

# BIOMEDICAL ENGINEERING AND PHYSIOLOGY (BMEP) – PROFESSIONAL MASTER'S

- Kristin Zhao, Ph.D., *Program Director*
- Matthew W. Urban, Ph.D., *Associate Program Director*

## Professional Master's Degree

The Professional Master's Degree track in Biomedical Engineering and Physiology is open only to permanent employees of Mayo Clinic. Admission to the program requires an interview with the program director.

## Application

Candidates must complete a Professional Master's Degree Application form. This form is available on the MCGSBS Master's Programs intranet site. Supporting documents include a program fee agreement form, transcripts from previous colleges and two letters of recommendation - one preferred from your direct supervisor/manager.

## Eligibility

Enrollment is restricted to current Mayo employees/appointees and is available at all three sites: Arizona, Florida, and Minnesota, as well as the Mayo Clinic Health System. Visiting clinicians, research trainees, and research collaborators are not eligible.

Applicants must have received a bachelor's degree from an accredited college or university, must have taken appropriate undergraduate science courses to adequately prepare for the Master's program, must have a minimum undergraduate grade point average that demonstrates a record of academic excellence.

## Time Requirement

Time to completion can vary by student (three to five years), but all requirements for the Master's degree must be completed within five years. The five-year period begins on the start date of the term the student is appointed to. If the student's Mayo employment ends prior to completion of the program, the MCGSBS appointment will also end.

## Registration Requirement

At least 75% of the coursework for the Master's degree must be completed in MCGSBS.

## Minimum Credit Requirements

Students must complete a minimum of 45 credits, including MGS 6000 Responsible Conduct of Research. Didactic credits may vary by track - refer to specific program requirements for details.

## Transfer Credits

A total of 9 didactic credits may be transferred into the Professional Master's Program. For more details, see the Credit Conversion, Transfer, Waiver and Substitution Policy on the MCGSBS intranet site.

## Course Requirements

A total of **45 credits** with maintenance of at least a 3.0 GPA are required for graduation.

Code	Title	Hours
<b>MGS Courses</b>		
MGS 6000	Responsible Conduct of Research	1
MGS 5050	Critical Thinking and Scientific Writing	2
MGS 5051	Critical Thinking and Scientific Writing, Part II	1
MGS 6400	Master's Capstone Project	6
<b>Track Requirements</b>		
BME 5010	Integrative Physiology of Health and Disease	2
BME 5011	Integrative Physiology of Health and Disease II	2
BME 5012	Integrated Physiology of Health and Disease III	2
BME 5020	Quantitative Biomedical Imaging and Signal Processing	2
BME 5021	Quantitative Biomedical Imaging and Signal Processing II	2
BME 5022	Quantitative Biomedical Imaging and Signal Processing III	2
BME 5030	Biomedical Applications of Engineering Principles	2
BME 5031	Biomedical Applications of Engineering Principles II	2
BME 5032	Biomedical Applications of Engineering Principles III	2
BME 6600	Physiology & Biomedical Engineering Seminars	1
BME 6650	Biomedical Engineering & Physiology Journal Club	1
<b>Advanced Coursework</b>		
15 credits Advanced Coursework <sup>1</sup>		15
<b>Total Hours</b>		<b>45</b>

<sup>1</sup> Fifteen elective credits should be selected after consultation between the student and the program director.

Program milestones are included in the Academic Progress and Graduation Requirements for Masters Programs Policy. See below for BMEP-specific program highlights and instruction.

Students are expected to make continuous and successful academic and professional progress toward graduation requirements for the M.S. degree. The concept of satisfactory progress mandates monitoring of a students' academic and professional performance through items including, but not limited to:

- Complete Degree Planning Tool (DPT)
- Project Advisor Selection
- Pass Written Qualifying Exam
- Masters Capstone Project
- Meet any program specific competencies as defined by track

Full details are included in the Academic Progress and Graduation Requirements for Masters Programs Policy on the MCGSBS intranet site.

## Minimum Grade Requirements

Students are expected to maintain a grade point average of 3.0 in didactic course work. Students whose performance falls below this standard in a given quarter will be placed on academic probation, as

described in the Deficiencies and Unsatisfactory Progress Policy and Warning, Probation, Dismissal and Appeal Policy outlined on the MCGSBS intranet site.

## Degree Planning Tool

The use of a Degree Planning Tool (DPT) is required and allows students to list the course work to fulfill degree requirements, including transfer credits. The DPT must be completed during the first academic year and should be updated as courses are completed throughout the training program. A final completed DPT must be submitted to the school when a tentative defense date has been determined to be cleared to graduate.

## Project Advisor Selection

Project Advisor is selected with counsel from Program Director, done at any time during training but no later than end of year. A list of Faculty with Privileges can be found on the MCGSBS intranet site.

## Written Qualifying Examination

The written qualifying examination will test the breadth of biomedical knowledge, and analytic and critical reasoning skills. The content and format of the examination is determined by each track. The written qualifying examination must be passed before the Master's final project review may be scheduled.

For more details, see the Written Qualifying Exam Procedure on the MCGSBS intranet site.

## Masters Capstone Project

This is required for all students in the Professional Master's Program and serves as the final academic milestone of the degree. Students will complete a scholarly project that demonstrates mastery of their chosen track and area of interest. Projects may take the form of a critical review article, original research manuscript, case study, or another approved scholarly product suitable for presentation or publication. Students must register for MGS 6400 Masters Capstone Project during their final quarter in the program. The course may only be taken once for credit. Students must register with the Program Director for their track as the course director.

## Suggested Sequence

*This is a suggested sequence based on a summer term start. Individual course plans may vary depending on true start date, program, employment/personal commitments, and research interests. Be sure to confirm you have met your requirements using your degree planning tool. Course offerings may vary slightly. Current course offerings are posted in the course catalog.*

*The BMEP Employee Master's Program is laid out for 5 years maximally. If students are able to manage their employment with a more rigorous schedule it is possible to finish in less than 5 years.*

*\* BMEP 5010, 5020, and 5030 are interchangeable for first second or third year, and dependent on the student's preferred sequencing.*

*\*\*BMEP 6600 begins first year Summer Quarter. Registration for BMEP Seminar should be during the quarter you intend to present, and you will be held accountable for attendance during this full term. Outside of your registered quarter you will be asked to attend as often as allowable by your employment supervisor.*

*\*\*\*BMEP 6650 may be taken in the Fall or Winter Quarter of the second year, not both.*

*\*\*\*\*MGS 6400 is the final review article and should be registered for in the quarter in which it will be presented to the committee.*

Code	Title	Hours
<b>First Year - Summer Term</b>		
MGS 6000	Responsible Conduct of Research	1
BME 6600	Physiology & Biomedical Engineering Seminars	1

Code	Title	Hours
<b>First Year - Fall Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
BME 5010	Integrative Physiology of Health and Disease	6

Code	Title	Hours
<b>First Year - Winter Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
BME 5011	Integrative Physiology of Health and Disease II	2

Code	Title	Hours
<b>First Year - Spring Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
BME 5012	Integrated Physiology of Health and Disease III	2

Code	Title	Hours
<b>Second Year - Summer Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
MGS 5050	Critical Thinking and Scientific Writing	2

Code	Title	Hours
<b>Second Year - Fall Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
BME 5020	Quantitative Biomedical Imaging and Signal Processing	6
BME 6650	Biomedical Engineering & Physiology Journal Club	1

Code	Title	Hours
<b>Second Year - Winter Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
BME 5021	Quantitative Biomedical Imaging and Signal Processing II	2
BME 6650	Biomedical Engineering & Physiology Journal Club	1

Code	Title	Hours
<b>Second Year - Spring Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
BME 5022	Quantitative Biomedical Imaging and Signal Processing III	2

Code	Title	Hours
<b>Third Year - Summer Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
BME 5030	Biomedical Applications of Engineering Principles	6
Electives		1-3

Code	Title	Hours
<b>Third Year - Fall Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
BME 5031	Biomedical Applications of Engineering Principles II	2
MGS 5051	Critical Thinking and Scientific Writing, Part II	1
Electives		1-3
<b>Code Title Hours</b>		
<b>Third Year - Spring Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
BME 5032	Biomedical Applications of Engineering Principles III	2
Electives		1-3
<b>Code Title Hours</b>		
<b>Fourth Year - Summer Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
Electives		1-3
<b>Code Title Hours</b>		
<b>Fourth Year - Fall Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
Electives		1-3
<b>Code Title Hours</b>		
<b>Fourth Year - Winter Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
Electives		1-3
<b>Code Title Hours</b>		
<b>Fourth Year - Spring Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
Electives		1-3
<b>Code Title Hours</b>		
<b>Fifth Year - Summer Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
<b>Code Title Hours</b>		
<b>Fifth Year - Fall Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
<b>Code Title Hours</b>		
<b>Fifth Year - Winter Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
<b>Code Title Hours</b>		
<b>Fifth Year - Spring Term</b>		
BME 6600	Physiology & Biomedical Engineering Seminars	1
MGS 6400	Master's Capstone Project	6