September 29, 2023

**SP 2024 PRE-REGISTRATION FAQ**

**Director of Undergraduate Studies:** Emily Boyd (ejboyd@wustl.edu)

**Aside from courses, what should we discuss in advising meetings?**

- □ Background and draw to engineering
- □ Extracurricular activities
- □ Job/internship searches and interviews
- □ Summer plans
- □ Undergraduate research
- □ Graduate school and preparation
- □ Goals: academic, professional, personal
- □ Taking the Fundamentals of Engineering (FE) exam in the senior year as a step toward Professional Engineering (PE) licensure

**Where do I find the BSME curriculum?**

The curriculum worksheet and registration FAQs can be found on the department website.
https://mems.wustl.edu/academics/undergraduate/BS-Mechanical-Engineering.html

**What are the BSME degree requirements?**

The best way for a student to track degree requirements is to look at a degree audit on WUachieve. This will include new courses that satisfy requirements from a previous catalog date. An advisor or student can request a degree audit at any time online at the link below. Degree requirements follow the catalog date when the student matriculated. https://engineering.wustl.edu/offices-services/student-services/WUachieve.html

**Are prerequisites strictly enforced?**

Yes. However, requests for waiver of prerequisites or substitution of required courses must be submitted in writing to the Director of Undergraduate Studies and must be approved by the course instructor and the student's faculty advisor. Prerequisites are listed in the course description in WebSTAC and on the BSME curriculum worksheet.

**Is MEMS 101 Intro to Mechanical Engineering and Mechanical Design required?**

For students matriculating into WashU mechanical engineering programs in fall 2020 or later, MEMS 101 is required. Students who matriculated before 2020 are not required to take MEMS 101.

**What is the chemistry requirement for the BSME?**

Students have the option of taking Chem 105 or Chem 111A. The two courses cover similar material except Chem 105 includes a review of chemistry fundamentals while Chem 111A covers quantum mechanics. Students must also take Chem 151 General Chemistry Lab.

**Does Chem 105 satisfy chemistry requirements in other engineering degree programs?**
Chem 105 will satisfy chemistry 1 requirements for all other engineering degrees except the BSBME.

**Do I have enough engineering topics courses?**
Students who transfer in credit for engineering courses could be short of engineering topics. Topics units are totaled in the degree audit on WUAchieve. A database of courses from other schools approved for transfer credit is available at the following link.
http://registrar.seas.wustl.edu/EVALS/evals.asp

**When should I declare a major?**
Students who have not declared a major should do so by the third semester.

**How often are MEMS courses offered?**
BSME courses are offered on a regular schedule as indicated on the curriculum worksheet. Courses listed in bold typeface are offered fall and spring semesters while those not in bold are only offered the semester they are listed on the curriculum worksheet. Planned future and past offerings can be found on the MEMS website.
https://mems.wustl.edu/academics/undergraduate/BS-Mechanical-Engineering.html

**Which of the required MEMS courses are offered only once a year?**
205 (SP), 301 (FL), 305 (SP), 3110 (SP), 3410 (FL), 3420 (SP), 3610 (SP), 4050 (FL), 411 (FL), 412 (SP), 4301 (SP) and 4310 (FL).

**What if I need to take MEMS 253 Statics & Mechanics of Materials or MEMS 3610 Materials Science in semesters they are not offered?**
Students may take BME 240 (offered in the spring) to satisfy MEMS 253 (only offered in the fall). Students may take EECE 305 Materials Science (offered in the fall) to satisfy MEMS 3610 (only offered in the spring).

**What is the physical or life science elective**?
A course from Bio, EPSc, EnSt, Phys, Chem taken for credit and graded: A suitable course is a 3 unit 2xx or greater course from Bio (L41), EPSc (L19), EnSt (L82), Phys (L31) or Chem (L07) with a NSM attribute (natural sciences and mathematics). University College U29 204 is **not** approved as a PLS elective. Some suggested courses are:

| | |
|---|---|
| E62 BME 314 | Physics of the Heart |
| L31 Phys350 | Physics of the Heart |
| L19 EPSc201 | Earth and the Environment |
| L19 EPSc219 | Energy and the Environment |
| L19 EPSc323 | Biogeochemistry |
| L82 EnSt 201 | Earth and the Environment |
| L82 EnSt 272A | Physics and Society |
| L07 Chem | 112A Chemistry II |
| L07 Chem | 261 Organic Chemistry |

| | |
|---|---|
| L41 Bio | 2960 Biology |
| L41 Bio | 2970 Biology |
| L41 Bio | 303A Human Biology |
| L31 Phys217 | Introduction to Quantum Mechanics |

**Can AP credit be used to satisfy degree requirements?**
Students in the McKelvey School of Engineering are given advanced placement in courses based upon the exam scores listed at the link below. The maximum number of general elective credit units from AP scores that can count toward a bachelor's degree is 15. No humanities or social sciences credit is awarded for AP scores.
https://engineering.wustl.edu/offices-services/student-services/undergraduate-student-services/advanced-placement.html

**Which courses count as social science or humanities?**
Washington University in St. Louis courses labeled with the EN:H or EN:S attribute in the semester course listings will count respectively toward the humanities or social sciences requirement for engineering degrees. More information can be found here: https://engineering.wustl.edu/offices-services/student-services/undergraduate-student-services/humanities-social-sciences-requirements.html

**How do I find social science and humanities courses in WebSTAC?**
WebSTAC has a search feature that will reveal courses with an H or S attribute. Go to: WebSTAC; Course Listings; by Semester Search; SP2023 Arts and Sciences; choose details (department, level, time, etc) and EN H or EN S.

**Do the ethics and professional values courses count as social science or humanities?**
Three one-unit courses, E60 4501, 4502 and 4503 are the ethics and professional values courses that count as SS credit. E60 Engr 450F, Urban Sustainability Challenges through the Lens of Engineering Ethics, Leadership and Conflict-Mngt (3 units) may be taken to satisfy the 4501, 4502 and 4503 requirements.

**Which courses satisfy the control systems requirement**?
MEs can take either MEMS 4301 Modeling Simulation and Control (spring) or ESE 441 Control Systems (fall) to satisfy the control systems requirement. Note that the ESE 441 prerequisite is ESE 351 or MEMS 4310.

**I have a conflict with MEMS 4301 Modeling Simulation and Control.**
Instead of taking MEMS 4301, take ESE 441 Control Systems (fall). Note that the ESE 441 prerequisite is ESE 351 or MEMS 4310.

**I have a conflict with Engr 328 Engineering Statistics with Probability.**
Students can alternatively take ESE 326 to satisfy the engineering probability and statistics requirement, although Engr 328 is preferred for ME majors.

**Is MEMS 201 Numerical Methods and Matrix Algebra required?**
Students can choose to take MEMS 201 or ESE 318 EnMath A. ME students are encouraged to take MEMS 201 because it teaches MATLAB and Excel, both of which are common and important software tools used in academia and industry. The software is applied to solve mechanical engineering problems.

**What are Engineering Math A and Engineering Math B?**
ESE 319 Engineering Math B is required. Students can choose between MEMS 201 Numerical Methods and Matrix Algebra and ESE 318 Engineering Math A.

**Is Math L24 3200 equivalent to ESE 326 or Engr 328?**
No, Math L24 3200 (or L24 320) does NOT satisfy the statistics and probability requirement.

**What are the prerequisites for MEMS E37 411 Mechanical Engineering Design?**
E37 MEMS 3110 Machine Elements and E37 3420 Heat Transfer are the prerequisites for E37 MEMS 411 Mechanical Engineering Design Project.

**In which extracurricular activities do MEs participate?**
The faculty and administration encourage participation in extracurricular activities. Popular student organizations include AIAA, ASME, Design Build Fly (DBF), Engineers Without Borders (EWB), FSAE, and WU Rocketry. Take the first step to learn about the profession and apply your studies to "real-world" problems through extracurricular activities.

**How many units can I take?**
Full undergraduate tuition covers 12-21 units. Undergraduates must maintain full time status by taking a minimum of 12 units each semester for the entire semester.

**What are the BSME requirements for my matriculation year?**
See the department website for the curriculum checklist by catalog year.
https://mems.wustl.edu/academics/undergraduate/BS-Mechanical-Engineering.html

**How do I become a professional engineer?**
Professional licensure in engineering is an option for seniors to consider; the initial step is to pass the Fundamentals of Engineering exam. Apply to the Missouri Board of the NCEES to register for the exam. To be eligible, one must have earned or expect to earn an ABET accredited degree in engineering. More information on NCEES, licensure, the exam and registration can be found at
https://ncees.org/engineering/fe/
https://ncees.org/about/

**When can I use the pass/fail option?**
There are restrictions on when a student may use the pass/fail grading option.

- MEMS degree requirements that list specific courses are **not** satisfied with courses taken pass/fail.
- MEMS elective degree requirements are **not** satisfied with courses taken pass/fail.
- The Physical or Life Science Elective degree requirement is **not** satisfied with courses taken pass/fail.
- The pass/fail grading option may be used with the humanities/social sciences electives course requirement or with free electives.
- Engineering students are eligible to register each semester for up to 6 units on the pass/fail option, up to a maximum of 18 units attempted. The pass/fail grading option replaces the letter grades A-F with either P# or F#. Assigning the grade P# to a course means the student passed the course; assigning the grade F# means the student did not pass the course. Neither grade affects the student's grade-point average. The units attached to a course assigned the grade P# may count towards the student's total cumulative units required.

**How is a repeat course noted on my transcript?**
If a student repeats a course, only the second grade is included in the calculation of the grade point average. Both enrollments and grades are shown on the student's official transcript. The symbol R next to the first enrollment's grade indicates that the course was later retaken. Credit toward the degree is allowed for the latest enrollment only.

**How can students get involved with undergraduate research?**
Students interested in pursuing an undergraduate research project should contact the faculty member he or she is interested in working with. If the faculty member agrees to supervise the student, the student must either be paid for the work or register for MEMS 400 Independent Study (see the Independent Study section at the end of this document).

**Where can I find information on popular minors?**
Information on the following popular technical minors may be found at:
https://mems.wustl.edu/academics/undergraduate/Minors.html

- Aerospace Minor
- Energy Engineering Minor
- Environmental Engineering Science Minor
- Materials Science and Engineering Minor
- Mechatronics Minor
- Nanoscale Science and Engineering Minor
- Robotics Minor

**What is the best strategy to select courses for the 9 units of MEMS senior electives?**
The purpose of these elective courses is to provide an in depth learning experience in one of the core topics of the BSME curriculum. Core curriculum topics are grouped (i) Aerospace, (ii) Biomechanics, (iii) Computational Mechanics, (iv) Energy Systems, (v) Materials Science, and (vi) Thermal Systems. A student may choose one of the areas and take three courses in that area to fulfill the elective requirement or select three courses from the comprehensive list in the following FAQ. MEMS senior elective courses may also partially satisfy the requirements for a minor. See specific minors for requirements.

**Aerospace**

| | |
|---|---|
| MEMS 5414 | Aeroelasticity |
| MEMS 5700 | Aerodynamics |
| MEMS 5701 | Aerospace Propulsion |
| MEMS 5703 | Analysis of Rotary Wing Systems |
| MEMS 5704 | Aircraft Structures |
| MEMS 5705 | Wind Energy Systems |
| MEMS 5706 | Aircraft Performance |
| MEMS 5707 | Flight Dynamics |

**Mechanics and Biomechanics**

| | |
|---|---|
| BME 459 | Intermediate Biomechanics |
| MEMS 5500 | Elasticity |
| MEMS 5501 | Mechanics of Continua |
| MEMS 5506 | Experimental Methods in Solid Mechanics |
| MEMS 5508 | Image-based Measurement of Shape, Motion, and Deformation |
| MEMS 5521 | Structure and Rheology of Complex Fluids |
| MEMS 5562 | Cardiovascular Mechanics |
| MEMS 5564 | Orthopedic Biomechanics-Cartilage/Tendon |
| MEMS 5565 | Mechanobiology |
| MEMS 5566 | Engineering Mechanobiology |
| BME 465 | Bio-Solid Mechanics |
| BME 468 | Cardiovascular Dynamics |
| BME 504 | Light Microscopy and Optical Imaging |
| BME 527 | Design of Artificial Organs |

**Computational Mechanics**

| | |
|---|---|
| MEMS 424 | Introduction to Finite Element Analysis of Structures |
| MEMS 5412 | Computational Fluid Dynamics |
| MEMS 5413 | Advanced Computational Fluid Dynamics |
| MEMS 5001 | Optimization Methods in Engineering |
| MEMS 5104 | CAE-Driven Mechanical Design |

**Energy Systems**

| | |
|---|---|
| MEMS 5422 | Solar Energy Thermal Processes |
| MEMS 5423 | Sustainable Environmental Building Systems |
| MEMS 5424 | Thermo-Fluid Modeling of Renewable Energy Systems |
| MEMS 5427 | Fundamentals of Fuel Cells |
| MEMS 5705 | Wind Energy Systems |
| ESE 437 | Sustainable Energy Systems |
| EECE 311 | Green Engineering |

**Materials Science**

| | |
|---|---|
| MEMS 5507 | Fatigue and Fracture Analysis |
| MEMS 5601 | Mechanical Behavior of Materials |

| | |
|---|---|
| MEMS 5603 | Materials Characterization I |
| MEMS 5604 | Materials Characterization II |
| MEMS 5605 | Mechanical Behavior of Composites |
| MEMS 5606 | Soft Nanomaterials |
| MEMS 5607 | Introduction to Polymer Blends and Composites |
| MEMS 5608 | Introduction to Polymer Science and Engineering |
| MEMS 5610 | Quantitative Materials Science & Engineering |
| MEMS 5611 | Principles and Methods of Micro and Nanofabrication |
| MEMS 5612 | Atomistic Modeling of Materials |
| MEMS 5613 | Biomaterials Processing |
| MEMS 5614 | Polymetric Materials Synthesis and Modification |
| MEMS 5615 | Metallurgy and Design of Alloys |
| MEMS 5616 | Defects in Materials |
| MEMS 5617 | Advanced Study of Solid-State Electronics |
| MEMS 5618 | Electronic Behavior of Materials |
| MEMS 5619 | Thermodynamics of Materials |
| **Thermal Fluids Systems** | |
| MEMS 5401 | General Thermodynamics |
| MEMS 5402 | Radiation Heat Transfer |
| MEMS 5403 | Conduction and Convection Heat Transfer |
| MEMS 5410 | Fluid Dynamics I |
| MEMS 5411 | Fluid Dynamics II |
| MEMS 5412 | Computational Fluid Dynamics |
| MEMS 5413 | Advanced Computational Fluid Dynamics |
| MEMS 5417 | Physical Acoustics |
| MEMS 5422 | Solar Energy Thermal Processes |
| MEMS 5424 | Thermo-Fluid Modeling of Renewable Energy Systems |
| MEMS 5425 | Thermal Management of Electronics |
| MEMS 5427 | Fundamentals of Fuel Cells |
| EECE 512 | Combustion Phenomena |

**What are the requirements for the 9 units of MEMS senior electives?**

*Independent Study*

Only 3 units of Independent Study (MEMS 400) are allowed as a MEMS senior elective. Students can register for this course to pursue a project or research with a supervising faculty member. An independent study proposal and petition must be submitted and approved ***before the first day of classes*** of the semester. The petition form can be found here: https://mems.wustl.edu/academics/undergraduate/independent-study.html. Each section of the proposal must be filled out in detail including: a clear definition the project, an assessment of the student's background and skills to perform the required procedures and methods, and a firm set of expected deliverables and schedule. At the end of the semester a copy of the deliverables is to be submitted to the department to be filed with the student's records. For a 3 credit course, a student is typically expected to spend 8-10 hours a week, meet weekly with his or her project supervisor, and submit a substantial report at the end of the project. *WebSTAC will reveal independent study and internship sections if the "hide" box is unchecked (the default is to hide these sections).*

*Courses from outside the department*

One of the MEMS (3xx/4xx/5xx) senior electives (3 units) may be taken from another department with permission. Transfer credit may be used as one of the MEMS (3xx/4xx/5xx) electives (3 units) with permission. Please see the list below for approved courses or send a request to the Director of Undergraduate Studies for approval of other courses. Note that graduate courses, MEMS (5xx), often do not list prerequisites, so the student should check with the instructor to determine the level of material to be covered.

Approved BSME senior elective courses:

| | |
|---|---|
| E37 MEMS | 312 Multidisciplinary Design & Prototyping |
| E37 MEMS | 400 Independent Study (3 units are allowed with department approval) |
| E37 MEMS | 4101 Manufacturing Processes |
| E37 MEMS | 424 Introduction to Finite Element Analysis of Structures |
| E37 MEMS | 463 Nanotechnology Concepts and Applications |
| E37 MEMS | 5001 Optimization Methods in Engineering |
| E37 MEMS | 5102 Materials Selection in Design |
| E37 MEMS | 5104 CAE-Driven Mechanical Design |
| E37 MEMS | 5301 Nonlinear Vibrations |
| E37 MEMS | 5302 Theory of Vibrations |
| E37 MEMS | 5403 Conduction and Convection Heat Transfer |
| E37 MEMS | 5404 Combustion Phenomena |
| E37 MEMS | 5410 Fluid Dynamics I |
| E37 MEMS | 5411 Fluid Dynamics II |
| E37 MEMS | 5412 Computational Fluid Dynamics |
| E37 MEMS | 5414 Aeroelasticity |
| E37 MEMS | 5417 Physical Acoustics |
| E37 MEMS | 5422 Solar Energy Thermal Processes |
| E37 MEMS | 5423 Sustainable Environmental Building Systems |
| E37 MEMS | 5424 Thermo-Fluid Modeling of Renewable Energy Systems |
| E37 MEMS | 5500 Elasticity |
| E37 MEMS | 5501 Mechanics of Continua |
| E37 MEMS | 5502 Plates and Shells |
| E37 MEMS | 5506 Experimental Methods in Solid Merchanics |
| E37 MEMS | 5507 Fatigue and Fracture Analysis |
| E37 MEMS | 5508 Image-based Measurement of Shape, Motion, and Deformation |
| E37 MEMS | 5521 Structure and Rheology of Complex Fluids |
| E37 MEMS | 5562 Cardiovascular Mechanics |
| E37 MEMS | 5564 Orthopaedic Biomechanics-Cartilage/Tendon |
| E37 MEMS | 5565 Mechanobiology of Cells and Matrices |
| E37 MEMS | 5566 Engineering Mechanobiology |
| E37 MEMS | 5601 Mechanical Behavior of Materials |
| E37 MEMS | 5603 Materials Characterization I |
| E37 MEMS | 5604 Materials Characterization II |
| E37 MEMS | 5605 Mechanical Behavior of Composites |
| E37 MEMS | 5606 Soft Nanomaterials |
| E37 MEMS | 5607 Introduction to Polymer Blends and Composites |
| E37 MEMS | 5608 Introduction to Polymer Science and Engineering |
| E37 MEMS | 5610 Quantitative Materials Science & Engineering |
| E37MEMS | 5611 Principles and Methods of Micro and Nano Fabrication |
| E37 MEMS | 5612 Atomistic Modeling of Materials |

| | |
|---|---|
| E37 MEMS | 5613 Biomaterials Processing |
| E37 MEMS | 5614 Polymetric Materials Synthesis and Modification |
| E37 MEMS | 5615 Metallurgy and Design of Alloys |
| E37 MEMS | 5616 Defects in Materials |
| E37 MEMS | 5617 Advanced Study of Solid-State Electronics |
| E37 MEMS | 5618 Electronic Behavior of Materials |
| E37 MEMS | 5619 Thermodynamics of Materials |
| E37 MEMS | 5700 Aerodynamics |
| E37 MEMS | 5701 Aerospace Propulsion |
| E37 MEMS | 5703 Analysis of Rotary Wing Systems |
| E37 MEMS | 5704 Aircraft Structures |
| E37 MEMS | 5705 Wind Energy Systems |
| E37 MEMS | 5706 Aircraft Performance |
| E37 MEMS | 5707 Flight Dynamics |
| E37 MEMS | 5801 Micro-Electro-Mechanical Systems I |
| E35 ESE | 330 Engineering Electromagnetics Principles |
| E35 ESE | 337 Electronic Devices and Circuits |
| E35 ESE | 405 Reliability and Quality Control |
| E35 ESE | 415 Optimization |
| E35 ESE | 437 Sustainable Energy Systems |
| E35 ESE | 442 Digital Control Systems |
| E35 ESE | 444 Sensors and Actuators |
| E35 ESE | 446 Robotics Dynamics and Control |
| E35 ESE | 447 Robotics Laboratory |
| E35 ESE | 448 Systems Engineering Laboratory |
| E35 ESE | 543 Control Systems Design by State Space Methods |
| E60 ENGR | 403 Engineering Cost Analysis |
| E62 BME | 459 Intermediate Biomechanics |
| E62 BME | 463 Orthopaedic Biomechanics-Bones and Joints |
| E62 BME | 464 Orthopaedic Biomechanics-Cartilage/Tendon |
| E62 BME | 4642 Human-Machine Interfaces |
| E62 BME | 465/565 Biosolid Mechanics |
| E62 BME | 468/568 Cardiovascular Dynamics |
| E62 BME | 479 Biofabrication & Medical Devices |
| E62 BME | 504 Light Microscopy and Optical Imaging |
| E62 BME | 527 Design of Artificial Organs |
| E62 BME | 559 Intermediate Biomechanics |
| E44 EECE | 311 Green Engineering |
| E44 EECE | 412 Sustainability Exchange: Community and University Practicums |
| E44 EECE | 513 Topics in Nanotechnology |
| E44 EECE | 512 Combustion Phenomena |
| A46 ARCH | 355A Carbon Neutrality in Architectural Design |
| A46 ARCH | 457G Creating a Resilient City: Gateway South, St. Louis |