BIOMEDICAL ENGINEERING: ACCELERATED PROGRAM, M.S.

This is a course-based named option within the Biomedical Engineering M.S. (http://guide.wisc.edu/graduate/biomedical-engineering/biomedical-engineering-ms/#text)

The Accelerated Program named option in the Biomedical Engineering M.S. is a non-thesis program with coursework focused on engineering and science to afford further preparation and training for students interested in careers in industry or pursuing advanced academic degrees.

ADMISSIONS

Please consult the table below for key information about this degree program’s admissions requirements. The program may have more detailed admissions requirements, which can be found below the table or on the program’s website. Graduate admissions is a two-step process between academic programs and the Graduate School. Applicants must meet the minimum requirements (https://grad.wisc.edu/apply/requirements/) of the Graduate School as well as the program(s).

Once you have researched the graduate program(s) you are interested in, apply online (https://grad.wisc.edu/apply/).

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Deadline</td>
<td>December 15</td>
</tr>
<tr>
<td>Spring Deadline</td>
<td>October 1</td>
</tr>
<tr>
<td>Summer Deadline</td>
<td>December 15</td>
</tr>
<tr>
<td>GRE (Graduate Record Examinations)</td>
<td>Required.*</td>
</tr>
<tr>
<td>English Proficiency Test</td>
<td>Every applicant whose native language is not English or whose undergraduate instruction was not in English must provide an English proficiency test score and meet the Graduate School minimum requirements (<a href="https://grad.wisc.edu/apply/requirements/#english-proiciency">https://grad.wisc.edu/apply/requirements/#english-proiciency</a>).</td>
</tr>
<tr>
<td>Other Test(s) (e.g., GMAT, MCAT)</td>
<td>The MCAT may be accepted as an alternate to the GRE.</td>
</tr>
<tr>
<td>Letters of Recommendation</td>
<td>3*</td>
</tr>
</tbody>
</table>

* a) Not required for applicants with a UW–Madison Biomedical Engineering bachelor’s degree.
   b) For the Spring 2021, Summer 2021, and Fall 2021 cycle of admissions, the GRE requirement is waived due to COVID-19.

Applicants should have a bachelor’s degree in engineering (biomedical, chemical, electrical, industrial, mechanical, etc.) or science (biology, biochemistry, chemistry, genetics, immunology, physics, etc.). Each application is judged on the basis of:

- Official academic transcripts
- Graduate Record Examinations (http://www.ets.org/gre/) (GRE) scores or Medical College Admission Test (MCAT) scores for the general test
- Test of English as a Foreign Language (http://www.ets.org/toefl/) (TOEFL) examination for international students
- Three letters of recommendation
- Statement of purpose (https://grad.wisc.edu/apply/prepare/)
- Resume (for Ph.D. applicants only)

All applicants must satisfy requirements that are set forth by the Graduate School (https://grad.wisc.edu/). Students admitted to the program may be required to make up deficiency course requirements.

To apply to the BME program, complete applications (https://grad.wisc.edu/apply/), including supportive materials, must be submitted as described below and received by the deadline.

OFFICIAL ACADEMIC TRANSCRIPT

Electronically submit one copy of your transcript of all undergraduate and previous graduate work along with your online application to the Graduate School. Unofficial copies of transcripts will be accepted for review, but official copies are required for admitted students. Please do not send transcripts or any other application materials to the Graduate School or the BME department unless requested. If you have questions, please contact bmegradadmission@engr.wisc.edu.

GRADUATE RECORD EXAMINATION (GRE)

Applicants should request ETS to send their official GRE scores by using institution code 1846.

MCAT scores may be substituted for GRE. Domestic applicants who choose to substitute MCAT scores for the GRE should send their MCAT score report to bmegradadmission@engr.wisc.edu.

TEST OF ENGLISH AS A FOREIGN LANGUAGE (TOEFL)

The TOEFL is required for international students unless a degree from a U.S. educational institution is held. Scores should be sent using institution code 1846.

An applicant whose TOEFL (paper-based) test score is below 580; TOEFL computer-based test (CBT) score below 237; (TOEFL internet-based iBT) test score below 92; IELTS score below 7; or MELAB below 82 must take an English assessment test upon arrival. Depending on your score, you may need to register for any recommended English as a Second Language (ESL) courses in the first semester you are enrolled.

Any international applicant who will hold a teaching assistantship (TA), and whose native language is not English must take the SPEAK test (https://esl.wisc.edu/ita-training/speak/) when arriving on campus.

THREE LETTERS OF RECOMMENDATIONS

These letters are required from people who can accurately judge the applicant’s academic or research performance. Letters of recommendation are submitted electronically to graduate programs through the online application. Applicants should not send any more than three letters (if more than three are sent, only the first three will be considered). See the Graduate School for FAQs (https://grad.wisc.edu/apply/) regarding letters of recommendation.
STATEMENT OF PURPOSE
In this document, applicants should explain why they want to pursue further education in BME and discuss which UW faculty members they would be interested in doing research with during their graduate study (see the Graduate School for more advice on how to structure a personal statement (https://grad.wisc.edu/apply/prepare/)).

RESUME (FOR PH.D. APPLICATIONS ONLY)
Include your resume ONLY if applying for the Ph.D. program.

APPLICATION FEE
Submission must be accompanied by the one-time application fee. It is non-refundable and can be paid by credit card (Master Card or Visa) or debit/ATM. By state law, this fee can only be waived or deferred through the conditions outlined here by the Graduate School (https://grad.wisc.edu/apply/fee-grant/).

FUNDING

GRADUATE SCHOOL RESOURCES
Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (https://grad.wisc.edu/funding/) is available from the Graduate School. Be sure to check with your program for individual policies and restrictions related to funding.

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS
Review the Graduate School minimum academic progress and degree requirements (http://guide.wisc.edu/graduate/policiesandrequirementstext), in addition to the program requirements listed below.

NAMED OPTION REQUIREMENTS

MODE OF INSTRUCTION

<table>
<thead>
<tr>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Mode of Instruction Definitions
- Accelerated: Accelerated programs are offered at a fast pace that condenses the time to completion. Students are able to complete a program with minimal disruptions to careers and other commitments.
- Evening/Weekend: Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.
- Face-to-Face: Courses typically meet during weekdays on the UW-Madison Campus.
- Hybrid: These programs combine face-to-face and online learning formats. Contact the program for more specific information.
- Online: These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

CURRICULAR REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Credit Requirement</td>
<td>30 credits</td>
</tr>
<tr>
<td>Minimum Residence Credit</td>
<td>16 credits</td>
</tr>
<tr>
<td>Requirement</td>
<td></td>
</tr>
<tr>
<td>Minimum Graduate Coursework</td>
<td>Half of degree coursework (15 credits out of 30 total credits) must be completed graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university's Course Guide (<a href="https://registrar.wisc.edu/course-guide/">https://registrar.wisc.edu/course-guide/</a>).</td>
</tr>
<tr>
<td>Requirement</td>
<td></td>
</tr>
<tr>
<td>Overall Graduate GPA</td>
<td>3.00 GPA required</td>
</tr>
<tr>
<td>Requirement</td>
<td></td>
</tr>
<tr>
<td>Other Grade Requirements</td>
<td>The Graduate School requires an average grade of B or better in all coursework (300 or above, not including research credits) taken as a graduate student unless conditions for probationary status require higher grades. Grades of Incomplete are considered to be unsatisfactory if they are not removed during the next enrolled semester.</td>
</tr>
<tr>
<td>Assessments and Examinations</td>
<td>There are no degree-specific assessments and examinations outside of those given in individual courses.</td>
</tr>
<tr>
<td>Language Requirements</td>
<td>None.</td>
</tr>
</tbody>
</table>

REQUIRED COURSES

The required coursework is designed to complement each student’s interests and background in biomedical engineering.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 semesters of B M E 701</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project or Independent Study (B M E 790 or B M E 799)</td>
<td>0-6</td>
<td></td>
</tr>
<tr>
<td>Courses in one area of specialization below, which all include:</td>
<td>24-30</td>
<td></td>
</tr>
<tr>
<td>3 or more credits of Bioscience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 credits of Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electives selected in consultation with advisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

Students choose one of the following areas of specialization.

**Biomaterials and Tissue Engineering**

Biomaterials and tissue engineering employ a diverse range of approaches to develop methods to diagnose and treat diseases, create living tissue environments that may be used to restore the function of a damaged organ, and uncover biological mechanisms related to tissue development and disease. Graduate students trained in biomaterials and tissue engineering are expected to gain a detailed understanding of cellular and molecular biology, materials science, and engineering methods.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRB 640</td>
<td>Fundamentals of Stem Cell and Regenerative Biology</td>
<td>3 or more</td>
</tr>
</tbody>
</table>

At least 3 credits of Bioscience. Relevant options include:
Biomedical Engineering: Accelerated Program, M.S.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRB 650</td>
<td>Molecular and Cellular Organogenesis</td>
<td></td>
</tr>
<tr>
<td>CRB/B M E 670</td>
<td>Biology of Heart Disease and Regeneration</td>
<td></td>
</tr>
<tr>
<td>ZOOLOGY/BIOCHEM/PHMCOL-M 630</td>
<td>Cellular Signal Transduction Mechanisms</td>
<td></td>
</tr>
</tbody>
</table>

At least 12 credits of Engineering. Relevant options include: 12 or more

Required courses:

- B M E/PHM SCI 430 Biological Interactions with Materials
- B M E/CBE 510 Introduction to Tissue Engineering
- B M E 511 Tissue Engineering Laboratory
- B M E/CBE 520 Stem Cell Bioengineering
- B M E 545 Introduction to Extracellular Matrices
- B M E 630 Nanomaterials for Biomedical Applications
- CBE 540 Polymer Science and Technology
- CBE 648 Synthetic Organic Materials in Biology and Medicine
- CBE 781 Biological Engineering: Molecules, Cells & Systems
- CHEM 654 Materials Chemistry of Polymers
- M S & E 521 Advanced Polymeric Materials

Electives (taken in consultation with your faculty advisor):

- B M I/STAT 541 Introduction to Biostatistics
- B M I/COMP SCI 776 Advanced Bioinformatics
- COMP SCI 765 Data Visualization
- STAT/F&W ECOL/HORT 571 Statistical Methods for Bioscience I
- STAT/B M I 877 Statistical Methods for Molecular Biology
- B M E 556 Systems Biology: Mammalian Signaling Networks
- B M E/CBE 560 Biochemical Engineering
- B M E/MED PHYS/PHMCOL-M/PHYSICS/RADIOL 619 Microscopy of Life
- B M E/CHEM/MED PHYS 750 Biological Optical Microscopy
- B M E/CBE 782 Modeling Biological Systems
- B M E/CBE 783 Design of Biological Molecules

1 These tracks are internal to the program and represent different pathways a student can follow to earn this degree. Track names do not appear in the Graduate School admissions application, and they will not appear on the transcript.

Biomechanics

Biomechanists use experiments and computational tools to investigate the mechanical aspects of biological systems, at levels ranging from whole organisms to organs, tissues, and cells. Graduate students trained in biomechanics are expected to gain a detailed understanding of mechanics, mathematics, biology, and engineering.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANAT&amp;PHY 335</td>
<td>Physiology</td>
<td></td>
</tr>
<tr>
<td>ANAT&amp;PHY 435</td>
<td>Fundamentals of Human Physiology</td>
<td></td>
</tr>
<tr>
<td>CRB/B M E 670</td>
<td>Biology of Heart Disease and Regeneration</td>
<td></td>
</tr>
<tr>
<td>KINES 773</td>
<td>Cardiorespiratory Adaptions to Environment and Exercise</td>
<td></td>
</tr>
<tr>
<td>ZOOLOGY 570</td>
<td>Cell Biology</td>
<td></td>
</tr>
</tbody>
</table>

At least 12 credits of Engineering. Relevant options include: 12 or more

Required courses:

- B M E/M E 414 Orthopaedic Biomechanics - Design of Orthopaedic Implants
- B M E/M E 415 Biomechanics of Human Movement
- B M E/M E 505 Biofluidics
- B M E/M E 603 Topics in Bio-Medical Engineering (Topics: Finite Elements for Biomechanics, Imaging Biomechanics, Cell Mechanics, and/or Advanced Cardiovascular Biomechanics)
- B M E/M E 615 Tissue Mechanics
- M E/E M A 540 Experimental Vibration and Dynamic System Analysis
- M E/CIV ENGR/E M A 508 Composite Materials
- M E 563 Intermediate Fluid Dynamics
- M E/E M A 570 Experimental Mechanics
- M E 573 Computational Fluid Dynamics
- E M A 506 Advanced Mechanics of Materials I
- E M A 519 Fracture Mechanics
- E M A/ M S & E 541 Heterogeneous and Multiphase Materials
- E M A 545 Mechanical Vibrations
- E M A 605 Introduction to Finite Elements
- E M A/E P 615 Micro- and Nanoscale Mechanics
- E M A 622 Mechanics of Continua
- E M A 630 Viscoelastic Solids

Electives (taken in consultation with your faculty advisor):

- MATH 443 Applied Linear Algebra
- MATH 519 Ordinary Differential Equations
- MATH 619 Analysis of Partial Differential Equations
- M E/STAT 424 Statistical Experimental Design
- M E/COMP SCI/E C E 532 Matrix Methods in Machine Learning
- B M I/STAT 541 Introduction to Biostatistics
- COMP SCI 368 Learning a Programming Language
These tracks are internal to the program and represent different pathways a student can follow to earn this degree. Track names do not appear in the Graduate School admissions application, and they will not appear on the transcript.

Biomedical Imaging and Optics
Biomedical imaging and optics research develops and utilizes new experimental and computational tools to characterize tissue structure across multiple size scales. A particular focus is on human health, especially with respect to achieving superior diagnostic/prognostic tools for a spectrum of diseased states. Graduate students trained in this track are expected to gain a detailed understanding of mathematics, biology and engineering as well as optical and/or physical methods.

Required courses:
- At least 3 credits of Bioscience. Relevant options include:
  - ANAT&PHY 335 Physiology
  - ZOOLOGY 570 Cell Biology
- At least 12 credits of Engineering. Relevant options include:
  - B M E/ MED PHYS 530 Medical Imaging Systems
  - B M E/ MED PHYS 573 Medical Image Science: Mathematical and Conceptual Foundations
  - B M E/ MED PHYS 574 Imaging in Medicine: Applications
  - B M E/ MED PHYS 575 Diagnostic Ultrasound Imaging
  - B M E/ MED PHYS 578 Non-Ionizing Diagnostic Imaging
  - B M E/ MED PHYS/Microscopy of Life PHMCOL-M/ PHYSICS/ RADIOL 619 Advances in Medical Magnetic Resonance
  - B M E/CHEM/ MED PHYS 750 Biological Optical Microscopy
  - B M E/ MED PHYS 751 Biomedical Optics and Biophotonics
  - B M E/ MED PHYS 580 The Physics of Medical Imaging with Ionizing Radiation
  - B M E/ MED PHYS 777 Principles of X-ray Computed Tomography
  - B M E/ E C E/ MED PHYS 778 Machine Learning in Ultrasound Imaging
  - E C E 630 All of Signal Processing

Electives (taken in consultation with your faculty advisor):
- MATH 443 Applied Linear Algebra
- COMP SCI 368 Learning a Programming Language
- COMP SCI 766 Computer Vision

Medical and Microdevices
Medical and microdevices involve the use of electronic and computational tools to develop devices used in diagnosis and treatment of disease ranging from the systemic to the cellular and molecular levels.

Required courses:
- At least 3 credits of Bioscience. Relevant options include:
  - ANAT&PHY 335 Physiology
  - BIOCHEM 501 Introduction to Biochemistry
  - BIOCHEM/ GENETICS/ MICROBIO 612 Prokaryotic Molecular Biology
  - BIOCHEM/ GENETICS/ MD GENET 620 Eukaryotic Molecular Biology
  - PATH 750 Cellular and Molecular Biology/ Pathology
  - ZOOLOGY/ PSYCH 523 Neurobiology
  - ZOOLOGY 570 Cell Biology
  - ZOOLOGY/ BIOCHEM/ PHMCOL-M 630 Cellular Signal Transduction Mechanisms
- At least 12 credits of Engineering. Relevant options include:
  - B M E/E C E 462 Medical Instrumentation
  - B M E 515 Therapeutic Medical Devices
  - B M E/ MED PHYS 535 Introduction to Energy-Tissue Interactions
  - B M E 550 Introduction to Biological and Medical Microsystems
  - B M E 601 Special Topics in Biomedical Engineering (Topics: Medical Design and Manufacturing, and/or Introduction to Neuroengineering)
  - B M E 602 Special Topics in Biomedical Engineering (Topic: Biosensors)

Electives (taken in consultation with your faculty advisor):
- MATH 443 Applied Linear Algebra
- MATH 519 Ordinary Differential Equations
- MATH 619 Analysis of Partial Differential Equations
- COMP SCI 300 Programming II
- COMP SCI 320 Data Programming II
Bioengineering is the convergence of neuroscience, computation, device development, and mathematics to improve human health. Bioengineering brings together state-of-the-art technologies for the development of devices and algorithms to assist those with neural disorders. It is also used to reverse engineer living neural systems via new algorithms, technologies and robotics. Students pursuing this track are involved in all of these endeavors so that as the next generation of engineers, they will transcend the traditional boundaries of neuroscience, technology, engineering and mathematics.

**Neuroengineering**

Neuroengineering is the convergence of neuroscience, computation, device development, and mathematics to improve human health. Neuroengineering brings together state-of-the-art technologies for the development of devices and algorithms to assist those with neural disorders. It is also used to reverse engineer living neural systems via new algorithms, technologies and robotics. Students pursuing this track are involved in all of these endeavors so that as the next generation of engineers, they will transcend the traditional boundaries of neuroscience, technology, engineering and mathematics.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 721</td>
<td>Neural Basis for Movement</td>
<td></td>
</tr>
<tr>
<td>KINES 861</td>
<td>Principles of Motor Control and Learning</td>
<td></td>
</tr>
<tr>
<td>NTP/NEURODPT</td>
<td>Cellular and Molecular Neuroscience</td>
<td></td>
</tr>
<tr>
<td>NTP/NEURODPT/PSYCH 611</td>
<td>Systems Neuroscience</td>
<td></td>
</tr>
<tr>
<td>NTP/NEURODPT</td>
<td>Sensation and Memory in Cerebral Cortex</td>
<td></td>
</tr>
<tr>
<td>NTP/NEUROL 735</td>
<td>Neuropathology of Disease</td>
<td></td>
</tr>
<tr>
<td>PSYCH 610</td>
<td>Design and Analysis of Psychological Experiments I</td>
<td></td>
</tr>
<tr>
<td>PSYCH 733</td>
<td>Perceptual and Cognitive Sciences</td>
<td></td>
</tr>
<tr>
<td>ZOOLOGY 625</td>
<td>Development of the Nervous System</td>
<td></td>
</tr>
<tr>
<td>ANAT&amp;PHY 335</td>
<td>Physiology</td>
<td></td>
</tr>
</tbody>
</table>

**Electives (taken in consultation with your faculty advisor):**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 443</td>
<td>Applied Linear Algebra</td>
</tr>
<tr>
<td>COMP SCI 320</td>
<td>Data Programming II</td>
</tr>
<tr>
<td>COMP SCI 368</td>
<td>Learning a Programming Language (multiple 1-credit options, including R, C++, and Matlab)</td>
</tr>
<tr>
<td>COMP SCI/ B M I 567</td>
<td>Medical Image Analysis</td>
</tr>
<tr>
<td>COMP SCI 766</td>
<td>Computer Vision</td>
</tr>
<tr>
<td>COMP SCI/ B M I 767</td>
<td>Computational Methods for Medical Image Analysis</td>
</tr>
</tbody>
</table>

**Systems and Synthetic Biology**

Systems and synthetic biology utilizes experimental and computational tools in an iterative fashion to analyze and regulate biological systems.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOCHEM 570</td>
<td>Computational Modeling of Biological Systems</td>
<td></td>
</tr>
<tr>
<td>BIOCHEM 919</td>
<td>Synthetic Biology Seminar</td>
<td></td>
</tr>
<tr>
<td>BIOCHEM 501</td>
<td>Introduction to Biochemistry</td>
<td></td>
</tr>
<tr>
<td>BIOCHEM/ GENETICS/MICROBIO 612</td>
<td>Eukaryotic Molecular Biology</td>
<td></td>
</tr>
<tr>
<td>BIOCHEM/ GENETICS/MD GENET 620</td>
<td>Eukaryotic Molecular Biology</td>
<td></td>
</tr>
<tr>
<td>BIOCHEM 729</td>
<td>Advanced Topics</td>
<td></td>
</tr>
<tr>
<td>ZOOLOGY 570</td>
<td>Cell Biology</td>
<td></td>
</tr>
<tr>
<td>ZOOLOGY/BIOCHEM/PHMCOL-M 630</td>
<td>Cellular Signal Transduction Mechanisms</td>
<td></td>
</tr>
</tbody>
</table>

**Electives (taken in consultation with your faculty advisor):**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B M E 515</td>
<td>Therapeutic Medical Devices</td>
<td></td>
</tr>
<tr>
<td>B M E/CBE 520</td>
<td>Stem Cell Bioengineering</td>
<td></td>
</tr>
<tr>
<td>B M E 550</td>
<td>Introduction to Biological and Medical Microsystems</td>
<td></td>
</tr>
<tr>
<td>B M E 601</td>
<td>Special Topics in Biomedical Engineering (Topics: Introduction to Neuroengineering and/or Medical Device Design and Manufacturing)</td>
<td></td>
</tr>
<tr>
<td>B M E 602</td>
<td>Special Topics in Biomedical Engineering (Topic: Biosensors)</td>
<td></td>
</tr>
<tr>
<td>B M E/ECE 462</td>
<td>Medical Instrumentation</td>
<td></td>
</tr>
<tr>
<td>B M E/ECE 463</td>
<td>Computers in Medicine</td>
<td></td>
</tr>
<tr>
<td>ECE 630</td>
<td>All of Signal Processing</td>
<td></td>
</tr>
<tr>
<td>ECE/COMP SCI/ I SY E 524</td>
<td>Introduction to Optimization</td>
<td></td>
</tr>
</tbody>
</table>

1. These tracks are internal to the program and represent different pathways a student can follow to earn this degree. Track names do not appear in the Graduate School admissions application, and they will not appear on the transcript.
Electives (taken in consultation with your faculty advisor):

- MATH 443: Applied Linear Algebra
- MATH 519: Ordinary Differential Equations
- MATH 619: Analysis of Partial Differential Equations
- B M I/STAT 541: Introduction to Biostatistics
- B M I/ COMP SCI 576: Introduction to Bioinformatics
- B M I 826: Special Topics in Biostatistics and Biomedical Informatics
- B M I/ COMP SCI 776: Advanced Bioinformatics
- COMP SCI 368: Learning a Programming Language (multiple 1-credit options available, including R, C++, and Matlab)

These tracks are internal to the program and represent different pathways a student can follow to earn this degree. Track names do not appear in the Graduate School admissions application, and they will not appear on the transcript.

**POLICIES**

**GRADUATE SCHOOL POLICIES**

The Graduate School's Academic Policies and Procedures (https://grad.wisc.edu/acadpolicy/) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

**NAMED OPTION-SPECIFIC POLICIES**

**PRIOR COURSEWORK**

Graduate Work from Other Institutions

A student may transfer graduate coursework from other institutions with program approval. These courses may not be used toward the Graduate School’s Minimum Graduate Residence Credit. Coursework earned five years or more prior to admission to the master’s program is not allowed to satisfy requirements. Reach out to the BME Graduate Coordinator for more information.

UW–Madison Undergraduate

A student who has completed their bachelor’s degree at UW-Madison may transfer 6 credits of coursework with program approval. These courses must be coursework numbered 400 level or above. Coursework earned five or more years prior to admission to a M.S. degree is not allowed to satisfy requirements. These courses may not be used toward the Graduate School's Minimum Graduate Residence Credit.

UW–Madison University Special

With program approval and payment of the difference in tuition (between Special and graduate tuition), students are allowed to count up to 15 credits of coursework numbered 300 or above taken as a UW–Madison Special student toward the minimum graduate residence credit requirement and, the minimum graduate degree credit requirement; if that coursework is numbered 700 or above it may be used to satisfy the minimum graduate coursework (50%) requirement.

**PROBATION**

The Graduate School regularly reviews the record of any student who earned grades of BC, C, D, F, or Incomplete in a graduate course (300 or above), or grade of U in research credits. This review could result in academic probation with a hold on future enrollment or in being suspended from the Graduate School.

**ADVISOR / COMMITTEE**

Every graduate student is required to have an advisor. An advisor is a faculty member from the major department responsible for providing advice regarding graduate studies. In many cases, an advisor is assigned to incoming students. To ensure that students are making satisfactory progress toward a degree, the Graduate School expects them to meet with their advisor on a regular basis.

**CREDITS PER TERM ALLOWED**

15 credits

**TIME CONSTRAINTS**

The accelerated MS program is typically completed in less than 18 months.

Master's degree students who have been absent for five or more consecutive years lose all credits that they have earned before their absence. Individual programs may count the coursework students completed prior to their absence for meeting program requirements but that coursework may not count toward Graduate School credit requirements.

**GRIEVANCES AND APPEALS**

These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting (https://doso.students.wisc.edu/bias-or-hate-reporting/)
- Graduate Assistantship Policies and Procedures (https://hr.wisc.edu/policies/gapp/#grievance-procedure)
- Hostile and Intimidating Behavior Policies and Procedures (https://hr.wisc.edu/hib/)
  - Office of the Provost for Faculty and Staff Affairs (https://facstaffprovost.wisc.edu/)
  - Dean of Students Office (https://doso.students.wisc.edu/) (for all students to seek grievance assistance and support)
  - Employee Assistance (http://www.eao.wisc.edu/) (for personal counseling and workplace consultation around communication and conflict involving graduate assistants and other employees, post-doctoral students, faculty and staff)
  - Employee Disability Resource Office (https://employeedisabilities.wisc.edu/) (for qualified employees or applicants with disabilities to have equal employment opportunities)
  - Graduate School (https://grad.wisc.edu/) (for informal advice at any level of review and for official appeals of program/departmental or school/college grievance decisions)
  - Office of Compliance (https://compliance.wisc.edu/) (for class harassment and discrimination, including sexual harassment and sexual violence)
  - Office of Student Conduct and Community Standards (https://conduct.students.wisc.edu/) (for conflicts involving students)
  - Ombuds Office for Faculty and Staff (http://www.ombuds.wisc.edu/) (for employed graduate students and post-docs, as well as faculty and staff)
BME Grievance Procedures

If a student feels unfairly treated or aggrieved by faculty, staff, or another student, the University offers several avenues to resolve the grievance.

Step 1

The student is encouraged to speak first with the person toward whom the grievance is directed to see if a situation can be resolved at this level. Students are also encouraged to talk with their faculty advisors regarding concerns or difficulties, or reach out to the Graduate Student Services Coordinator or Associate Chair of BME Graduate Advising for additional assistance. These activities do not rise to the level of a formal grievance; however, the student is encouraged to keep documentation of these interactions as they may be useful if a formal grievance is pursued.

Step 2

Should a satisfactory resolution not be achieved, a formal grievance can be filed with the BME Grievance Committee. To do so, the student contacts the Department Administrator, who will provide the student with the name of the current chair of the Grievance Committee. The student will then contact the Chair of the Grievance Committee, who will reply within seven calendar days. If the grievance is with the current Chair of the Grievance Committee, please let the Department Administrator know and they will identify an alternate committee member to contact. It is advised that grievances are filed within 60 calendar days of the alleged unfair treatment to enable a thorough investigation.

Step 3

If the student does not feel comfortable working through the departmental process, they are encouraged to seek out other campus resources including:

- The Assistant Dean for Graduate Affairs in the College of Engineering
- The Graduate School
- UW Division of Diversity, Equity & Educational Achievement (DDEEA)
- McBurney Disability Resource Center
- Employee Assistance Office
- Ombuds Office
- University Health Services

Step 4

At this point, if either party (the student or the person toward whom the grievance is directed) is unsatisfied with the decision of the faculty committee, the party may file a written appeal. Either party has ten working days to file a written appeal to the School/College. For more information, students should consult the College of Engineering Academic Advising Policies and Procedures.

Step 5

Documentation of the grievance will be stored for at least seven years. Significant grievances that set a precedent will be stored indefinitely. The Graduate School has procedures for students wishing to appeal a grievance decision made at the school/college level. These policies are described in the Graduate School’s Academic Policies and Procedures.

OTHER

Due to the accelerated, course-based nature of the Biomedical Engineering Accelerated Master’s program, students cannot hold funded appointments such as research assistantships, teaching assistantships, or project assistantships, either inside the BME department or elsewhere on campus. These appointments may impact the student’s progress and are inconsistent with the nature of an accelerated program. Compliance with this policy will be confirmed by regular audits of appointments. Students can be placed in probation for failure to adhere to these policies.

In the uncommon instance that a BME Accelerated MS student has an offer for a funded appointment (research assistantship, teaching assistantship, or project assistantship) they may appeal this policy. In order to initiate the process, the student should contact the Associate Chair of the Master’s degree program, Darilis Suarez-Gonzalez and provide details on the funded position. Dr. Suarez-Gonzalez will bring the student’s request to the other members of the appeals committee and the committee will determine if the student can accept the funded appointment. The student may not accept the position without approval from the appeals committee.

Students in this program may not take courses outside the prescribed curriculum without faculty advisor approval. Students in this program cannot enroll concurrently in other undergraduate, graduate or certificate programs.

PROFESSIONAL DEVELOPMENT

GRADUATE SCHOOL RESOURCES

Take advantage of the Graduate School’s professional development resources (https://grad.wisc.edu/pd/) to build skills, thrive academically, and launch your career.

PROGRAM RESOURCES

THE INDIVIDUAL DEVELOPMENT PLAN (IDP)

An Individual Development Plan (IDP) (https://grad.wisc.edu/pd/idp/) helps graduate students and postdoctoral researchers:

- assess current skills, interests, and strengths;
- make a plan for developing skills to meet academic and professional goals; and
- communicate with supervisors, advisors, and mentors about evolving goals and related skills.

The IDP is a document to be revisited again and again, to update and refine as goals change and/or come into focus, and to record progress and accomplishments.

The university recommends IDPs for all postdoctoral researchers and graduate students, and requires IDPs for all postdoctoral researchers and graduate students supported by National Institutes of Health (NIH) funding. See the Graduate School for more information and IDP resources (https://grad.wisc.edu/pd/idp/).

ENGINEERING CAREER SERVICES

The Engineering Career Services (https://ecs.wisc.edu/) staff offers assistance to students searching or preparing for internships, co-ops, and jobs with well-recognized organizations.
THE WRITING CENTER
The Writing Center (https://writing.wisc.edu/) is a campus-wide organization that provides free of charge, face-to-face and online consultations for students writing papers, reports, resumes, and applications.

PEOPLE

FACULTY
Paul Campagnola (Chair)
Randolph Ashton
David Beebe
Walter Block
Christopher Brace
Kevin Eliceiri
Shaoqin 'Sarah' Gong
Aviad Hai
Melissa Kinney
Pamela Kreeger
Wan-ju Li
Kip Ludwig
Kristyn Masters
Megan McClean
Beth Meyerand
William Murphy
Jeremy Rogers
Krishanu Saha
Melissa Skala
Darryl Thelen
Justin Williams
Colleen Witzenburg
Filiz Yesilkoy

INSTRUCTIONAL STAFF AND FACULTY ASSOCIATES
Amit Nimunkar
John Puccinelli
Tracy Jane Puccinelli
Darilis Suarez-Gonzalez
Aaron Suminski

See also Biomedical Engineering Faculty Directory (http://directory.engr.wisc.edu/bme/).