

**The Pennsylvania State University
One Year MS in
Biomedical Engineering**

Handbook

2021

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I. General Information

The Penn State M.S. in Biomedical Engineering is a one-year degree that includes faculty members with their primary appointment in the Biomedical Engineering Department. Please visit the department webpage for detailed faculty information.

Graduate Program Office

The Graduate Program Office for Biomedical Engineering is located in 122B Chemical and Biomedical Engineering Building (CBEB).

The Graduate Programs Assistant, Virginia Simparosa (vls5248@psu.edu), is available to assist students between the hours of 8:00-4:30 Monday through Friday. If she is unavailable, you may contact Lisa Daub (lqr1@psu.edu), Administrative Staff Coordinator in 122C CBEB.

The Graduate Program Office can help with the following:

- ✓ answer administrative questions and supply forms
- ✓ schedule controlled biomedical engineering/bioengineering classes
- ✓ submit final scholarly papers

Keys: Keys may be obtained by asking your adviser to send an email to Gary Meyers at gmeyers@engr.psu.edu detailing which lab keys are needed. Keys can then be picked up at his office in 124 CBEB. *Before you leave the BME Program, all keys need to be returned to Gary.*

Purchasing Equipment and Supplies: Graduate students may be responsible for purchasing supplies for their lab. Before ordering any supplies or equipment, please see Santina Newlen (smn19@psu.edu) for the correct procedures for ordering and completing the forms. In addition, be prepared and know what budget numbers to use. Consult your adviser for this information.

Mail: Inter-university mail and all outgoing mail is picked up at 1:00 Monday–Friday. Students may put personal mail in the outgoing wire basket as long as it has postage.

Sending UPS Packages: The office staff in CBEB can send out packages. Bring package to 122 CBEB along with shipping information, phone number of recipient, budget number to be charged, weight and whether or not the package needs insured.

Packages are delivered to the mailroom outside 122 CBEB by UPS. Each student is responsible for checking deliveries of their lab supplies. This room is used by the entire department for many functions, so please be diligent in retrieving your packages.

II. Registration and Tuition

Tuition Bills

After enrolling in classes, all students will receive an e-mail notification from the Penn State Bursar's Office requiring payment of tuition. Students should follow the instructions outlined in the e-mail to file the tuition bill electronically. Do not ignore this e-mail.

Full-time Academic Status

Full-time academic status is achieved by taking appropriate course loads as shown in the following pages. Most loan granting agencies and other organizations will consider a **9-12** credit course load to be full-time status, fulfilling their registration requirements.

The U.S. Immigration and Customs Enforcement (ICE) requires that all international students on student visas must achieve "full-time academic status" during the Fall and Spring semesters. For ICE purposes, a course load of **nine credits** is considered full-time during Fall and Spring semesters.

For full details, see the Graduate Degree Programs Bulletin website at <http://bulletins.psu.edu/bulletins/whitebook/index.cfm>.

Course Load

Students will take a total of **32 credits** for the 1-year BME MS Program. Students can take 400 and 500 level courses and need a minimum of 18 credits of 500 level courses.

The Graduate School requires that all students receive a cumulative grade point average of 3.0 or better to graduate. Only grades of C or better count toward MS course requirements.

Student Insurance

Health insurance is mandatory for all international students (and their dependents) who are supported on assistantships/fellowships or who are self-supported. US students on other health care plans may file a waiver on-line with the Student Insurance Office if they are covered under another health insurance plan. International students may file a declination form on-line, but they must present evidence of being covered under another health care plan which is equivalent to the Penn State plan. Students on assistantships/fellowships are automatically enrolled in the medical, dental and vision plans. Insurance premiums are deducted monthly from the assistantship stipend. Penn State will pay 80% of insurance coverage and the student is responsible for 20%. Students who are not on assistantships/fellowships must pre-pay for health care coverage.

The insurance subsidy for eligible dependents is 75% of the annual premium expense for spouse, domestic partner OR children; 76% of the annual premium expense for family.

Detailed information on health insurance, including the health insurance booklet, enrollment deadlines and table of monthly payroll deductions is available at:

<https://studentaffairs.psu.edu/health-wellness/health-insurance>.

It is each student's responsibility to notify the department, payroll office, and the international office (if applicable) if there is a change of address during your stay at Penn State. Please change the information on LionPath also.

Training in the Responsible Conduct of Research (RCR)

During the first year of study, all graduate students studying for the M.S. in Biomedical Engineering are required to complete the free online Scholarship and Research Integrity (SARI) training provided by the Collaborative Institutional Training Initiative (CITI) at <https://www.research.psu.edu/training/sari>. This may be completed during BIOE 591. Upon completing the training, participants are issued a certificate of completion. Forward your completed certificate to the Graduate Programs Assistant, Virginia Simparosa (vl5248@psu.edu) prior to the end of the first semester of study.

Code of Conduct

The Penn State 1 year MS BME Program has adopted the same Code of Conduct as The Graduate School. Please refer to the links below regarding the code policies.

<http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-800/gcac-801-conduct/>

Bioengineering/Biomedical Engineering Colloquium/seminar

The Bioengineering/Biomedical Engineering Colloquium (BME 590/BIOE 590) is held every week during the Fall and Spring semesters. All graduate students are required to register for BIOE/BME 590 (1 credit) each semester in attendance. **Attendance is mandatory.**

III. Master's Degree Requirements

Below are degree requirements for the BME M.S. degree in terms of general requirements as delineated by the Graduate School and specific requirements set by the Biomedical Engineering Department.

The policies described here apply to the M.S. degree in Biomedical Engineering. Official Graduate School policies covering all M.S. degrees at Penn State can be found at:

<http://gradschool.psu.edu/graduate-education-policies/>

Requirements:

- Total of 32 credits. You can take 400 and 500 level courses. You need a minimum of 18 credits of 500 level courses.
- The following courses are required:
 - o Graduate Seminar (BME 590/BIOE 590 Fall and Spring): 2 credits
 - o Ethics and Professional Development (BIOE 591 Fall): 1 credit
 - o Mentored Project (BME 594): 6 credits (1 credit in Fall, 2 credits in Spring, 3 credits in Summer)
 - o 1 lab course (BME 429): 2 credits
 - o 3 foundation courses: 9 credits, including:
 - BIOE 512 Cell and Biomolecular Engineering: 3 credits
 - BME 597 (Hancock) for Physiology: 3 credits
 - Take 1 numerical method related course: 3 credits. You can take either BME 597 (Liu) or BME 497 (Pritchard).
- Take additional elective courses: 12 credits (4 courses).

Notes:

- ✓ Please talk to the program advisor if you need additional time (more than one year) to complete the coursework and program.
- ✓ You can find the active BME/BIOE courses via LionPath by searching the Course Catalog.
- ✓ With respect to required courses, students who have taken identical/similar courses may choose to substitute a higher-level related course from BME or another department. Talk to the program advisor if needed.
- ✓ The required BIOE 591 course, taken by all students in the program, will address biomedical ethics and responsible conduct of research through readings and class discussions. Readings and discussions will cover both Penn State and NIH regulations regarding ethical treatment of animals, data management, conflict of interest, and intellectual property. At least 5 hours of class discussion time will be devoted to these topics. Additionally, all students in BIOE 591 will be required to complete the online PSU SARI training through the CITI program. These activities will ensure that students in the program meet the University's SARI@PSU requirements.

Recommended Timeline for Biomedical Engineering M.S. Degree

Fall

Take 15 credits of courses:
BIOE 590 (1), BIOE 591 (1),
BME594 (1), BIOE 512 (3), one
numerical course (3), two electives
(6)

Take 1 credit of BME 594

Identify adviser: Faculty members
speak in the class and students choose
faculty they would like to work with
Outcome: *project summary*

Spring

Take 14 credits of course:
BIOE 590 (1), BME 594 (2), BME
429 (2), BME 597 (Hancock) for
Physiology(3), two electives (6)

Take 2 credit of BME 594

Research topics: Abstract, Research
Planning, Poster, Proposal, Paper,
Statistics, and job hunting
Outcome: an one-page specific aim
page on mentored research

Summer

Take 3 credits of BME 594

Full-time research: project presentation
Outcome: 6-page R21-like proposal at the end of summer

Intent to Graduate

You must activate the intent to graduate on LionPath during the semester in which you plan to graduate. This will put your name on the graduation list so that a diploma is printed for you. If you fail to meet the completion deadline, your intent to graduate will be removed. It does not carry over to the next semester.

Instruction for BME 594 scholar paper

Scholarly paper and presentation. Each student must follow the guidelines outlined below regarding their scholarly paper. A pdf copy of the final paper must be submitted to the Graduate Program Assistant Virginia Simparosa (vls5248@psu.edu) via email. A presentation of the scholarly paper must be given during the second summer session after the paper has been submitted. The presentation will be 12 minutes with 3 minutes for Q&A.

Scholarly Paper Format

The format of the proposal will be similar in style to an NIH R21 proposal. Examples of NIH proposals can be found online at: <http://www.niaid.nih.gov/researchfunding/grant/pages/appsamples.aspx>. The proposal should contain the following sections:

I. Title Page (see Appendix)

II. Summary (1/2 page)

State the proposal's broad, long-term objectives and specific aims, making reference to the health or biology relatedness of the project. Describe concisely the research design and methods for achieving these goals. Avoid summaries of past accomplishments and the use of the first person.

This abstract is meant to serve as a succinct and accurate description of the proposed work when separated from the proposal. Do not exceed the ½ page limit. Make page separate from title page and specific aims.

III. Specific Aims (1 page limit)

State concisely the goals of the proposed research and summarize the expected outcome(s), including the impact that the results of the proposed research will exert on the research field(s) involved. List succinctly the specific objectives of the research proposed, e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology. A figure on the specific aims page is allowed.

IV. Research Strategy (6 pages)

Significance (max. 2 pages):

Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses. Describe the scientific premise for the proposed project, including consideration of the strengths and weaknesses of published research or preliminary data crucial to the support of your application. Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields. Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved.

Innovation (max. ½ page):

Explain how the application challenges and seeks to shift current research or clinical practice paradigms. Describe any novel theoretical concepts, approaches or methodologies, instrumentation, or interventions to be developed or used, and any advantage over existing methodologies, instrumentation, or interventions. Explain any refinements, improvements, or new applications of theoretical concepts, approaches or methodologies, instrumentation, or interventions.

Approach (the remainder of the 6 pages):

Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project. Describe the experimental design and methods proposed and how they will achieve robust and unbiased results. Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims. If the project is in the early stages of development, describe any strategy to establish feasibility, and address the management of any high-risk aspects of the proposed work. Provide a tentative sequence and timetable for the investigation.

V. Bibliography

Provide a list of all references cited in the above sections that is in the format of articles written for major journals, such as the American Journal of Physiology or Journal of Biomechanics. Citations within the text may be made by either author (year) or by number. Provide the full citation in the bibliography, i.e., authors, title, journal, volume, page numbers and year (do not use “et. al.” or give download information for standard references). The student is expected to have critically read and understood the publications that provide the foundation of their proposal. There is no limit to the number of references for the thesis proposal. The use of EndNote, Mendeley, or equivalent bibliographic software is strongly recommended.

VI. Appendix

The student should include as an appendix any code, design drawings and/or manuscripts on which he/she is first or middle author, and which have been published, accepted, or submitted to date as part of their graduate studies. There is no page limit or format requirements for the appendix.

All text in the proposal (not including the appendix) should be typed single space and a minimum font size of 11 points should be used. A minimum 3/4-inch margin should be maintained on the top, bottom, and sides of each page. Each page should be numbered at the bottom. Figures should all have legends, and images taken from the literature should be properly referenced.