Handbook for
Biomedical Engineering Graduate Students

Department of Biomedical Engineering
Wayne State University

Last Update: January 24, 2011
PREFACE

The policies outlined in this *Handbook* pertain to graduate students at the M.S. or Ph.D. level in the Department of Biomedical Engineering (BME). In case of error, omission, or conflict, policies of the Graduate School of Wayne State University (WSU) supersede those stated here. If the policies of the Program change during a student's tenure at Wayne State, the student can elect one of the two following options:

1. Continue studies under the complete set of policies in place at the time of his/her matriculation into the program
2. Continue studies under the complete set of new policies

Students must choose one set of policies or the other; they may not pick and choose policies from each group. In rare cases, the faculty may apply a new regulation to all students who have not passed a specific milestone (i.e. candidacy) in their program if such a change will not materially affect the progress of the students.

The Graduate Committee reserves the right to correct typographical errors in these policies at any time without giving students the above choice.

It is the ultimate responsibility of the student to make sure that these policies and timelines are followed in order to allow for a timely graduation.
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POLICY ON ACADEMIC INTEGRITY

It is the policy of the Department of Biomedical Engineering that academic dishonesty will not be accepted in any course or examination. The University defines cheating as “intentionally using or attempting to use, or intentionally providing or attempting to provide, unauthorized materials, information, or assistance in any academic exercise.” This includes any group efforts on assignments or exams unless specifically approved by the professor for that assignment/exam. Fabrication of data or plagiarism, as defined by the University in its brochure “Academic Integrity,” is also prohibited. All students are expected to be fully aware of and compliant with the Expectations for Citations in Biomedical Engineering given below.

Any instance of academic dishonesty will result (at the instructor’s sole discretion) in either: 1) a failing grade for the assignment or examination in question; or 2) a failing grade in the course. Instances of academic dishonesty will be reported to the Graduate Committee. If a student is found guilty of any subsequent act of academic dishonesty, either within that course or a subsequent course, administrative action will be taken in accordance with the Student Due Process Policy and may include a recommendation for dismissal from the Graduate Program.

“Academic dishonesty ... tends to compromise the academic integrity of the institution or subvert the education process. All forms of academic dishonesty are prohibited at Wayne State University, as outlined in the Student Due Process Policy.” -- from Academic Integrity: Important Information for Faculty and Students
Expectations for Citations in Biomedical Engineering

Throughout your career in Biomedical Engineering, you will be asked to write reports, responses to exam questions or research papers that meld your ideas with those of others. It is very important that proper techniques for including citations of others’ work be included in these written, and oral, presentations. There are many accepted formats for citing your research sources. The American Psychological Association (APA) developed one of these in the 1920s. In their *Quick Guide to APA Documentation*, the discussion of referencing correctly is introduced with the following statement:

If you use the exact words of another writer, it is a quotation. If you rework the words, stating the ideas in your own way, it is a paraphrase. Either way, these words or ideas are not yours. You must give credit to the original author. Not giving due credit to your sources is PLAGIARISM. (1)

In addition, the *Quick Guide* emphasizes the seriousness of plagiarism:

Plagiarism is a form of lying. You take something written by someone else and claim it as your own. Simply listing your sources in a reference list at the end of a paper does not absolve you from plagiarism. You have to indicate within the body of your paper exactly which sources are used and where you used them. (1)

All methods of documentation, or referencing, have the same goal: readers should be able to refer to your reference list and, in doing so, find the original source of the information you present. The readers then have the option of obtaining this material for their own analysis. It is therefore important that your means of referencing include two parts: 1) an in-line reference which directs the reader from the specific point in your paper to the reference list; and 2) a complete reference list, including authors, titles, years, and pages.

Correctly documenting the references used in your written and oral presentations is an important part of scientific and academic integrity. It is important that a reader be able to determine the original source of an idea or piece of data. Further discussion of the data should include an analysis of the original source, not merely your representation of that information. Also, think of the issue from the opposite side. You have spent several years working on a project to develop both data and theories. When you read an article one day, you see your hard work presented without your name attached. This is an extremely disheartening experience.

All students within the Biomedical Engineering program are expected to adhere to accepted practices for documentation in all of their written and oral projects. Your professor may give you specific guidelines for this documentation. M.S. theses and doctoral dissertations are expected to use the style laid out in the *Journal of Biomechanics*.

Determining what needs to be referenced requires some practice. Common knowledge does not need to be cited -- however, it is often difficult to define that term. A good guideline is that if you had to look it up or it came from a paper that you read, then you should report the source.
When in doubt, include the reference. “It is better to cite a common knowledge fact that you may not be familiar with than to inadvertently commit plagiarism in the belief that something is common knowledge.” (1)

In order to avoid plagiarism, be aware when you are quoting or paraphrasing another individual’s work. A quotation is defined as using the exact words of another individual. Quotations should be set apart from the remainder of the text by using either quotation marks (“xxx”) or the block quotation format. The block quotation format was used above for the introduction material from the APA. This technique should be used for quotations that are longer than two or three lines of text. Paraphrasing involves rewriting another individual’s ideas or words using your own style and wording. This must still be cited because, although the words are yours, the ideas were actually first laid out by another person (1). Changing one or two words in another person’s sentence does not count as paraphrasing – this is still a quotation and the copied portions should be in quotation marks.

Data that you are citing from another individual’s work, or even your own work which has been published elsewhere, should also be cited. A number or series of numbers does not need to be quoted, but the reference to the original source must be included. Any figures that are taken directly from or adapted from another source must be referenced appropriately. If your paper is destined for publication in any manner, then permission must be obtained from the original copyright holder for the figures in addition to including the reference, unless the publisher of the original material only requires an acknowledgement of the source.

All students are expected to be aware of and compliant with accepted standards for writing technical reports and reviews of the literature. This includes proper styles and usages for citations. All students are encouraged to obtain and follow the guidelines provided in Pocket Handbook of Technical Writing for Engineers and Scientists by Leo Finkelstein, Jr. The Department has adopted this book as the style guide for all classes within the program. Failure to comply with these standards will constitute a violation of the Departmental Policy on Academic Integrity, as stated above, and penalties will be applied.

If you have any questions regarding methods of documentation, please consult with your instructor or contact the Associate Chair of the Department of Biomedical Engineering.

REQUIREMENTS FOR MASTER OF SCIENCE DEGREE

Academic Advisor

Master students should meet with the Departmental Academic Advisor during their first semester in the program to review a draft Plan of Work. The advisor will assist the student with course selection and the development of the Plan of Work. If a student is pursuing the Thesis option, the student’s Research Advisor will become his/her academic advisor and needs to approve the Plan of Work. For a list of approved Research Advisors, please consult with the Departmental Academic Advisor.

Coursework

A minimum of 34 semester credits beyond the baccalaureate degree is required for the completion of the M.S. program. Both thesis and non-thesis options are available. The division of credits for each program is:

**Thesis Program:**
- 14 credits of core courses
  - BME 5005 (2 cr) - Introduction Cell Biology/Physiology for Engineers
  - OR
  - BME 5040 (2 cr) - Fundamentals of Engineering Analysis
  - BME 5010 (4 cr) –Engineering Physiology
  - BME 5020 (4 cr) - Math and Computer Applications
  - BME 5030 (3 cr) - Molecular Biology for Engineers
  - BME 8070 (1 cr) - Seminar in Biomedical Engineering
- 12 credits of general courses (at least 4 credits in BME/Approved list)
  - Minimum of 6 credits at the 7000-level or above*
  - Maximum of 4 credits in 7990 or 7996 (Directed study or research)
- 8 credits of 8999 - Master's Thesis Research

**Non-Thesis Program:**
- 14 credits of core courses
  - BME 5005 (2 cr) - Introduction Cell Biology/Physiology for Engineers
  - OR
  - BME 5040 (2 cr) - Fundamentals of Engineering Analysis
  - BME 5010 (4 cr) –Engineering Physiology
  - BME 5020 (4 cr) - Math and Computer Applications
  - BME 5030 (3 cr) - Molecular Biology for Engineers
  - BME 8070 (1 cr) - Seminar in Biomedical Engineering
- 20 credits of general courses (at least 12 credits in BME/Approved list)
  - Minimum of 9 credits at the 7000-level or above* (with 6 credits in BME/Approved list)
  - Maximum of 4 credits in 7990 or 7996 (Directed study or research)
  - Maximum of 4 credits in BME 6991 (Internship)

*7990, 7996, and 8999 credits cannot be counted towards the minimum number of 7000-level credits in either the thesis or non-thesis program
A Plan of Work detailing the student's complete program must be completed and submitted to the student's academic advisor and the Graduate Program Chair for approval upon completion of 8 credit hours of course work. Students must pass all core classes before advancing to upper level classes. Sample curricula are provided in the following pages for the six general concentration areas in order to assist students with the development of their Plans of Work.

Students with life science backgrounds must complete a program of mathematics, physics and engineering materials in order to remediate deficiencies in their backgrounds. This requirement has to be satisfied through the satisfactory completion (B- or better) of undergraduate courses in appropriate subjects, which include Calculus I and II, Differential Equations and Linear Algebra, Physics I and II and other core engineering topics dependent on the proposed concentration. Upon admission into the program, students with life science backgrounds will be required to take BME 5040 (Fundamental of Engineering Analysis). Students with engineering/mathematical backgrounds must complete a program of physiology and cell biology material in order to remediate deficiencies in their backgrounds. This requirement can be satisfied through the satisfactory completion (B- or better) of BME 5005 (Introduction to Cell Biology/Physiology for Engineers). It may also be satisfied through the satisfactory completion of undergraduate courses in appropriate subjects, including physiology, cell biology and related topics dependent on the proposed concentration. Upon admission into the program, students with engineering backgrounds will be required to take BME 5005. Students with an undergraduate degree in BME do not have to take BME 5005 or 5040, but must select two credits of their choice to complete the required 34 credits.

In addition to the course offerings at Wayne State, students may elect to take courses at the University of Michigan, Michigan State University, or other universities within the state through the Michigan Intercollegiate Graduate Studies (MIGS) Program or the reciprocal registration agreement with the University of Michigan. Both programs are designed to allow graduate students to expand their curriculum beyond what is offered at Wayne State.

Credit earned through the MIGS program will be treated in the Plan of Work and grade point average as if it were earned at Wayne State. There may be additional tuition fees involved if the MIGS system is used. In order to enroll in courses through this program, a MIGS Application Form must be completed and signed by the student’s academic advisor, the WSU MIGS Liaison Officer at the Office of Graduate Enrollment Services, the faculty contact, department chair, and MIGS Liaison Officer of the host institution. It is recommended that this process be started as early as possible before the semester in question in order to minimize potential problems.

No additional tuition is charged for students registered at U of M through the reciprocal registration agreement. However, while the credits count towards the graduate degree, the classes shall not be included in calculation of the GPA. MS students may elect no more than 1/3 of their total degree program, exclusive of thesis, through this program. Students may only elect courses for which there is not an equivalent course at Wayne State. In order to utilize this option, students should complete the Graduate Petition to Elect Courses at the University of Michigan form.

Transfer Credits

A maximum of 8 semester hours of credit from graduate school at other institutions may be transferred to the M.S. program provided that the following conditions apply:
(a) The credit is certified as graduate-level (from an accredited institution) on an official transcript of the original institution.
(b) The coursework is applicable to the degree program.
(c) The credit has not been used toward the requirements of another earned degree.
(d) The course was completed with a grade of B or better. Note: B-, S or P grades are not acceptable for transfer.

Students wishing to apply transfer credit to their program should include those courses in the appropriate categories of the Plan of Work. The student must also file a Petition for Transfer of Graduate Credit towards MS Degree (found on the Graduate Change of Status Form) with their Plan of Work within the first term of the student’s MSBME program. The Petition must be approved by the student's advisor and the Graduate Program Chair. The student is responsible for maintaining copies of all approved record changes.

Program Load

A full-time graduate student is one who is enrolled for eight or more credits during a semester. A student with a strong academic record who is devoting full-time effort to graduate study and carrying no outside employment may register for a program not to exceed sixteen credits per semester. A student engaged in part-time work should limit registration in proportion to the amount of outside work. A student employed full-time will normally not register for more than eight credits. A student working full-time who desires to carry more than eight credits must get permission from his/her Academic Advisor.

Graduate Teaching Assistants or Graduate Research Assistants are required to register for at least six credits of graduate level courses per semester (1 credit during the Spring/Summer semester). If students supported by Graduate Assistantships are also required to take undergraduate courses as part of their programs, these must be in addition to the six graduate credits. As assistantships do not cover tuition for undergraduate courses, students should discuss options for payment of this portion of their tuition with their supervisors who offered the assistantship.

Minimum Grade Point Average and Policy to Repeat a Course

Students must maintain a cumulative grade point average of 3.0 or above in order to continue in the program. Students receiving a grade below a B- in a course listed in their Plan of Work cannot count that course towards their graduation requirements. No more than two courses may be repeated in a graduate program, and a student must have the appropriate approvals from the Academic Advisor and Graduate Program Chair BEFORE the repeat registration takes place. These two repeats may consist of a second attempt of two separate courses or two repeat attempts of a single course.

Per University policy, any course in which a mark appears on the student's transcript (including WN, WP, or WF) counts as an attempt to earn credit in that course. These attempts are therefore factored into the assessment of allowed repeats unless an exception is granted during the semester of the withdrawal. 'F' grades earned while in the College of Engineering may be the basis for immediate termination. Students will be restricted to one registration per course through the Banner student information system. The registration system will prevent students from registering for the same course a second time. They will need to contact the Academic Advisor for this second registration override.
The grade received in repetition of the course will be shown on the transcript and used in computation of the student's grade point average for the degree program. Students should consult the Graduate Bulletin for rules concerning the grading system (I, WF, WN, WP, Y, and Z) and its effect on the student’s overall GPA. Students will not receive University financial aid for repetition of courses.

**Thesis**

In order to satisfy the requirements for the thesis option, a student must develop a thesis project with their Research Advisor and complete eight credits of BME 8999, Master's Thesis Research. To initiate registration of thesis credits, students are required to complete *Petition and Authorization for Master’s Thesis Research and Direction* and obtain the necessary signatures. Students also have to attach an abstract of their thesis research with this form. All completed credits of BME 8999 will receive a grade of ‘Y’ until the time of the satisfactory completion of the thesis defense, at which time they will be converted to the appropriate letter grade. At the completion of the thesis, an oral defense must be scheduled and the thesis must be presented to the Graduate School in accordance with its requirements.

A Master's Thesis Committee must consist of at least three individuals, with one member preferably coming from outside of the Primary Biomedical Engineering Faculty. The Thesis Committee should be selected as early as possible in order to gain their insight into the research project. The completed thesis, approved by the student's Research Advisor, must be delivered to the Thesis Committee at least three weeks prior to the scheduled defense and Part 1 of the Final Report form must be submitted to the Graduate Program Chair. The defense must be publicized openly and the initial portion shall be open to the public. At the time of the defense, Part 2 of the Final Report form must be completed and signed by all committee members. It should then be submitted to the Graduate Chair.

Once approved, 3 copies of the completed thesis must be submitted to the Ph.D. Office of the Graduate School. The thesis must conform to the published style manual (please see Expectations in Citations for guidance) in order for it to be accepted by the University. Students should obtain a copy of the *WSU Guide for Preparing Theses and Dissertations* from the Graduate School. These guides are updated regularly, and students should make sure that they have the most recent version. The Ph.D. Office staff is available to assist advisors and students who have format questions or problems. It is suggested that a draft copy of the thesis be submitted to the Ph.D. Office as early as possible to check for compliance with these standards. A check made payable to Wayne State University must be submitted along with the approved thesis to cover the cost of binding.

Students should obtain the deadline dates for graduation requirements from the Ph.D. Office of the Graduate School. These should be reconfirmed during the semester in which the thesis defense is planned.

Any student enrolled in the MS thesis option will need permission from his/her Research Advisor to switch to non-thesis program. If the thesis cannot be completed, any thesis credits already registered for cannot be converted to any coursework or directed study/research credits.
BME Academic Probation and Exclusion Guidelines:

PROBATION

A BME student will be put on academic probation under the following conditions:

If, at any time, a graduate student’s scholastic grade point average falls below 3.0, the student is placed on probation and automatically has a hold placed on their registration. A student on probation must secure the approval of the Academic Advisor before registering for subsequent work in the Department.

Once on academic probation the following rules apply in order to continue in the BME program:

1. Obtain a term GPA of 3.0 or greater for the FIRST semester on probation. (If not currently enrolled, this requirement applies to the next semester enrolled in our program).
2. Obtain a term GPA of 3.0 or greater EACH semester in the program until overall GPA is above 3.0.
3. Failure to maintain GPA of 3.0 for EACH semester until cumulative GPA is 3.0 or greater will result in exclusion from the program.
4. The student will continue to see a Probation Hold for Registration each semester that their GPA remains below 3.0. Students placed on hold will see the BME advisor to obtain an override to register. The advisor will determine if an override should be granted. Further consideration can be obtained from the BME Associate Chair.

The department reserves the right to ask a student to withdraw at any time from specific courses or from the department entirely, if progress does not warrant continuance.

EXCLUSION

Basis for Exclusion from the BME program:

1. Grade below B- in each of two attempts to pass a core course (BME 5005, 5010, 5020, 5030, 5040) – Withdrawal of a course counts as an attempt (includes WP, WF, WN grades)
   OR
2. Overall GPA below 3.0 for two semesters once a student is placed on probation.

Exclusion Process:
1. This is initiated by a letter from the Associate Chair to the student.
2. The student can appeal the exclusion in writing to the Department Chair.
3. The Department Chair may agree with the appeal and set up a remedial program which the student MUST follow to remain in the program. Alternatively, the Department Chair may deny the appeal.
4. Further appeals are in writing to the Associate Dean of Academic Affairs in the College of Engineering.
5. The Associate Dean may agree with the appeal and set up a remedial program which the student MUST follow to remain in the program. The Associate Dean will advise the student of any further appeals.
6. If all appeals are denied OR if the student has not met the conditions of the remedial program, the exclusion is carried out to completion and the student has no more recourse.
Time Limitations

Students have a six-year time limit to complete all requirements for the Master's degree. The six-year period begins with the end of that semester during which the student has first taken work that applies toward meeting requirements of the M.S. degree. No credit may be more than six years old at the time all requirements are completed, including transfer credits. A time extension may be authorized by the Graduate School with the approval of the BME Graduate Program Chair, but only for conditions that are clearly beyond the control of the student. Upon recommendation of the Graduate Program Chair and approval of the Graduate School, a student may arrange for revalidation of over-age credits which are between six and ten years old and which represent courses completed at Wayne State University. Credits from other institutions may not be revalidated. In revalidation cases, the Academic Advisor and the student must set a terminal date for completion of all degree requirements, including such additional requirements as may be indicated to revalidate over-age credits. If revalidation is to be by examination, a special examination fee will be charged.

Residency Requirements

A student pursuing a Master's degree must complete at least 26 semester hours of graduate work at Wayne State University.

Graduation

Students must complete the Graduate Application for Degree form on their Pipeline prior to the end of the fourth week of classes in which they hope to graduate. If graduation is postponed for any reason, the Graduate Application for Degree must be re-filed in the appropriate semester.

Information concerning Commencement announcements, caps and gowns, tickets, and other relevant information will be mailed to the degree candidate by the Commencement Office (313-577-2414) prior to the event. Please make sure that the Records Office (5057 Woodward Avenue) and the Graduate Office of the College of Engineering has your current address. Candidates for advanced degrees are requested and expected to attend the Commencement at which the University confers upon them the honor of the degree. Diplomas will be mailed to all students after the Department, College, and University certify that degree requirements have been satisfied. Be forewarned that this often takes several weeks after the end of the term.

Paperwork Summary

Students should be aware of the following paperwork requirements. Some forms are required for all students, others only in certain circumstances. Sample copies of each form are provided on the Department web page. It is the responsibility of each student to make sure that the appropriate forms are filed in a timely fashion.

Application for Admission or Change of Status Form

Students who are NOT currently enrolled in a graduate program at Wayne State University must complete the Graduate Application Form online on the Graduate Enrollment Services website (http://gradadmissions.wayne.edu/apply.php) and send all supporting documentation to the Graduate Enrollment Services Office. A GPA of 3.0 in an accredited undergraduate program is required for regular admission. Qualified
admission may be granted to students who need to remediate deficiencies in their background.

Please keep in mind that your admission is for a specific term only. If you do not enroll during the term for which you were admitted, you must complete a Graduate Re-Application. Please refer to the Graduate Enrollment Services website (http://gradadmissions.wayne.edu/apply.php) for directions to Re-Apply into the program.

Students who are currently enrolled in a different graduate program within the University may apply to transfer to BME by submitting a Graduate Record/Status Change form and copies of undergraduate and graduate transcripts to the Academic Services Officer or Associate Chair. It is important to submit these forms in order to be officially registered with BME, which is required before graduation can be approved.

Other types of Graduate Applications such as Graduate Guest Admission Application and Graduate Permit to Register Application are described and available on the Graduate Enrollment Services website.

Plan of Work
By the time a student has completed 8 credits of work towards the M.S. degree; he/she must complete and submit a Plan of Work to the Academic Advisor and Graduate Program Chair for approval. A new Plan of Work must be filed and approved if any of the course selections are changed. Any classes taken outside of the BME department have to be pre-approved in a Plan of Work signed by both the Academic Advisor and the Graduate Program Chair prior to the registration of these classes.

Transfer of Credit
In order for transferred credit to be applied towards the M.S. Degree, a Petition for Transfer of Graduate Credit towards MS Degree form must be submitted to the Academic Advisor at BME. It must be accompanied by original, official transcripts from the university where the credit was earned. The student must also file a Petition for Transfer of Graduate Credit towards MS Degree (found on the Graduate Change of Status Form) with their Plan of Work within the first term of the student’s MSBME program. The petition must be approved by both the Academic Advisor and Graduate Program Chair before being forwarded to the Associate Dean for Academic Affairs for final approval.

Outline of Directed Study/Research
Prior to registering for BME 5990, 7990, or 7996, students must complete and file a Master of Science Petition and Authorization for Directed Study form. This form must describe the outline of the course, significance of the course to the graduate program, and manner in which the course is to be evaluated. A M.S. student may count no more than 4 credits of Directed Study or Directed Research towards their degree. The plan for Directed Study must be approved by the course instructor and the Graduate Program Chair. An override to register for these credits can be obtained by the Academic Advisor.

Outline of BME Internships
Registration for BME 6991 can only occur with approval from the Graduate Program Chair. Students must complete and file a Petition and Authorization for Internship Form.
This form must describe the outline of the internship, significance of the work to the graduate program, and include the offer letter communicated from place of internship. A M.S. student may count no more than 4 credits (1 credit equals 4 hours work per week) of internship towards their degree. A midterm and final report summarizing the internship experience must be submitted to the Graduate Program Chair before the final grade is issued. Students must also request their internship supervisors complete the Internship Supervisor Evaluation form and forward to the Advisor.

Graduate Application for Degree
Students must apply for their degree certificate on their Pipeline no later than the last day of the fourth week of classes in the graduation term. (The graduation term is the term when the student expects to complete academic requirements for the degree or certificate.) To submit an application, log into WSU Pipeline, click on the Student tab and select “Apply for Degree or Certificate” from the list of Student Services. Payment for the Graduation Fee must be made in the Web application by credit card or electronic check.

Masters Thesis Report
For students electing the Thesis Option, a Thesis Defense must be scheduled before satisfactory completion of degree requirements will be certified. At the time of the defense, the Final Report must be completed and signed by all members of the Thesis Committee.

Time Line

- Prior to commencement of program, complete Graduate Application online or Graduate Record/Status Change form as appropriate. Admission or transfer into the BME program must be approved by the Associate Chair.
- Upon commencement of program, please consult with the Academic Advisor for course selection advice. If pursuing the thesis-option, the student needs to identify a thesis Research Advisor.
- Upon completion of 8 semester credits, submit Plan of Work to Academic Advisor and Graduate Program Chair for approval. Once approved, student’s status will change from Applicant to Candidate.
- If electing thesis-option, select Thesis Committee in conjunction with thesis advisor.
- Before the end of the fourth week of classes of the semester in which you hope to graduate, submit the Graduate Application for Degree on WSU Pipeline.
- If electing thesis option, schedule thesis defense early in the semester in which you hope to graduate. Complete Final Report at time of thesis defense and submit to Graduate Chair. Submit 3 copies of thesis to Ph.D. Office, along with binding fees and other required forms.

NOTE: Deadlines for submission of the various forms and manuscripts required for thesis approval and graduation should be obtained from the Graduate School for the semester in which graduation is planned. The final date for the defense is typically 4 weeks before the end of the semester. Please check www.gradschool.wayne.edu for the exact dates.
Sample Curricula

On the next pages are listed typical curricula for the thesis and non-thesis option for an M.S. degree in each of the six areas of concentration (and their sub concentrations). When a choice exists between two or more specific courses to satisfy a requirement, the courses are boxed. Sequences of courses designed to satisfy a requirement are shaded. These curricula should be considered as examples and not definitive requirements. All Plans of Work must have the approval of a student’s Academic Advisor and the Graduate Program Chair.

**Injury Biomechanics**

### Thesis Plan

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr</th>
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<tbody>
<tr>
<td>BME 5005</td>
<td>Introduction to Cell Biology and Physiology for Engineers</td>
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<tr>
<td>OR</td>
<td>BME 5040 Fundamentals of Engineering Analysis</td>
<td>2</td>
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<td>BME 5010</td>
<td>Engineering Physiology</td>
<td>4</td>
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<tr>
<td>BME 5020</td>
<td>Computer and Mathematical Applications in Biomedical Engineering</td>
<td>4</td>
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<tr>
<td>BME 5030</td>
<td>Introduction to Molecular Biology for Engineers</td>
<td>3</td>
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<tr>
<td>BME 7160</td>
<td>Impact Biomechanics</td>
<td>4</td>
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<tr>
<td></td>
<td>TWO of the Following:</td>
<td></td>
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<tr>
<td>BME 6480</td>
<td>Biomedical Instrumentation</td>
<td>4</td>
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<tr>
<td>BME 7100</td>
<td>Mathematical Modeling in Impact Biomechanics</td>
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<tr>
<td>BME 7170</td>
<td>Experimental Methods in Impact Biomechanics</td>
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<td>BME 8070</td>
<td>Seminars in Biomedical Engineering</td>
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<td>BME 8999</td>
<td>Thesis</td>
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**TOTAL**

| 34 |

### Non-Thesis Plan

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# Smart Sensors

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<td>BME 5370</td>
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<td>BME 5380 Biocompatibility</td>
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**TWO of the Following:**

- BME 7300 Advanced Topics in Biomaterials and Tiss. Biomech 4
- BME 7370 Biomaterial Interfaces 4
- BME 7380 Advanced Biocompatibility 4
- BME 7390 Tissue Engineering and Hybrid Systems 4

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<td>Tissue Engineering and Hybrid Systems</td>
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**TOTAL** 34
Biomedical Imaging

NOTE: Please contact Dr. Haacke for more details (haacke@wayne.edu).

**Thesis Plan**

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**TOTAL**                                                                 34

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**TOTAL**                                                                 34

* Consult with BME Academic Advisor for approved course list. In addition, these courses should only be taken by students within the Imaging Concentration and will not be approved as BME courses within non-imaging students.
# Forensic Bioengineering

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**TOTAL**                                                                 | **34**  


REQUIREMENTS FOR DOCTOR OF PHILOSOPHY

Advisor

Each student admitted to the doctoral program is required to be sponsored by a faculty member who has indicated the willingness to serve as a dissertation advisor for that student (a written communication confirming this acceptance must be sent by the faculty advisor to the department Academic Advisor). If a student wishes to change advisors, he/she should discuss the change with the current advisor and must then submit a Graduate Record/Status Change form, signed by both the current and new advisor, notifying both the Graduate Committee and the College of Engineering of this change. The student is also required to have his/her Plan of Work approved by the new advisor.

Coursework

The doctoral degree requires a minimum of 90 semester credits beyond the baccalaureate degree. The division of these credits is as follows:

- 22 - 23 credits of core courses
  - BME 5005 – Introduction to Cell Biology and Physiology for Engineers (2 cr)
  - OR
  - BME 5040 – Fundamentals of Engineering Physiology (2 cr)
  - BME 5010 - Engineering Physiology (4 cr)
  - BME 5020 - Computer and Mathematical Applications (4 cr)
  - BME 5030 - Molecular Biology for Engineers (3 cr)
  - BIO 5040 or FPH 7015 - Biological Statistics (3-4 cr)
  - BME 7010 - Functional Anatomy (4 cr)
  - BME 8070 - Seminar in Biomedical Engineering (1 cr)
  - BME 8080 – Doctoral Seminar in Biomedical Engineering (1 cr)
- 6 credits of a minor in the life sciences or another relevant field
- 30 credits of dissertation research (BME 999x)
- 31 - 32 credits of additional coursework

The additional coursework must be completed with the following conditions:

- At least 30 credits of relevant courses at the 7000-level or above (may include BME 7010, BME 7990, BME 7996, BME 8070, BME 8080, and life science courses)
- If more than 12 credits of 7990 and 7996 are to be applied to the degree, this must be substantially justified by both the student and the advisor and must be approved by the Graduate Program Officer
- At least 12 credits of lecture credits in the Biomedical Engineering program, not including those from the core program
- At least 30 credits of coursework, outside of dissertation direction, must be completed at Wayne State

The life sciences minor must be fulfilled by completing 6 credits of graduate life science courses beyond those of the core program. If ANA 7010 (Gross Anatomy) is selected as part of the minor requirement, it may be used to satisfy the requirement of BME 7010 and 4 of the required 6 minor credits. Thus, an additional 2 credits of life sciences outside of the core must also be successfully completed.
A Doctor of Philosophy Plan of Work must be completed as early in the graduate program as possible and submitted to the Ph.D. Office of the Graduate School. Prior to submission, the Plan of Work must be approved by both the student's Dissertation Advisor and the Graduate Program Chair. This Plan of Work must be submitted before the Petition for Candidacy form can be filed. Approval by the Graduate School can take several months. If changes to the Plan of Work are made following approval, a Change in Ph.D. Plan of Work form must be filed with the Ph.D. Office. This form may be used for up to four changes (pairs of additions/deletions) to the Plan of Work. If more than four changes are desired, a revised Plan of Work form must be filed with appropriate approval.

A student wishing to transfer graduate credit toward the Ph.D. program should file a Transfer of Credit - Doctor of Philosophy form along with the Doctor of Philosophy Plan of Work. It must be accompanied by original, official transcripts from the university where the credit was earned. A minimum grade of B is necessary to transfer credits; B-minus credits and courses graded "P" or "S" (Pass or Satisfactory) are not transferable. Transfer credit must be appropriate to the student's degree program and may not be used to reduce the minimum requirement of thirty credits that must be earned at Wayne State.

Up to 32 semester hours of B or better graduate credit earned prior to the student's admission as a doctoral applicant may be applied toward the degree without regard to lapse of time. This credit may be from Wayne State or other institutions, if approved for transfer credit. Credit earned beyond these thirty-two semester hours shall not be over ten years old at the time of admission as a Ph.D. applicant. Credit earned after acceptance as a Ph.D. applicant may not be over seven years old at the time the degree is conferred, except when, on the recommendation of the advisor, up to ten semester hours of credit previously earned at Wayne State may be specified for revalidation by examination. Courses completed at other institutions cannot be revalidated. In the event that any courses have been previously revalidated in connection with the earning of the Master's degree, these shall be counted as part of the total ten credits. A special examination fee is charged for course revalidations. Time extensions beyond these limitations are authorized only for conditions that are clearly beyond the student's control.

Students with life science backgrounds must complete a program of mathematics, physics and engineering material in order to remediate deficiencies in their backgrounds. This requirement has to be satisfied through the satisfactory completion (B- or better) of undergraduate courses in appropriate subjects, which include Calculus I and II, Differential Equations and Linear Algebra, Physics I and II and other core engineering topics dependent on the proposed concentration. Upon admission into the program, students with life science backgrounds will be required to take BME 5040 (Fundamental of Engineering Analysis). Students with engineering/mathematical backgrounds must complete a program of physiology and cell biology material in order to remediate deficiencies in their backgrounds. This requirement can be satisfied through the satisfactory completion (B- or better) of BME 5005 (Introduction to Cell Biology/Physiology for Engineers). It may also be satisfied through the satisfactory completion of undergraduate courses in appropriate subjects, including physiology, cell biology and related topics dependent on the proposed concentration. Upon admission into the program, students with engineering backgrounds will be required to take BME 5005. Students with an undergraduate degree in BME do not have to take BME 5005 or 5040, but must select two credits of their choice to complete the required 34 credits.

In addition to the course offerings at Wayne State, students may elect to take courses at the University of Michigan, Michigan State University, or other universities within the state through
the Michigan Intercollegiate Graduate Studies (MIGS) Program or the reciprocal registration agreement with the University of Michigan. Both programs are designed to allow graduate students to expand their curriculum beyond what is offered at Wayne State.

Credit earned through the MIGS program will be treated in the Plan of Work and grade point average as if it were earned at Wayne State. There may be additional tuition fees involved if the MIGS system is used. In order to enroll in courses through this program, a MIGS Application Form must be completed and signed by the student’s academic advisor, the WSU MIGS Liaison Officer (at the Graduate Enrollment Services Office), the faculty contact, department chair and the MIGS Liaison Officer of the host institution. It is recommended that this process be started as early as possible before the semester in question in order to minimize potential problems.

No additional tuition is charged for students registered at U of M through the reciprocal registration agreement. However, while the credits count towards the graduate degree, the classes shall not be included in calculation of the GPA. Ph.D. students may elect any number of credits through this program except as required for dissertation credit or satisfaction of the residency requirement. However, students may only elect courses for which there is not an equivalent course at Wayne State. In order to utilize this option, students should complete the Graduate Petition to Elect Courses at the University of Michigan form.

Program Load

A full-time graduate student is one who is enrolled for eight or more credits during a semester. A student with a strong academic record who is devoting full-time effort to graduate study and carrying no outside employment may register for a program not to exceed sixteen credits per semester. A student engaged in part-time work should limit registration in proportion to the amount of outside work. A student employed full-time will normally not register for more than eight credits. A student working full-time who desires to carry more than eight credits must get permission from the Graduate Program Chair.

Graduate Teaching Assistants and Graduate Research Assistants are required to register for at least six credits of graduate level courses per semester (1 credit during the Spring/Summer semester). If students supported by Graduate Assistantships are also required to take undergraduate courses as part of their programs, these must be in addition to the six graduate credits. As assistantships do not cover tuition for undergraduate courses, students should discuss options for payment of this portion of their tuition with their dissertation advisors.

Minimum Grade Point Average

Students must maintain a cumulative grade point average of 3.0 or above in order to continue in the program. Students receiving a grade below a B- in a course listed in their Plan of Work cannot count that course towards their graduation requirements. No more than two courses may be repeated in a graduate program, and a student must have the appropriate approvals from the Academic Advisor and Graduate Program Chair BEFORE the repeat registration takes place. These two repeats may consist of a second attempt of two separate courses or two repeat attempts of a single course. This approval must be obtained through the submission of a Request to Repeat a Graduate Course form. Per University policy, any course in which a mark appears on the student's transcript (including WN, WP, or WF) counts as an attempt to earn credit in that course. These attempts are therefore factored into the assessment of allowed repeats unless an exception is granted during the semester of the withdrawal. ’F’ grades earned while in the
College of Engineering may be the basis for immediate termination. Students will be restricted to one registration per course through the Banner student information system. The registration system will prevent students from registering for the same course a second time. They will need to contact the Academic Advisor for this second registration override.

The grade received in repetition of the course will be shown on the transcript and used in computation of the student's grade point average for the degree program. Students should consult the Graduate Bulletin for rules concerning the grading system (I, WF, WN, WP, Y, and Z) and its effect on the student’s overall GPA. Students will not receive University financial aid for repetition of courses.

Residency Requirement

The Ph.D. requirement of one year of residence is met through the completion of at least six graduate credits in course work, exclusive of dissertation research, in each of two successive semesters. The Spring-Summer semester may be excluded from the definition of successive semesters. If a student's research must be completed off campus, the residence requirement for the Ph.D. may be met by the dissertation advisor's written certification that the student has been in full-time residence for at least two successive semesters and one summer session. In this case, a count of course credits is not required for the fulfillment of the requirement, but specific dates of residence must be furnished. In addition, the Ph.D. residency requirement stipulates that the student must elect at least 30 credits in graduate work, exclusive of dissertation credits, at Wayne State University.

Dissertation

The dissertation requirements are satisfied through the completion of 30 credits of BME 999X (9991, 9992, 9993, and 9994) in the course of developing and conducting an independent research project. A grade of Y will be supplied for all dissertation credits earned until the time at which the defense is successfully completed. At that time, all grades will be converted to 'S' - satisfactory. A student is not allowed to register for dissertation credits until they have been approved for candidacy after filing a Petition for Candidacy. Students must email phdstudents@wayne.edu to request an override to register for BME 9990-9995 credits. Students must complete four consecutive semesters of BME 999X. The Spring/Summer semester may or may not be counted towards the definition of consecutive semesters, at the student's discretion. Registration for all dissertation credits must be done through the Ph.D. Office. A student may contact the Ph.D. office by phone (313-577-2171) or in person. Once 30 credits of 999X are completed, students may register for BME 9995 (Doctoral Candidacy Maintenance) at a reduced tuition rate.

When petitioning the Graduate School for Doctoral Candidacy status, the student must form a Dissertation Committee. Committee membership is described in the Examinations section, below. Advisors have the primary responsibility for approval of the dissertation, but the Dissertation Committee must read, approve, and sign the manuscript. Such approval includes all academic and professional evaluations and judgments as to originality, accuracy, significance, methodology, conclusions, and correctness of style.

Candidates are instructed to closely follow the Graduate School regulations governing the format of the dissertation. Students should obtain a copy of the WSU Guide for Preparing Theses and Dissertations from the Graduate School (4327 FAB). These guides are updated regularly, and
students should make sure that they have the most recent version. The Ph.D. Office staff is available to assist advisors and students who have format questions or problems. The final draft of the manuscript should be submitted to the Graduate School for format check at least two weeks prior to the defense date. The dissertation format and appearance must be acceptable to the Graduate School before the Public Lecture Presentation-Defense shall be authorized.

Students should obtain the deadline dates for graduation requirements from the Ph.D. Office of the Graduate School. These should be reconfirmed during the semester in which the dissertation defense is planned.

It is official policy that acceptance of the dissertation as well as certification of the degree shall not take place unless a manuscript is correct in style and in a format suitable for publications. The final draft of the manuscripts should be submitted to the Graduate School for format check by at least two weeks prior to the Dissertation Public Lecture – Defense or by the deadline date listed for the current semester. Students can submit the dissertation electronically or should plan to leave the manuscript at least overnight with the Ph.D. Office for the format check.

The dissertation manuscript must be submitted to all committee members at least 3 weeks prior to the planned defense date. When all members of the committee have tentatively approved the dissertation, the candidate prepares the Final Report form. After it has been signed by all committee members, indicating approval of the content of the dissertation for a public lecture presentation defense, the candidate brings the form and the Ph.D. Publication Requirement Form to the BME Graduate Program Chair for approval before forwarding the Final Report Form to the Graduate School. Graduate School needs at least two weeks in advance of the defense date for processing.

Following satisfactory completion of the defense, the student must do the following within two weeks of the defense:

- Receive approval of the manuscript by the Graduate School
- Submit the dissertation electronically, or submit a CD-ROM of the dissertation (in Adobe PDF read-only format) or one paper copy of the dissertation to the Ph.D. office, 4327 FAB along with a money order payable to ProQuest in the appropriate amount.
- Submit the “Doctoral Dissertation Agreement Form” either electronically or in hard copy form. The hard copy form must be completed and signed on the back. If you are copyrighting the dissertation, please check “yes” on the front of the form, and sign the copyright section on the back too. Staple one copy of your title page and abstract to the Agreement form.
- Submit the “Commencement Reply” Form, the “Survey of Earned Doctorates”, and the “Ph.D. Exit Survey” to the Ph.D. Office.

These are requirements! They must be done in order to receive your degree, a certified transcript, or a letter certifying the degree.

Time Limitation

Students have a seven year time limit to complete all requirements for the Ph.D. degree. The clock starts on the first day of the semester for which the student is admitted to the Ph.D. program and ends on the last day of that semester seven years later. (For example, admitted 9/1/99, time expires 12/31/06).
Examinations

Preliminary Qualifying Examination
Students must pass the preliminary qualifying examination before completing 48 credits of work towards their doctoral degree, including credits earned in a master's program. It is recommended that students take the preliminary qualifying examination after taking 16 credits of new coursework towards their Ph.D.

The preliminary qualifying exam will be offered once yearly, in May. Students must notify the Graduate Program Chair by May 1 of the year in which they intend to take the exam. Students wishing to take the Preliminary Qualifying Examination must have a minimum GPA of 3.4 for all BME courses. A faculty member must be identified as the student’s advisor and grant permission for the student to take the examination.

A written examination and oral presentation based on a research problem developed by a designated member of the Faculty will be administered to all qualified students.

In this Written Examination, the student will be presented a “real-world” problem in Biomedical Engineering. They will have three (3) weeks from the date of issuance of the examination to prepare and submit their written proposal to the Graduate Program Chair. The document will be no longer than 25-30 pages in total length (references not included), prepared in 12-point font (e.g., Times New Roman), double-spaced, with 1 inch margins on 8.5 x 11 inch paper. The document may contain figures as appropriate; such figures should be accompanied by figure legends. The document subheadings (and any length restrictions) should include:

- Abstract (of no more than 300 words);
- Table of Contents;
- Statement of the Problem
- Introduction and Background (no more than six (6) pages);
- Specific Aims of the Project (no more than one (1) page);
- Methods and Materials with Expected Outcomes and Anticipated Problems (no more than twelve (12) pages)
- References Cited (not counted in the page limit)

References citations will be numbered in order of appearance, and will use the following format:


The students will also present their research proposal to the Department’s Ph.D. Examining Committee as an illustrated oral presentation. The student should use PowerPoint slides for the presentation with viewgraphs or white board to illustrate examples during questions. The student will give a copy of that presentation to the Committee for the Committee’s records. The Committee members may be expected to ask questions of the students during and after the
presentation for the purpose of clarifying points of interest or concern, and to stimulate deeper consideration of the student’s proposal.

Students who sign up for the exam but elect not to take it must notify the Graduate Program Chair at least 24 hours before the exam is available to be picked up. If this notification is not made, the assumption will be made that the student is taking the exam and plans to submit a report to be graded by the committee. In extreme situations, with support of an employer’s or physician’s letter, students will be allowed to withdraw from the examination before the exam is made available. **UNDER NO CIRCUMSTANCES WILL A STUDENT BE ALLOWED TO WITHDRAW FROM THE EXAMINATION WITHOUT PENALTY AFTER THE EXAMS ARE MADE AVAILABLE FOR PICK-UP.**

Students will have two chances to pass the preliminary qualifying examination. If the exam is not passed on the second attempt, the student will be asked to leave the doctoral program. Completion of a terminal master's degree will be allowed. A student who fails to complete the examination without properly withdrawing will be noted as having used one attempt at the exam.

Students enrolled in the M.S. program may elect to take the Preliminary Qualifying Examination prior to applying to the doctoral program. However, this counts as one of their two attempts at this exam.

Students receiving a Provisional Pass on their Written Qualifying Examination will be asked to prepare a paper, of not more than five (5) single-spaced pages, in response to written feedback provided by the Examination Committee. This paper should encompass an analysis of the proposal and Committee’s comments, deficiencies identified during the examination, and new insights obtained by the student regarding their proposal and performance.

That paper will be requested by the Committee in writing, and will be due within one week (i.e., 7 calendar days) of receipt of that letter from the Committee. While the paper may include some discussion on revising of specific points in the student’s proposal, this paper is not to be a “revision” of the original proposal, but a response to comments. The Committee will review the student’s paper and decide on a final score for the Written Examination, using the criteria described in the section above.

Ph.D. students can convert M.S. thesis credits while working as a M.S. student at Wayne State University to Directed Study credits but only after they pass all core course work and the Preliminary Qualifying Examination.

**Proposal Defense (Oral Examination)**

Before taking the examination, the student must have filed the *Plan of Work* and the *Petition for Doctoral Candidacy* with the Graduate School. The Oral Examination is administered by the Dissertation Committee previously selected by the student and his/her advisor. The committee must consist of at least four members with a minimum of two from the Biomedical Engineering Department (full time faculty, joint faculty or full time affiliates) and one external member (outside of BME that broadens the scope of the committee). With the exception of the external member, all committee members must be on the WSU graduate faculty. The Committee membership should be selected based on the proposed dissertation project.

The Oral Examination takes the form of the Dissertation Proposal Defense. The Dissertation Proposal (Prospectus) should be completed in close consultation with the student's research
advisor. There is no set format. The defense will consist of a public oral presentation of the proposed research project, followed by a period of questions on any topic considered relevant by the Dissertation Committee. The proposal should be submitted to the Dissertation Committee at least two weeks before a planned defense.

The Dissertation Committee is responsible for examining and certifying that the student has an adequate command of knowledge in the field of study and can organize, apply, and convey that knowledge. The Exam should be conducted following the rules set forth on the Report on Doctor of Philosophy Oral Exam form (NOTE: This form is for information purposes only, it is not to be turned in. Use the Doctoral Dissertation: Prospectus and Record of Approval in its place.) The Dissertation Advisor shall serve as the lead examiner (Chair of the Dissertation Committee) and complete the evaluation form. A student may be passed in the examination if there is not more than one negative vote. Abstentions shall be considered negative votes. If the Examining Committee determines that the applicant has not passed all parts of the written and oral portions of the examination, the committee must make specific recommendations as to admitting the applicant to a second examination and specify any additional work that should be completed prior to the examination. If the Chair of the Dissertation Committee certifies that the student has failed the oral part of the examination, a second examination may not be held until at least one semester has elapsed but must be held within one calendar year following the first exam. The second examination shall be considered final.

The Oral Examination must be satisfactorily completed at least 12 months prior to the Dissertation Defense.

Upon satisfactory completion of the Proposal Defense, the student must complete a Doctoral Dissertation: Prospectus and Record of Approval form. The form should be signed by all members of the Dissertation Committee and the Graduate Program Chair. If human or animal subjects are involved in the dissertation research, evidence of prior approval by the HIC or AIC is also needed. The Doctoral Dissertation: Prospectus and Record of Approval form, HIC or AIC approval form (if applicable) and a copy of the approved Prospectus should be forwarded to the Graduate School for final approval.

Dissertation Defense
The Dissertation Committee shall normally consist of the same members who oversaw the Proposal Defense. There shall be at least three members from the Biomedical Engineering Program and at least one member from outside of the program. The expertise of the outside members must be appropriate to the student's dissertation work. In the case of co-advisors from within the program, the number of members from the Biomedical Engineering program shall be increased to four. The outside member shall attend all meetings of the Dissertation Committee, including the Dissertation Lecture Presentation-Defense, as a voting member. After Graduate School approval of the committee, through the Petition for Doctoral Candidacy form, any change in the committee requires written approval of the Graduate School Dean.

The dissertation manuscript must be submitted to all committee members at least 3 weeks prior to the planned defense date. When all members of the committee have tentatively approved the dissertation, the candidate prepares the Final Report form. After it has been signed by all committee members, indicating approval of the content of the dissertation for a public lecture presentation defense, the candidate brings the Final Report form and the Ph.D. Publication Requirement Form to the Graduate Program Chair for approval. The approved Final Report
form will be forwarded to the Graduate School, which needs at least two weeks in advance of the
defense date for processing.

Arrangements for the Lecture Presentation-Defense should be confirmed via written notice by
the Graduate Program Chair. If arrangements must be changed, the Graduate Program Chair or
advisor should notify the Graduate School, the doctoral candidate, and the committee members.

The Lecture Presentation-Defense is conducted by the doctoral candidate's committee and is
presided over by the Dissertation Advisor. This final lecture must be publicized to the entire
academic community in advance by the Biomedical Engineering Department. This is normally
done by the student and/or the advisor. The Lecture Presentation is open to the general
University community. In this lecture, the student shall formally present the methodology,
research, and results of the investigation. Following the formal presentation and an open
discussion period, a closed examination will be held on any subjects deemed relevant by the
Dissertation Committee. Finally, a closed-door session of the Committee will be held to
determine whether or not the student has passed the Dissertation Defense.

**Committee Meetings and Annual Evaluations**

Following petition for Doctoral Candidacy, each doctoral student is required to meet at least on
an annual basis with their Dissertation Committee. If the outside faculty member is from a non-
local institution, they may be involved in this meeting through teleconferencing or
videoconferencing technology. The committee should discuss the student’s progress in their
dissertation research and complete the Annual Evaluation form. After the Oral Exam has been
successfully completed, changes to the Dissertation plan that are agreed upon by the Committee
should be noted for the student’s file.

**Requirements for Journal Publication**

By its very nature, doctoral-level research should result in a minimum of one journal publication
describing the results. As an indication of this expectation, all doctoral students will be required to
have at least one article published or accepted for publication as the first author, prior to the public
defense date. Submission to a peer-reviewed journal must be approved by the dissertation advisor.
Acknowledgement of all funding sources is required in each publication, presentation and in the
student’s dissertation.

Any exception to the above requirements will require written approval of the dissertation advisor
and Graduate Program Chair. No exception will be granted without submission of a manuscript to
a peer-reviewed journal approved by the advisor.

In order to document completion of this requirement, students must submit the *Ph.D. Publication
Requirement Form* (found on BME website) when they submit the *Dissertation Final Report Form*
to the Graduate Program Chair for initial approval. Copies of the published paper or acceptance
letter should be provided for the student’s file.

**Graduation**

Students must submit a *Graduate Application for Degree* prior to end of the fourth week of
classes of the semester in which they hope to graduate. If graduation is postponed for any
reason, the *Graduate Application for Degree* must be re-filed in the appropriate semester.
Information concerning Commencement announcements, caps and gowns, tickets, and other relevant information will be mailed to the degree candidate by the Commencement Office (313-577-2414) prior to the event. Please make sure that the Records Office (5057 Woodward Avenue) and the Ph.D. Office (4327 FAB) have your current address. Candidates for advanced degrees are requested and expected to attend the Commencement at which the University confers upon them the honor of the degree. Diplomas will be mailed to those students unable to attend the ceremonies.

Certification of Degree

Upon request and for purposes of employment, a candidate who completes all requirements between the degree-granting periods may request a certificate from the Graduate School certifying completion of degree requirements and the date of formal awarding of the degree.

Paperwork Summary

Students should be aware of the following paperwork requirements. Some forms are required for all students, others only in certain circumstances. Electronic copies of these forms are provided on the Handbook CD and on the Department web page.

Application for Admission or Change of Status Form
Students who are not currently enrolled in a graduate program at Wayne State University must submit a Graduate Application online and accompanying documentation to the Graduate Enrollment Services Office indicating Biomedical Engineering as their selected major. A GPA of 3.5 in an accredited undergraduate program is required for direct admission into the doctoral program. Students with below a 3.5 in their undergraduate program should complete a graduate degree in a related field before applying to the doctoral program. GRE scores are required for doctoral applicants who have not previously completed the MS-BME at Wayne State. In order to be granted admission to the doctoral program, a student must be sponsored by a faculty member.

If a student has applied to any program at the University for regular admission within the previous three consecutive semesters, either successfully or unsuccessfully, a Graduate Renewal Application can be filed indicating Biomedical Engineering as the selected major. The application will undergo the normal review process, but supporting paperwork need not be filed an additional time.

Students who are currently enrolled in a different graduate program within the University may apply to transfer to the Department of Biomedical Engineering by submitting a Graduate Record/Status Change form and copies of graduate and undergraduate transcripts to the Associate Chair. Students who are changing from Master's Candidate to the doctoral program, even within the Biomedical Engineering program, must also submit a Graduate Record/Status Change form. It is important to submit these forms in order to be officially registered with the Department of Biomedical Engineering at the correct degree level, which is required before graduation can be approved.

Plan of Work
Early in his/her program, doctoral students must develop a plan of study in conjunction with his/her advisor. This Doctor of Philosophy Plan of Work must be approved by the
advisor and the Graduate Program Chair before being submitted to the Graduate School for final approval. The individualized curriculum should be developed and submitted before the student has completed 16 credits of new coursework towards the doctoral degree. The Graduate School must receive the form before the Petition for Candidacy can be submitted. Students will receive a Ph.D. Plan of Work Review form once the plan of work has been processed by the Ph.D. Office, detailing any deficiencies in the proposed plan of study.

Once the Plan of Work is approved by the Graduate School, any subsequent changes in the plan of study must be approved by the advisor, the Department Graduate Program Chair, and the Ph.D. Office of the Graduate School. These changes should be submitted through the Change in Ph.D. Plan of Work form. Up to four pairs of additions/deletions to the Plan of Work may be submitted with this form. Changes in excess of four require the submission of a complete, revised Plan of Work form with appropriate approvals.

Transfer of Credit
If a student plans to include credit earned from institutions other than Wayne State in their curriculum, the form Transfer of Credit - Doctor of Philosophy must be completed and submitted along the Plan of Work. A separate form must be completed for each institution from which a student wishes to transfer credit. This form must be accompanied by original transcripts.

Doctor of Philosophy Petition and Authorization for Directed Study
Independent study may be authorized for areas of interest not covered by courses scheduled at the time the student is completing course requirements. Before a Ph.D. Applicant/Candidate may register for directed study, he/she should prepare an outline of the study and obtain the approval of the course instructor and the Graduate Committee Chair. Students wishing to take more than 8 credits of 5990, 7990, or 7996 and apply them towards their degree requirements must fully document the justification on the Petition form.

Petition for Candidacy
This form is to be completed by the student and signed by the members of the Dissertation Committee. These signatures indicate the willingness of the committee members to oversee the dissertation and allow the Graduate School to confirm eligibility. In order to be eligible for candidacy, a student must have:

- Completed approximately 50 credits of coursework
- Successfully completed the Preliminary Qualifying Examination
- Submitted an approved Plan of Work to the Graduate School

Following granting of candidacy status, a student may register for BME 999X (9991, 9992, 9993, and 9994) credits.

Doctoral Dissertation: Prospectus and Record of Approval
This form must be completed and submitted to the Graduate School following successful completion of the Proposal Defense. The topic of the Doctoral Dissertation requires final approval from the Dean of the Graduate School. This satisfies the University’s requirement for an Oral Examination.
Final Report: Dissertation Public Lecture Presentation - Defense

This form should be completed by the student and signed by the members of the Dissertation Committee indicating preliminary approval of the dissertation manuscript. Students must also satisfy the Publication Requirement. The signed Final Report must be submitted to the Ph.D. Office of the Graduate School, along with a draft of the dissertation and a copy of the public announcement of the defense, at least two weeks in advance of the scheduled defense. The format of the dissertation will be checked (if not previously approved). Following successful completion of the defense, the form must be signed again by all Committee members and submitted, along with the Graduate Examiner's Report, to the Graduate School.

Graduate Application for Degree
Students must apply on their Pipeline no later than the last day of the fourth week of classes in the graduation term. (The graduation term is the term when the student expects to complete academic requirements for the degree or certificate.) Payment for the Graduation Fee must be made in the Web application by credit card or electronic check.

Time Line

1. Prior to commencement of program, complete online Application for Admission or Graduate Record/Status Change form as appropriate. Admission or transfer into the program must be approved by the Graduate Program Committee.
2. Upon commencement of program, select a faculty academic advisor. This individual should preferably be the dissertation advisor. If a dissertation field has not been selected, a temporary academic advisor can be appointed. Selection of a permanent advisor must occur within one semester after successfully completing the Preliminary Qualifying Examination.
3. Prior to completion of 16 new semester credits, submit Plan of Work to dissertation advisor and Graduate Program Chair for approval. Once approved, submit to Ph.D. Office of the Graduate School.
4. Inform Graduate Program Chair of intention to take Preliminary Qualifying Exam by May 1 of appropriate year. It is recommended that this exam be taken at the completion of 16 credits of new coursework; it must be passed successfully before completion of 48 credits towards the doctoral degree (including transfer credits).
5. Submit signed Petition for Doctoral Candidacy to the Graduate School, indicating the members of the Dissertation Committee, after completing approximately 50 credits of coursework towards the Ph.D. – including transfer credit.
7. Develop research plan in conjunction with advisor. Schedule a public proposal defense as your Oral Exam. Following the successful Proposal Defense, submit the signed Doctoral Dissertation: Prospectus and Record of Approval to the Ph.D. Office of the Graduate School. This must be at least 12 months prior to the planned Dissertation Defense.
8. Publish at least one paper or submit a manuscript for publication in a Committee-approved, peer-reviewed publication at least six months prior to planned Dissertation Defense.
9. Before the end of the fourth week of classes of the semester in which you hope to graduate, submit the Graduate Application for Degree on WSU Pipeline.
10. Submit dissertation manuscript to Dissertation Committee at least 3 weeks prior to scheduled defense. Following preliminary approval of written manuscript and at least
2 weeks prior to the scheduled defense date, submit a copy to the Ph.D. Office of the Graduate School along with the Final Report: Dissertation Public Lecture Presentation-Defense form.

11. Following successful completion of the defense and within 10 days, submit 2 correctly formatted copies of the dissertation to the Ph.D. Office, along with binding fees and other required forms.

**NOTE:** Deadlines for submission of the various forms and manuscripts required for dissertation approval and graduation should be obtained from the Graduate School for the semester in which graduation is planned. The final date for Defense is often 6 or more weeks prior to the end of the semester. Please check [www.gradschool.wayne.edu](http://www.gradschool.wayne.edu).
BME Academic Probation and Exclusion Guidelines:

PROBATION

A BME student will be put on academic probation under the following conditions:

If, at any time, a graduate student’s scholastic grade point average falls below 3.0, the student is placed on probation and automatically has a hold placed on their registration. A student on probation must secure the approval of the Academic Advisor before registering for subsequent work in the Department.

Once on academic probation the following rules apply in order to continue in the BME program:

1. Obtain a term GPA of 3.0 or greater for the FIRST semester on probation. (If not currently enrolled, this requirement applies to the next semester enrolled in the BME program).
2. Obtain a term GPA of 3.0 or greater EACH semester in the program until the cumulative GPA is above 3.0.
3. Failure to maintain a GPA of 3.0 for EACH semester until cumulative GPA is 3.0 or greater will result in exclusion from the program.
4. The student will continue to see a Probation Hold for Registration each semester that their cumulative GPA remains below 3.0. Students placed on hold will see the BME Academic Advisor to obtain an override to register. The Academic Advisor will determine if an override should be granted. Further consideration can be obtained from the BME Associate Chair.

The department reserves the right to ask a student to withdraw at any time from specific courses or from the department entirely, if progress does not warrant continuance.

EXCLUSION

Basis for Exclusion from the BME program:

1. Grade below B- in each of two attempts to pass a core course (BME 5005, 5010, 5020, 5030, 5040) – Withdrawal of a course counts as an attempt (includes WP, WF, WN grades)
2. Overall GPA below 3.0 for two semesters once a student is placed on probation.

Exclusion Process:

1. This is initiated by a letter from the Associate Chair to the student.
2. The student can appeal the exclusion in writing to the Department Chair.
3. The Department Chair may agree with the appeal and set up a remedial program which the student MUST follow to remain in the program. Alternatively, the Department Chair may deny the appeal.
4. Further appeals are in writing to the Associate Dean of Academic Affairs in the College of Engineering.
5. The Associate Dean may agree with the appeal and set up a remedial program which the student MUST follow to remain in the program. The Associate Dean will advise the student of any further appeals.
6. If all appeals are denied OR if the student has not met the conditions of the remedial program, the exclusion is carried out to completion and the student has no more recourse.
FINANCIAL SUPPORT AT WAYNE STATE

Office of Scholarship and Financial Aid

The Wayne State University Office of Scholarship and Financial Aid (OSFA) can be accessed online at www.financialaid.wayne.edu. It provides information on a wide variety of financial aid, including grants, scholarships and loans.

For U.S. Citizens and/or Residents, the Wayne State University OSFA provides information for filing the Free Application for Federal Student Aid (FAFSA) from the U.S. Department of Education. This form may be filed online at www.fafsa.ed.gov. The OSFA also offers a Private Scholarship Application, which is available November 1 to March 1, for aid opportunities for the subsequent academic year. In order to file the Private Scholarship Application, the student must have already filed the FAFSA for the academic year for which the private scholarship is sought. The Private Scholarship Application may be filed online at the WSU OSFA website. The OSFA website also provides necessary forms and helpful links to other financial aid sources, such as loans and scholarship search websites.

Wayne State Graduate School and the Department of Biomedical Engineering

The WSU Graduate School website at www.gradschool.wayne.edu is also a good source of scholarship and grant information. This website provides links to fellowships, scholarships, and assistantships offered by the Graduate School. The following is a list of scholarships and fellowships available for graduate students:

Thomas C. Rumble University Graduate Fellowships
Graduate-Professional Scholarships
The King-Chavez-Parks Future Faculty Program
Munich Fellowship
Dean’s Diversity Fellowship
Summer Dissertation Fellowship

Assistantships are also available to qualified graduate students. The positions include: Graduate Teaching Assistant (GTA), Graduate Student Assistant (GSA), and Graduate Research Assistant (GRA). A detailed explanation of the position requirements and benefits may be found on the Graduate School website. Assistantships are funded either through research or departmental accounts.

To apply for a research assistantship in BME, complete the form available on the department website at www.bme.wayne.edu. Departmental consideration of these applications occurs annually in March. Applications received after that time or not initially funded are kept on file for future reference by faculty. It is important that you contact prospective research advisors before submitting your application in order to discuss your research interests. It should be noted that the majority of research assistantships are provided to doctoral students rather than master’s students.
Office of International Students and Scholars

Financial Aid information specifically for international students may be found at the Office of International Students and Scholars (OISS). The website for this office is www.oiss.wayne.edu and is helpful when dealing with visa, banking, and legal issues in addition to financial aid.