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

The Biomedical Innovation, Design, and Entrepreneurship named option in the Biomedical Engineering M.S. program is designed to provide additional graduate-level, project-based experiences in design, prototyping, and manufacturing, as well as an understanding of business fundamentals, entrepreneurship, and project management. Upon completion, student will be prepared for careers at the interface of engineering and business.

**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://graduate.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>Not 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-proficiency">https://grad.wisc.edu/apply/requirements/#english-proficiency</a>).</td>
</tr>
<tr>
<td>Other Test(s) (e.g., GMAT, MCAT)</td>
<td>n/a</td>
</tr>
<tr>
<td>Letters of Recommendation Required</td>
<td>3*</td>
</tr>
</tbody>
</table>

* Not required for applicants with a UW-Madison Biomedical Engineering bachelor’s degree.

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.

**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 S.P.E.A.K 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://graduate.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 (see the Graduate School for more advice on how to structure a personal statement (https://grad.wisc.edu/apply/prepare/)).

**RESUME**

Upload your resume in your application.

**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/).

**GRADUATE SCHOOL ADMISSIONS**

Graduate admissions is a two-step process between academic degree programs and the Graduate School. Applicants must meet requirements of both the program(s) and the Graduate School. Once you have researched the graduate program(s) you are interested in, apply online (https://grad.wisc.edu/admissions/).

**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**

- **Face to Face**
- **Evening/Weekend**
- **Online**
- **Hybrid**
- **Accelerated**

**Minimum Residence Credit Requirement**

- 16 credits

**Minimum Graduate Coursework Requirement**

- 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 (https://registrar.wisc.edu/course-guide/).

**Overall Graduate GPA Requirement**

- 3.00 GPA required.

**Other Grade Requirements**

- 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.

**Assessments and Examinations**

- There are no degree-specific assessments and examinations outside of those given in individual courses.

**Language Requirement**

- n/a

**REQUIRED COURSES**

<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>9</td>
</tr>
<tr>
<td>B M E 601</td>
<td>Special Topics in Biomedical Engineering</td>
<td></td>
</tr>
<tr>
<td>B M E 602</td>
<td>Special Topics in Biomedical Engineering</td>
<td></td>
</tr>
<tr>
<td>B M E/M E 603</td>
<td>Topics in Bio-Medical Engineering</td>
<td></td>
</tr>
<tr>
<td>B M E/I SY E 662</td>
<td>Design and Human Disability and Aging</td>
<td></td>
</tr>
<tr>
<td>M E 449</td>
<td>Redesign and Prototype Fabrication</td>
<td></td>
</tr>
<tr>
<td>M E 514</td>
<td>Additive Manufacturing</td>
<td></td>
</tr>
<tr>
<td>M E 549</td>
<td>Product Design</td>
<td></td>
</tr>
<tr>
<td>M E 601</td>
<td>Special Topics in Mechanical Engineering</td>
<td></td>
</tr>
<tr>
<td>M E/I SY E 641</td>
<td>Design and Analysis of Manufacturing Systems</td>
<td></td>
</tr>
<tr>
<td>M E 748</td>
<td>Optimum Design of Mechanical Elements and Systems</td>
<td></td>
</tr>
<tr>
<td>I SY E 415</td>
<td>Introduction to Manufacturing Systems, Design and Analysis</td>
<td></td>
</tr>
<tr>
<td>I SY E 515</td>
<td>Engineering Management of Continuous Process Improvement</td>
<td></td>
</tr>
<tr>
<td>I SY E 517</td>
<td>Decision Making in Health Care</td>
<td></td>
</tr>
<tr>
<td>I SY E 552</td>
<td>Human Factors Engineering Design and Evaluation</td>
<td></td>
</tr>
<tr>
<td>I SY E 557</td>
<td>Human Factors Engineering for Healthcare Systems</td>
<td></td>
</tr>
<tr>
<td>I SY E 601</td>
<td>Special Topics in Industrial Engineering</td>
<td></td>
</tr>
</tbody>
</table>
Biomedical Engineering: Biomedical Innovation, Design, and Entrepreneurship, M.S.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISY 602</td>
<td>Special Topics in Human Factors</td>
</tr>
<tr>
<td>ISY 603</td>
<td>Special Topics in Engineering Analytics and Operations Research</td>
</tr>
<tr>
<td>ISY 604</td>
<td>Special Topics in Manufacturing and Supply Chain Management</td>
</tr>
<tr>
<td>ISY 606</td>
<td>Special Topics in Healthcare Systems Engineering</td>
</tr>
<tr>
<td>INTEREGR 477</td>
<td>Tools for Prototyping and Manufacturing</td>
</tr>
<tr>
<td>INTEREGR 601</td>
<td>Topics in Interdisciplinary Engineering</td>
</tr>
</tbody>
</table>

**Special Topics in Human Factors**

**ISY 602**

**Special Topics in Engineering Analytics and Operations Research**

**ISY 603**

**Special Topics in Manufacturing and Supply Chain Management**

**ISY 604**

**Special Topics in Healthcare Systems Engineering**

**INTEREGR 477**

**Tools for Prototyping and Manufacturing**

**INTEREGR 601**

**Topics in Interdisciplinary Engineering**

**9 credits of general business, entrepreneurship and strategic innovation courses:**

**GEN BUS 310**

Fundamentals of Accounting and Finance for Non-Business Majors

**GEN BUS 311**

Fundamentals of Management and Marketing for Non-Business Majors

**MHR/AAE 540**

Intellectual Property Rights, Innovation and Technology

**MHR 715**

Strategic Management of Innovation

**MHR 722**

Entrepreneurial Management

**MHR 734**

Venture Creation

**MHR 738**

Weinert Applied Ventures in Entrepreneurship (WAVE)

**RMI 650**

Sustainability, Environmental and Social Risk Management

**At most, 6 credits of other technical elective engineering courses:**

**BME/MED PHYS/MPHMCOL-M/PHYSICS/RADIOL 619**

Microscopy of Life

**BME/CHEM/MED PHYS 750**

Biological Optical Microscopy

**BME/ECE/MED PHYS 778**

Machine Learning in Ultrasound Imaging

**CBE 540**

Polymer Science and Technology

**ECE/COMP SCI/I SYE 524**

Introduction to Optimization

**ECE/COMP SCI 533**

Image Processing

**ECE/COMP SCI 539**

Introduction to Artificial Neural Networks

**ME 563**

Intermediate Fluid Dynamics

**E/EM A 570**

Experimental Mechanics

**ME 573**

Computational Fluid Dynamics

**MS & E 521**

Advanced Polymeric Materials

**MED PHYS/PEDIAT 705**

Women and Leadership: Science, Health and Engineering

**At most, 3 credits of advanced design or research project:**

**BME 799**

Advanced Independent Study

**Additional credits taken in consultation with advisor**

**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 BME graduate student must have a faculty advisor. A faculty advisor provides the graduate student with academic guidance in their course program and research oversight in their thesis, project, or engineering report. Graduate students should always seek advice from their advisor and other faculty in their interest area prior to enrolling for courses.

CREDITS PER TERM ALLOWED
15 credits maximum

TIME CONSTRAINTS
The MS BIDES 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; 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://facstaff.provost.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://employee.disabilities.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)
- Title IX (https://compliance.wisc.edu/titleix/) (for concerns about discrimination)

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 Innovation, Design, and Entrepreneurship 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 Biomedical Innovation, Design, and Entrepreneurship 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.

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/).

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/).