow up to 21 credits of graduate level courses taken as an undergraduate, which were not used to satisfy undergraduate degree requirements, to count toward their graduate degree. The courses must be chosen from those that normally satisfy requirements for an advanced degree. No course can be used to satisfy both an undergraduate and a graduate degree requirement.

### **Satisfactory Progress**

- Students must maintain a GPA of 3.0 or higher.
- The Office of Graduate and Postdoctoral Studies requires that students be provided a written assessment of their academic progress at the end of each semester. The student's transcript meets this requirement. Should a student wish a more detailed assessment they are encouraged to speak to their course instructors or the Director of the Master's Program. If a student's grade point average falls below 3.0 the student will be placed on probationary status. The department will notify the student of this status after final semester grades are posted.
- The period of probation extends to the end of the next semester in which the student is enrolled. Once a student is placed on probationary status, they have one semester to improve their grades. If the next semester again results in probationary status, (cumulative

GPA of less than 3.0) the student may be dismissed from the program without further notice. Decisions regarding dismissal will be determined by the Director of Graduate Studies in consultation with the Director of the Master's Program and with the approval of the Department Chair.

- If a student's GPA falls below 2.33 for two consecutive semesters the student will be immediately dismissed without further warning in accordance with University policy. Students will be notified of their status and/or dismissal once final grades have been received and posted to their records.

## **Academic Guidance**

Students may seek academic guidance from the Director of the Master's Program Committee or the Bioengineering Director of Graduate Studies.

## **Time to Degree**

Students may enroll on a full-time or part-time basis. It is expected that students will complete degree within two to four semesters. Students expecting to take more than four semesters to complete their degree should discuss their plans with the Director of the Master's Program.

Students are required to complete the program within five years of initial enrollment. This time boundary includes any period in which a student is not enrolled or enrolled part-time for whatever reason.

Students who are required to take prerequisites will likely require more than two semesters to complete the program

## **Graduation**

All degree candidates are required to apply for degree conferral with the office of the Registrar during the semester in which they wish to graduate. Degree conferrals take place in May, August, and December. Commencement is held only once per year at the end of the spring semester in May. If a student completes their degree in the summer or fall, they may participate in the following commencement held in the spring.

**MBE, Applied Bioengineering Specialization  
(Course-Base Concentration)**

**Requirements**

Students pursuing the Applied Bioengineering track must complete:

- A minimum of 18 credit from the department approved course list (See Table 1).
- A minimum of 3 credit hours courses taken as electives at the 500-level or above from the Bioengineering department or another department.
- [BIOE 539](#) or an alternative quantitative-based BIOE course at the 400-level or above may count toward this requirement.
- [BIOE 627](#) *Medical Technology Design Seminar* and [BIOE 628](#) *Medical Technology Design Seminar II*.
- A minimum of 3 credit hours of graduate level professional development electives chosen from a specific list of approved courses (see list below)

A minimum overall GPA of 3.0 in required coursework.

Course List		
Code	Title	Credit Hours
Required Courses		
<a href="#">BIOE 627</a>	Medical Technology Design Seminar 1	1.5
<a href="#">BIOE 628</a>	Medical Technology Design Seminar 2	1.5
Students must complete 6 courses from departmental course offerings (BIOE) at the 500-level or above.		18
Elective Requirements		
Professional Development Electives		
Select a minimum of 3 credit hours from the following: <sup>1</sup>		3
ENGI 501	Workplace Communication	
ENGI 515	Leading Teams and Innovation	
ENGI 529	Ethics and Engineering Leadership	
ENGI 555	Engineering Persuasion	
ENGI 610	Management for Science and Engineering	
ENGI 614	Learning How to Innovate?	
ENGI 615	Leadership Coaching for Engineers	
Quantitative Elective Requirement		
<a href="#">BIOE 539</a>	Applied Statistics for Bioengineering and	3

Course List		
Code	Title	Credit Hours
	Biotechnology <sup>2</sup>	
BIOE Elective		
Select 3 credit hour courses at the 500-level or above from BIOE or another department. <sup>3</sup>		3
Total Credit Hours		30
1	Additional course offerings may be completed with advisor approval.	
2	<a href="#">BIOE 539</a> or an alternative quantitative-based BIOE course, taken at the 400-level or above.	
3	Students may complete a course offered by another department, but it must be relevant to the MBE degree.	

### **BIOE 506 – Graduate Independent Study**

Students may take BIOE 506 (Graduate Independent Study) for a maximum of six credit hours to count towards their MBE degree. Students interested in BIOE 506 typically take 1-3 credit hours per semester. When a student registers for this class it is their responsibility to locate a faculty member willing to mentor them through this independent study course.

The following apply:

- Students must produce a final project in the form of a paper, design project, exam, or other project goals as defined by the instructor (mentor)
- BIOE 506 must be taken for a standard letter grade
- If the student is participating in an internship to fulfill the requirements of BIOE 506, they must submit written proof of the internship offer, including the name and contact information of their supervisor, prior to the first day of the internship.
- Students must submit "notification form" confirming they have an advisor willing to mentor them for this course prior to a special registration form (also required for this course) being submitted. Both forms should be submitted to the BIOE academic program administrator.

## Applied Bioengineering Specialization (Research-Based Concentration)

---

### Requirements

- A minimum of 30 credit hours to satisfy degree requirements.
- A minimum of 30 credit hours of graduate-level study (coursework at the 500-level or above) including a required 9 hours of graded research credit (3-hour BIOE 507 and 6-hour BIOE 607).
- Optional allowed 3-hour research credit beyond 30 hours requirement BIOE 506
- A minimum of 24 credit hours must be taken at Rice University.
- A minimum residency enrollment of one fall or spring semester of part-time graduate study at Rice University.
- A minimum overall GPA of 2.67 or higher in all Rice coursework.
- A minimum GPA of 3.00 or higher in all Rice coursework that satisfies requirements for the non-thesis master's degree with a minimum grade of a B- (2.67 grade points) in each course (for the Applied Bioengineering area of specialization)
- Flexibility of finishing the MBE study in 2-4 semesters

### Course Requirement Specifics

- A minimum of 6 courses (18 credit hours) taken at the 500-level or above from selected departmental (BIOE) course offerings.
- A minimum of 3 courses (9 credit hours) of graded research (3 hours BIOE 507 and 6 hours of BIOE 607)
- Ethics (UNIV 594) is a required course
- A technical writing course

Course List		
Course	Title	Credit
UNIV 594	Responsible Conduct - Research	1
BIOE 507	Graduate Research for MBE I	3
BIOE 607	Graduate Research for MBE II	6
ENGI 501, or ENGI 510, or ENGI 542	Workplace Communication Technical and Managerial Communication Professional Communication	3
BIOE >500 Level	See list of courses in Table 1	18
	Total	31

## Research Aspects

- BIOE 506 to allow early match with advisor (not counted toward 30 hours limit)
- BIOE 507 requires to write and submit research proposal to receive S grade.
- BIOE 607 is a higher-level research credit - student is required to submit a report in the form of a manuscript draft (it is encouraged to be a foundation for a peer reviewed paper) and make a final oral presentation on the project. This course should be graded using a F
- BIOE 507 and 607 must taken in the same lab/advisor
- BIOE 507 and 607 can be taken in using following schedules:
- BIOE 507 – first semester (fall of year 1) and BIOE 607 – second semester (spring of year 1)
- BIOE 507 – second semester (spring of year 1) and BIOE 607 – third semester (summer of year 1) – allows to take BIOE 506 in the first semester in the program (fall of year 1)
- BIOE 507 – second semester (spring of year 1) and BIOE 607 – third semester (fall of year 2) – allows to take BIOE 506 in the first semester in the program (fall of year 1)

	<b>Year 1 Fall</b>	<b>Year 1 Spring</b>	<b>Year 1 Summer</b>	<b>Year 2 Fall</b>
Option 1	BIOE 507	BIOE 607		
Option 2	(BIOE 506)	BIOE 507	BIOE 607	
Option 3	(BIOE 506)	BIOE 507		BIOE 607

A student who demonstrates strong performance in research and the faculty mentor is willing to allow the student to remain in his or her lab, the student should be allowed to apply for the BIOE PhD program, and can be admitted as a "direct admit" to the particular lab with either Spring of Fall matriculation date.

---

## Professional Master's Degree, Global Medical Innovation

---

### Overview

The Masters in Bioengineering (MBE) Global Medical Innovation (GMI) program prepares engineers to develop cost-effective, sustainable, and accessible medical solutions through local and global clinical immersion, industry internships, real-world medical innovation projects, practical engineering training, and commercialization opportunities.

### Program Learning Outcomes for the Global Medical Innovation track :

Upon completing the MBE degree, students pursuing the Global Medical Innovation track requirements will be able to

- Apply knowledge of Bioengineering topics in at least one of the following areas: Biomaterials and Drug Delivery, Biomedical Imaging and Diagnostics, Computational and Theoretical Bioengineering, Tissue Engineering and Biomechanics, or Systems and Synthetic Biology.
- Develop effective medical products, from concept to commercialization, within a team environment.
- Comprehend and navigate the global medical technology industry by leveraging an internship experience.
- Gain employment or advance professionally in a technical field related to bioengineering.

### Requirements for the Global Medical Innovation Track.

Students pursuing the Global Medical Innovation track must complete:

- A minimum of 30 credit hours as listed below
- A minimum overall GPA of 3.2 in required coursework.

Code	Title	Credit Hours
<b>Core Requirements</b>		
<b>Medical Technology Design</b>		
BIOE 527	Healthcare Innovation & Entrepreneurship	3
BIOE 529	Innovation and Entrepreneurship Lab	3
<b>Medical Technology Implementation</b>		
BIOE 528	Medical Engineering & Design Lab	3
BIOE 530	Medical Engineering & Design Lab 2	3
<b>Industry Seminar Series</b>		
BIOE 627	Medical Innovation Industry Seminar	1.5
BIOE 628	Medical Technology Design Seminar 2	1.5
<b>Internship or Independent Study</b>		
<b>Select one of the following<sup>1</sup></b>		
BIOE 600	Graduate Bioengineering Industry (completed during the summer)	6
BIOE 506	Graduate Independent Study (completed in fall and spring semesters)	6

<b>Elective Requirements</b>		
<b>Select three Electives</b>		<b>9</b>
<b>Select 1 from the following:</b>		<b>3</b>
BIOE 633/MGMT 633	Life Science Entrepreneurship and The Roles of Founders and Venture Capital on High Tech Startup	
ENGI 510	Technical and Managerial Communications	
ENGI 515	Leading Teams and Innovation	
ENGI 529/CEVE 529	Ethics and Engineering Leadership	
ENGI 542	Communication for Engineers. Building a Practical Toolbox	
ENGI 610	Management for Science and Engineering	
ENGI 615	Leadership Coaching for Engineers	
ENGI 545/LEAD 545	Strategic Thinking for Complex Problem Solving	
MGMT 734	Technology Entrepreneurship	
<b>Math Elective</b>		
BIOE 539	Applied Statistics for Bioengineering and Biotechnology <sup>2</sup>	3
BIOE Elective	Select one course from the departmental course offering (BIOE) at the 500 level or above	3
Total Credit Hours		30

<sup>1</sup>This will be considered on a case-by-cases basis, and the student is responsible for obtaining and

<sup>2</sup>selecting an internship that best aligns with their career goals.

BIOE 539 or an alternative quantitative-based BIOE course, taken at the 400 level or above.

<b>Table 1: Approved Bioengineering Courses</b>		
<b>Course</b>	<b>Course Title</b>	<b>Credit Hours</b>
<b>FALL</b>		
BIOE 506	INDEPENDENT GRADUATE STUDY	1 to 6
BIOE 508 001	SYNTHETIC BIOLOGY	3
BIOE 509 001	POINT-OF-CARE DIAGNOSTICS	3
BIOE 515 901	ENGINEERING DRUG DELIVERY SYS.	3
BIOE 517 903	INSTRUMENT/MOLECULAR ANALYSIS	3
BIOE 523 901	BIOENG SYSTEMS & CONTROLS	3
BIOE 527 001	HEALTHCARE INNOV & ENTREPREN	3
BIOE 528 001	MED ENGINEERING & DESIGN LAB	3
BIOE 535 001	CELL-BASED THERAPEUTICS	3
BIOE 536 002	IMMUNOENGINEERING	3
BIOE 537 002	GENETIC AND EPIGENETIC CONTROL	3
BIOE 552 001	INTRO SYSTEMS BIOLOGY MODELING	3
BIOE 593 001	BIOTECH STARTUP	3
BIOE 690 901	PROF DEVELOPMENT FOR BIOE	3
<b>SPRING*</b>	<b>*Schedule not confirm – courses may or may not be taught</b>	
BIOE 505 001	MACROMOLECULAR ASSEMBLIES	3
BIOE 506 010	GRADUATE INDEPENDENT STUDY	1 TO 6
BIOE 512 001	BIOPHOTONICS INSTRUMENTATION	3
BIOE 518 001	INTRO TO COMPUTATION BIOLOGY	3
BIOE 535 001	CELL-BASED THERAPEUTICS	3
BIOE 537 001	GENETIC AND EPIGENETIC CONTROL	3
BIOE 539 001	APPLIED STATISTICS FOR BIOE TECHNOLOGY	3
BIOE 587 001	OPTIC IMAGING/NANOBIOPHOTONICS	3
BIOE 620 001	TISSUE ENGINEERING	3
BIOE 648 002	MOLECULAR TECHNIQUES IN BIOENG	3

## **Master of Science (Thesis Based)**

---

### **Introduction**

New students interested solely in the Master of Science (MS) degree are admitted only under special circumstances. MS students must satisfy the departmental and university course requirements, fulfill the teaching requirement, complete a research project, write a thesis and successfully defend their work in a public oral examination.

### **Master of Science (MS) Curriculum**

Candidates receive a master's degree after completing:

A minimum of 30 graduate semester credit hours of coursework taken at the 500-level or above (including thesis credit hours).

A minimum of 24 graduate semester credit hours must be taken at Rice University.

A minimum overall GPA of 2.67 or higher in all Rice coursework.

A minimum GPA of 2.67 or higher in all Rice coursework that satisfies requirements for the thesis master's degree.\*

A minimum residency enrollment of one fall or spring semester of full-time graduate study at Rice University.

Original work reported in a thesis and a public oral examination, approved and submitted to the Office of Graduate and Postdoctoral Studies.

### **Policies for Choosing Advisor**

In exceptional cases where a MS student is admitted directly to the MS program, an advisor will be chosen prior to admission.

If a student transferred from the PhD program to the MS program will remain with the same advisor as for their PhD studies.

In very rare circumstances where a student transferring from the PhD program to the MS program who do not wish to remain with the same advisor, the same rules that apply to PhD students who change advisors are followed.

### **Financial Support**

Students are governed by the same general financial support rules as the PhD program.

### **Teaching Requirement**

If a student receives departmental support during their MS studies they must fulfill the same teaching requirements as PhD students. If the student receives no departmental support (i.e. support from advisor only) the student is not required to fulfill a teaching requirement.

## **Satisfactory Performance**

- Students are expected to make continuous and satisfactory progress towards fulfilling their degree requirements. Satisfactory progress is defined as and includes the following:
- Students must have a least 12 semester hours of graduate degree courses, using a standard letter grade scale and excluding courses taken on a "pass/fail" or "satisfactory/unsatisfactory" by the end of the first semester in residence.
- After the student's first semester in residence, they must work on their thesis research on a full-time basis.
- Students must maintain a grade point average (GPA) of 3.0 or better.
- Probationary Status/Possible Dismissal Due to Academic Grades
- If a student's cumulative GPA falls below 3.0 are placed on probationary status. The period of probation extends to the end of the next semester in which they are enrolled. Satisfactory/Unsatisfactory grades cannot be used to end probationary status.
- Once a student is placed on probation they have one semester (excluding summer semester) to improve their grades. If the student's GPA remains below
- 3.0 for two consecutive semesters, the advisor has the prerogative to immediately dismiss the student or suspend the student's stipend and the student may become responsible for tuition costs until their cumulative GPA is once again at or above 3.0.
- Decisions to reduce or terminate a student's stipend or dismiss a student from the program will be made on a case-by-case basis. The Graduate Academic Affairs Committee, the thesis advisor, and the Director of Graduate Study will consider all the factors that may have affected the student's performance before reaching such a decision. The Department Chair will be advised of all potential action prior to final actions of the involved parties.
- If a student's GPA falls below 2.33 for two consecutive semesters, the student will be immediately dismissed without further warning in accordance with university Policy. (The student will be notified of their status once final grades have been received and posted to their record.)

## **Inadequate Progress in Research**

Students will earn research hours by registering for BIOE 500. If a student does not make adequate progress in research during a semester, he or she will receive a grade of "unsatisfactory" in BIOE 500 and placed on probation during the subsequent semester and subject to continuous evaluation. If a student makes a grade of "unsatisfactory" the student will receive a written warning with notice of potential dismissal from the lab/graduate program. If a student receives a grade of "unsatisfactory" in BIOE 500 for two semesters and has not met the milestones in the prior written warning, the student will be immediately dismissed from the graduate program.

### Possible Dismissal Due to Inadequate Progress in Research

The dismissal process due to inadequate progress in research is the same as for PhD

## **Change in Advisor for Reason Other than Inadequate Progress in Research**

Since switching advisors will likely affect progress toward the degree and/or any financial support arranged by the previous advisor, a student should only consider switching advisors in exceptional circumstances. However, the department recognizes that in rare circumstances, a student may feel

their interests could be better served by working with a different advisor. Requests to voluntarily switch advisors will be handled on a case-by-case basis. In such cases the department will try to assist the student, however, the student bears the ultimate responsibility of finding a new advisor. Master of Science students follow the same procedure for choosing a new advisor as PhD students.

## **Progress Review and Evaluation**

### Advisor/Committee Meetings

- Students will meet with their advisor as deemed necessary. Once they pick the members of their thesis committee, the committee and advisor they should meet with their advisor on an annual basis or more often as deemed appropriate by the student's advisor or thesis committee.
- Semi-Annual Progress Reviews
- Master's student must follow the same requirements as PhD students.
- should, in consultation with his or her advisor, select the courses most appropriate for his or her research. Advanced topic courses may be used to meet the 18 semester hours of graduate level courses (graded using a standard letter grade scale).
- Department policy requires that full-time students be registered for at least 9 credit hours each semester. If hours are needed in addition to course work, the student should register for BIOE 500. Students are expected to fulfill the research requirements as defined by their advisor to earn a grade of "satisfactory" in BIOE 500.
- All course work must be completed by the deadline for candidacy. Students should carefully consider their course choices to assure they meet the degree requirements for the MS program.
- The student's thesis advisor or thesis committee may require further course work if it is considered essential to the thesis research.

## **Time Boundaries for Candidacy and Defense**

### **Time to Candidacy**

Students must be approved for candidacy before October 31st prior to their juried defense. MMus students must be approved for candidacy before beginning the 4th semester of study. All other thesis master's students must be approved for candidacy no later than the beginning of the 5th semester of their enrollment in the degree program at Rice. See [Candidacy, Oral Examinations and Thesis](#).

### **Time to Defense**

Master's students must defend the thesis no later than the 8th semester from the date of their enrollment in the degree program at Rice. See [Candidacy, Oral Examinations and Thesis](#).

### **Time to Thesis Submission**

Candidates who successfully pass the oral examination in defense of the thesis must submit the thesis to the Office of Graduate and Postdoctoral Studies no later than six months from the date of the examination. See [Candidacy, Oral Examinations and Thesis](#).

### **Time to Degree**

All master's students are required to complete their program within five years of initial enrollment. This time boundary includes any period in which the student was not enrolled or enrolled part-time, for whatever reason. Failure to meet any university time to degree deadline may result in the student not being able to continue in their degree program.

### **Approval of Candidacy**

- Candidacy marks a midpoint in the course of graduate education. Achieving candidacy for the master's degree signals that a graduate student has:
- completed required coursework,
- passed any required exams to demonstrate his/her comprehensive grasp of the subject area,
- demonstrated the ability for clear oral and written communication, and
- shown the ability to carry on scholarly work in his/her subject area.
- More detailed information on approval of candidacy can be found at <https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-thesis-masters-degrees/>

### **Thesis Committee**

- The thesis committee administers the oral examination for the student's thesis defense and has final approval/disapproval authority and responsibility for the written thesis.
- A thesis committee is composed of at least three members. Two, including the committee chair, must be members of the student's department faculty. At least three members of the committee must meet one of the following requirements:
- Tenured or tenure-track members of the Rice faculty
- Research faculty holding the rank of assistant research professor, associate research professor, or research professor
- Qualified individuals who have been certified as thesis committee members by the dean of graduate and postdoctoral studies

### **Announcement of Thesis Defense**

Oral examinations for the master's degree must be announced at least 7 days in advance. Oral examination announcements are to be submitted to the Office of Graduate and Postdoctoral

Studies by entering the information into the Graduate Students Thesis Defense Announcement form at <https://events.rice.edu/rgs>.

### **Oral Examination in Defense of Thesis**

The public oral defense of a thesis is intended to be an examination of a completed body of work and should be scheduled only when the thesis is essentially completed. Students may take the final oral examination in defense of their thesis only after the dean of graduate and postdoctoral studies approves their candidacy.

Master's students must defend their theses before the end of the eighth semester of their enrollment at Rice. Students who are unable to meet the university time boundary for thesis defense may petition the dean of graduate and postdoctoral studies or his/her designee for an extension of time to defense. Students who exceed their time boundaries without an approved extension request will be charged a fee of \$125 for reinstatement to good standing. Students who exceed their time boundaries and do not receive an extension to their time to defense are subject to dismissal by the Office of Graduate and Postdoctoral Studies.

A candidate must be enrolled in the semester in which his or her oral examination is held. Students who defend during the summer must enroll in the summer session of classes. For the purpose of the oral defense only, enrollment in a semester is considered valid through the Friday of the first week of class of the following semester. Students passing the oral examination on or before the end of the first week of classes of any semester do not have to register for that or any subsequent semester even though they may be continuing to make minor revisions to the final copy of their thesis.

In addition to announcing the planned defense as described above, at least one copy of the thesis must be available in the departmental office not less than two calendar weeks prior to the date of the oral defense. Graduate programs may allow or require the thesis to be submitted and stored in an electronic format.

The length of the oral examination and the subject matter on which the candidate is questioned are left to the judgment of the thesis committee. The defense should be scheduled by the student after consultation with the thesis advisor, who agrees that the thesis is completed and ready to be defended. All oral thesis defenses must take place on the Rice University campus with the candidate and all thesis committee members in physical attendance. In exceptional cases, appeals to this requirement can be made in writing to the dean of graduate and postdoctoral studies.

Should a candidate fail, the committee chair may schedule a second examination. Students who fail a second time will be dismissed from the university.

Following their defense, students must submit a copy of their approval of candidacy form, signed by the thesis committee signifying successful defense of the thesis, to the Office of Graduate and Postdoctoral Studies within one week after the oral examination. Instructions to submit this form are located online at <https://graduate.rice.edu/thesis>. The original approval of candidacy form must be turned in when the thesis is submitted.

## **Thesis Submission Regulations and Procedures**

The thesis is the principal record of a student's work for an advanced degree. Instructions for online thesis submission and guidelines for thesis formatting are available at: <https://graduate.rice.edu/thesis>.

## **Other Requirements**

There are other additional requirements, regulations and procedures for all graduate programs. They are found under *Graduate Students > Academic Policies and Procedures > All Graduate Students*, or can be accessed directly [here](#).

## **Graduation**

Degrees are conferred at the end of the semester in which the student defends his or her thesis, including the end-of-summer degree conferral. If the student defends their thesis in the summer by the deadline set by the Office of graduate and Postdoctoral Studies, the student may have their degrees conferred in August. Students are required to apply for degree conferral with the Office of the Registrar during the semester in which they wish to graduate, prior the deadline set by the registrar's Office. Students should refer to the Office of the Registrar at <http://registrar.rice.edu> for additional information regarding deadlines.

Commencement occurs only once per year. If a student submitted their final thesis after the deadline for commencement, the student may participate in the following commencement.