Departmental Assessment Plan:

At the end of the Biomedical Engineering Master’s Research/Thesis and Coursework program, students will be able to:

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<tr>
<th>Learning Goals</th>
<th>Measures</th>
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<tr>
<td>Demonstrate proficiency of the subject matter.</td>
<td>Graduate course grades</td>
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<td>Thesis/Report &amp; Defense</td>
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<td>Master’s Self-assessment</td>
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<td>Demonstrate research skills, execute a research project. (thesis and report only)</td>
<td>Thesis Research Proposal</td>
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<td>Thesis/Report &amp; Defense</td>
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<td>Master’s Self-assessment</td>
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<td>Peer Reviewed Publications</td>
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<td>Conference Publications</td>
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<td>Make a contribution to the discipline. (thesis only)</td>
<td>Thesis/Research Proposal</td>
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<td>Peer-reviewed publications</td>
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<td>Conference presentations</td>
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<td>Seminar presentation evaluations (if applicable)</td>
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<td>Master’s Self-assessment</td>
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<td>Demonstrate professional skills.</td>
<td>Thesis/Report &amp; Defense</td>
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<td>Teaching evaluations (if applicable)</td>
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<td>Practice responsible conduct of research (field appropriate)</td>
<td>Thesis/Report &amp; Defense</td>
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<td>RCR Training</td>
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MASTER’S ADMISSION PROCESS

Applications will be accepted on a rolling basis. There is no deadline for applying to the master’s program.

Master’s students typically do not receive support from the BME department during their studies.

Admission Requirements:

- GPA of 3.0 on a scale of 4.0
  - To convert your GPA to the 4.0 scales, please use this link:
    http://www.foreigncredits.com/Resources/GPA-Calculator/

- GRE: Recommended scores of:
  - 160 Quantative
  - 153 Verbal
  - 3.0 Analytical
    (Michigan Tech students are exempt)

- TOEFL: Recommended Score of 100 iBT (International Students)

- IELTS: Recommended Overall Band Score of 7.0 (International Students)

The BME graduate committee will review applications approximately biweekly and reject any applications that do not meet the basic requirements.

- All students who have a BS in an engineering discipline are eligible to apply. However, students lacking undergraduate courses in life sciences or biomedical engineering may be required to complete additional courses to correct this deficiency. The advisor and BME graduate program director will approve a plan for satisfying the deficiency.

- Exceptional students with non-engineering BS degrees are also eligible to apply. However, these students may be required to complete additional courses in engineering and/or mathematics to correct the deficiency. The advisor and BME graduate program director will approve a plan for satisfying the deficiency.

- The standard Graduate School admissions process applies.

Advisor Assignment

We recommend that students review the website and contact us with who they would like to set up as their temporary advisor. If they are having trouble selecting an advisor by a specific date (one month prior to arrival on campus) a temporary advisor will be assigned.
Typical Program of Study and Requirements for ALL Master’s Students

- Students can be enrolled in the MS program under three options: Thesis Option, Report Option, and Coursework Option. Students need to indicate their option by completing the MS Plan of Study Form before the end of the first semester in the program. Students are allowed to change their plans while enrolled in the program at any time. This plan must be approved by their BME advisor.

- The following courses are required core courses that each student must take and pass with a minimum of a “B” grade:
  - MA5701 Statistical Methods I offered Fall
  - BE5200 Cellular & Molecular Biology II offered Spring

- Graduate students who wish to take 3000/4000 level courses must get special approval from their advisor.

- Students who wish to change their program option (same advisor) must submit a Degree Schedule Form to the Graduate School.

- All graduate students are required to attend all BME graduate seminars. See separate section - Graduate Seminar Series for further information and requirements.

- Students are permitted to take courses outside the BME department as determined by the student and his/her advisor.

- A cumulative GPA for courses counted toward the degree of 3.0 is required for graduation.

- Students who are accepted to the program will be placed under probation if their cumulative GPA for courses counted toward their degree falls below a 3.0. Students with 2 consecutive probation semesters will not be allowed to continue in the program.

- All Graduate School residency and credit requirements must be met.

All students are required to complete a Self-assessment Form every spring semester. They must also meet with their advisor after completion of the assessment.
Coursework Option

This plan requires the minimum of 30 credits be earned through coursework. Research credits taken by students in other plans may not be counted as coursework credits.

- Students must complete the [master's requirements for all students](#) (see link), as well as the below requirements for courses:
- A minimum of 30 approved credits (including required core courses)
- Coursework must satisfy the following:
  - 18 credit minimum 5000-6000 classes
  - 9 credit maximum 4000 classes
  - 3 credit minimum 4000 or higher level courses outside the department
  - 12 credit minimum from BME department
- Up to 6 credits taken as Independent Study may be for research-related activities

The following courses are required core courses, all students must take and pass with a minimum of a “B” grade:

- MA5701 Statistical Methods I offered Fall
- BE5200 Cellular & Molecular Biology II offered Spring

Graduate students who wish to take 3000 or 4000 level courses must get special approval from their advisor.

All other deadlines and requirements for completion of the master's coursework are located at this link.

Coursework students are required to complete a Self-assessment and meet with their advisor annually to ensure they are taking and enrolling in the correct courses to fulfill degree requirements.
Required Deadlines – Coursework Option

Each MS student enrolled in the Department of Biomedical Engineering (BME) MS program is required to adhere to the following deadlines.

REMEMBER THAT FORMS ARE AVAILABLE ON THE GRADUATE SCHOOL WEBSITE, MyMichiganTech AND THE BIOMEDICAL ENGINEERING’S GRADUATE WEBSITE.

STUDENTS ARE REQUIRED TO MONITOR THEIR ACCOUNTS AND SUBMIT FORMS BY THE REQUIRED DEADLINES.

Newly accepted student responsibilities upon arrival on campus and prior to 1st day of class:

Obtain Husky Card

International students report to International Programs and Services (IPS)

Attend Graduate School Orientation

• Complete Basic Responsible Conduct of Research Training:
  o Provided during Graduate School Orientation
  Or
  o www.mtu.edu/gradschool/administration/academics/resources/rcr/online-basic/
• Complete on MyMichiganTech the Patent, Research, & Proprietary Rights Agreement Form
• Submit official proof of previous degrees earned to the Graduate School

Attend BME Department Grad Student Orientation Meeting.

Beginning of 1st semester:

• Complete Campus Clarity Training
  o www.mtu.edu/gradschool/administration/academics/resources/rcr/online-basic/

Prior to the end of the 1st semester:

• Complete Advisor Recommendation Form (M2) and submit to the Graduate School. A copy of the document is also required for department files. This process is to choose your advisor.
• Proposed coursework and MS option: Biomedical Engineering MS Plan of Study Form. The proposed coursework will include the classes taken during the first semester. This must be signed by the advisor, the BME graduate program director and/or the BME department chair. This form is for department files only.

2nd or 3rd semester:

• Complete Advanced Responsible Conduct of Research Training:
  o www.mtu.edu/research/administration/integrity-compliance/responsible-conduct/training/courses/
  o Students are recommended to take these courses fall or spring semester

At the end of every year:

• Submit Master’s Coursework Student Self-assessment Form to advisor before the end of the spring semester.
• **Arrange meeting with advisor to review the self-assessment.**
• The purpose of the self-assessment is to keep the advisor abreast of progress and garner their feedback. The advisor may determine if more frequent meetings are required.

Semester before Planned Degree Completion:

• Submit Degree Schedule to the Graduate School (M4).
SEMMESTER OF PLANNED DEGREE COMPLETION:

Students need to monitor their MyMichiganTech account for required Graduate School forms and deadlines.

- Submit Commencement Application Form to the Graduate School.
- Submit Degree Completion Form to the Graduate School.
- Submit Verification of Final Degree Requirements Form to Graduate School.
- Advisor complete Biomedical Engineering Evaluation of MS Graduate Student Outcomes – Coursework using the Biomedical Engineering MS Evaluation Rubric.

Please refer to the Graduate School guidelines for remaining procedures at:

www.gradschool.mtu.edu/td/subscription/#final or MyMichiganTech
Master’s Thesis Option

Under this master's option a student will select a project of research interest. The program requires a research thesis prepared under the supervision of the advisor. The thesis describes a research investigation and its results. The scope of the research topic for the thesis should be defined in such a way that a full-time student could complete the requirements for a master's degree in twelve months or three semesters following the completion of coursework by regularly scheduling graduate research credits. The thesis must be prepared following the current Graduate School procedures.

Upon completion of the course requirements and research thesis, a master’s thesis student will present a defense of their work. The defense must include the faculty advisor and the committee. The defense will be open to the public. Upon dismissal of the general audience the committee will continue to question the student. The committee will evaluate the student’s ability to present and defend the thesis using the Biomedical Engineering MS Evaluation Rubric and record the results on the Biomedical Engineering Evaluation of MS Graduate Student Outcomes - Thesis. Students must report the results of their oral examination and submit a final thesis to the Graduate School prior to completing their degree.

Visit the deadlines section for detailed information about required forms and due dates.
Thesis Option Course Requirements

Under this plan, the student is required to produce a research thesis with the supervision of an advisor. The minimum course requirements are as follows:

- Students must complete the master's requirements for all students (see link), as well as the below requirements for courses:
  - A minimum of 30 approved credits (including required core courses)
  - 20 credit minimum of relevant coursework
    - 12 credit minimum 5000-6000 level courses
    - 9 credit maximum 4000 level courses
    - 3 credit minimum 4000 or higher level courses outside the department
    - 12 credit minimum from BME department
  - 6 to 10 research credits

The following courses are required core courses, all students must take and pass with a minimum of a “B” grade:

- MA5701 Statistical Methods I offered Fall
- BE5200 Cellular & Molecular Biology II offered Spring

Graduate students who wish to take 3000 or 4000 level courses must get special approval from their advisor.

All other deadlines and requirements for completion of the master’s thesis are located at this link.
Master’s Report Option

Under this master’s option a student will select an independent project of research interest. The student will prepare a report describing the results of the project. The scope of the research topic for the report should be defined in such a way that a full-time student could complete the requirements for a master’s degree in twelve months or three semesters following the completion of course work by regularly scheduling graduate research credits. Reports must be prepared following the formatting guidelines from the Graduate School.

Upon completion of the course requirements and project, the student must present the results of their report during their defense. The defense must include the faculty advisor and the committee. The defense will be open to the public. Upon dismissal of the general audience the committee will continue to question the student. The committee will evaluate the student’s ability to present and defend the report using the Biomedical Engineering MS Evaluation Rubric and record the results on the Biomedical Engineering Evaluation of MS Graduate Student Outcomes - Report. Students must report the results of their oral examination and submit a final report to the Graduate School prior to completing their degree.

Visit the deadlines section for detailed information about required forms and due dates.
Report Option Course Requirements

Under this plan, the student is required to produce a report describing the results of an independent study project. At least 24 of the 30 credits must be earned in coursework other than the project.

- Students must complete the Master's requirements for all students (see link), as well as the below requirements for courses for the report option:
- A minimum of 30 approved credits (including required core courses).
- 24 credit minimum of course work
  - 12 credit minimum 5000-6000 level courses
  - 12 credit maximum 4000 level courses
  - 3 credit minimum 4000 or higher level courses outside the department
  - 12 credit minimum from BME department
- 2 to 6 research credits

The following courses are required core courses, all students must take and pass with a minimum of a “B” grade:

- MA5701 Statistical Methods I offered Fall
- BE5200 Cellular & Molecular Biology II offered Spring

Graduate students who wish to take 3000 or 4000 level courses must get special approval from their advisor.
Required Deadlines – Thesis and Report Option

Each MS student enrolled in the Department of Biomedical Engineering (BME) MS program is required to adhere to the following deadlines.

REMEMBER THAT FORMS ARE AVAILABLE ON THE GRADUATE SCHOOL WEBSITE, MyMichiganTech AND THE BIOMEDICAL ENGINEERING’S GRADUATE WEBSITE.

STUDENTS ARE REQUIRED TO MONITOR THEIR ACCOUNTS AND SUBMIT FORMS BY THE REQUIRED DEADLINES.

Newly accepted student responsibilities upon arrival on campus and prior to 1st day of class:

Obtain Husky Card

International students report to International Programs and Services (IPS)

Attend Graduate School Orientation

• Complete Basic Responsible Conduct of Research Training:
  o Provided during Graduate School Orientation
  Or
  o www.mtu.edu/gradschool/administration/academics/resources/rcr/online-basic/
• Complete on MyMichiganTech the Patent, Research, & Proprietary Rights Agreement Form
• Submit official proof of previous degrees earned to the Graduate School

Attend BME Department Grad Student Orientation Meeting

Beginning of 1st semester:

• Complete Campus Clarity Training
  o www.mtu.edu/gradschool/administration/academics/resources/rcr/online-basic/
• Complete Advisor & Committee Recommendation Form (M2) and submit to the Graduate School. A copy of the document is also required for department files. This process is to confirm who the advisor will be.

2nd semester:

• Complete Advisor & Committee Recommendation Form (M2) and submit to the Graduate School. A copy of the document is also required for department files. This process is to choose your advisory committee. This committee will consist of the student’s advisor, and at least 3 additional full-time faculty members. Two members must have a primary appointment in the BME department. There must be at least one member who does not have a primary or adjunct appointment in the BME department.

• Proposed coursework and MS option: Biomedical Engineering MS Plan of Study Form. The proposed coursework will include the classes taken during the first semester. This must be signed by the advisor. This form is for department files only.

2nd – 3rd semester:

• Complete Advanced Responsible Conduct of Research Training:
  o www.mtu.edu/research/administration/integrity-compliance/responsible-conduct/training/courses/
  o Students are recommended to take these courses fall or spring semester.

Every semester:

• Must attend a minimum of 6 BME graduate seminars each semester. Attendance of other department seminars is required if there are not enough BME seminars offered.
At the end of Spring semester:

- Submit Graduate Student Self-assessment Form to advisor.
- **Arrange meeting with advisor to review the self-assessment.**
- The purpose of the self-assessment is to keep the advisor abreast of progress and garner their feedback. The advisor may determine if more frequent meetings are required. This also provides graduate students with a review of their performance and expectations for the coming semester. Negative reviews will reflect in the graduate student’s grade.

Semester before Planned Degree Completion:

- Submit Degree Schedule to the Graduate School (M4).

SEMESTER OF PLANNED DEGREE COMPLETION:

Students need to monitor their MyMichiganTech account for required Graduate School forms and deadlines.

- Submit Commencement Application Form to the Graduate School.
- Submit Degree Completion Form to the Graduate School.

Thesis/Report Defense:

The thesis/report defense is open to the public. The student will give a presentation to the audience. The general audience will first question the student on the proposal. Upon dismissal of the general audience, the thesis/report committee members will continue to question the student. The committee will evaluate the student’s ability to present and defend the thesis/report using the Biomedical Engineering MS Evaluation Rubric and record the results on the Biomedical Engineering Evaluation of MS Graduate Student Outcomes – Thesis or – Report. If the student does not pass the defense, he/she can retake the defense a second time. Failure in the second defense will result in the dismissal of the student from the thesis/report MS program. The student will have the option to complete the MS degree with the coursework option.

2 weeks prior to Defense:

- Provide the date, time, building/room number and title of defense to the departmental coordinator. M&M 309 staff can reserve a room for the defense.
- Submit Pre-defense Form & Defense Draft (M5) to the Graduate School and advisory committee. Committee members may request to have the defense draft turned in sooner.

On the day of your Defense:

- Bring a copy of the Report on Final Oral Examination Form (M6) with you to your defense.

Please refer to the Graduate School guidelines for remaining procedures at:

www.gradschool.mtu.edu/td/submission/#final or MyMichiganTech