FL2017 PRE-REGISTRATION FAQs

NEW - Minor in Materials Science and Engineering
see FAQ “Where can I find information on popular minors?”

Where do I find the BSME curriculum?
The curriculum worksheet and registration FAQs can be found on the department web site.
https://mems.wustl.edu/undergraduate/programs/Pages/BS-in-Mechanical-Engineering.aspx

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/current-students/student-services/Pages/WUachieve.aspx

Are prerequisites strictly enforced?
Yes. However, requests for waiver of prerequisites or substitution of required courses must be submitted in writing to the Associate Department Chair for Mechanical Engineering and must be approved by the course instructor, the student’s advisor, and the Associate Department Chair. Prerequisites are listed in the course description in WEBSTAC and on the BSME curriculum worksheet.

Are the ME introductory courses required?
Freshmen are encouraged but not required to take one or more of the introduction to mechanical engineering courses.

<table>
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<td>E37 MEMS 1001</td>
<td>Machine Shop Practicum</td>
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<td>E37 MEMS 1003</td>
<td>Mechanical Engineering Design and Build</td>
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<td>E37 MEMS 101</td>
<td>Intro to Mechanical Engineering and Mechanical Design</td>
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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. 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.

Which courses are in the mechanics sequence?
MEMS 253 (fall) or BME 240 (spring)
MEMS 255 (fall and spring)
MEMS 350 (fall and spring).
Students are encouraged to take E37 MEMS 350 in the fourth semester.
Which of the required MEMS courses are offered only once a year?
MEMS 205 (SP), 301 (FL), 305 (SP), 3110 (SP), 3410 (FL), 3420 (SP), 405 (FL), 411 (FL), 412 (SP), 4301 (SP) and 4310 (FL).

How often are MEMS courses offered?
BSME courses are offered on a regular schedule as indicated on the curriculum worksheet.
https://mems.wustl.edu/undergraduate/programs/Pages/BS-in-Mechanical-Engineering.aspx
MEMS 253, 255 and 350 are offered both fall and spring semesters. Recent offering history can be used to project forward for anticipated future offerings. Offering history can be found in WEBSTAC for a particular course under “details” and “frequency”.

When should I take MEMS 412 Design of Thermal Systems?
MEMS 412 is best taken in the semester after MEMS 301.

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 NS attribute (natural science). University College U29 204 is not approved as a PLS elective. Some suggested courses are:

- E62 BME 314 Physics of the Heart
- L31 Phys 350 Physics of the Heart
- L19 EPSc 201 Earth and the Environment
- L19 EPSc 203S Critical Earth Issues (WU Semester Online)
- L19 EPSc 221A Human Use of the Earth
- L82 EnSt 221A Human Use of the Earth
- L07 Chem 112A Chemistry II
- L07 Chem 261 Organic Chemistry
- L41 Bio 2960 Biology
- L41 Bio 2970 Biology
- L41 Bio 303A Human Biology
- L19 EPSc 323 Biogeochemistry
- L31 Phys 217 Introduction to Quantum Mechanics
- L19 EPSc 210A Epic of Evolution: Life, Earth, and the Cosmos

Can AP credit be used to satisfy degree requirements?
Students in the School of Engineering & Applied Science 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.
http://engineering.wustl.edu/current-students/student-services/Pages/advanced-placement.aspx

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. Other approved H&SS courses can be found at:
https://engineering.wustl.edu/current-students/student-services/Pages/humanities-social-sciences-placement-exams-requirements.aspx
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; FL2016 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. They should be taken in separate semesters in the following order.
1) 4502 Leadership and Team Building – sophomore spring or junior
2) 4501 Ethics and Sustainability – junior or senior
3) 4503 Management and Negotiation - senior
E60 4501, 4502 and 4503 count as 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?
ME’s can take either MEMS 4301 Modeling Simulation and Control (spring) or ESE 441 Control Systems (fall and spring) 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.
Instead of taking MEMS 4301 take ESE 441 Control Systems (fall and spring). Note that the ESE 441 prerequisite is ESE 351 or MEMS 4310.

What is the computing requirement?
CSE 131 is the computing requirement effective spring 2015. Freshmen should take CSE 131 in the spring semester.

CSE 131 is taught with a general-purpose computer programming language such as Java. Engineers use a computational computer programming language such as MATLAB. In fact, MATLAB is used in MEMS courses, in research labs and in industry. You can do almost anything in MATLAB, simulation, plotting, coding, and GUIs to name a few. It is one of the most used languages in undergraduate engineering schools, graduate schools and in companies. MATLAB skills can help to land an internship or employment.

Students should take CSE 131 and ESE 101 (a MATLAB review course if they do not have MATLAB skills). If ESE 101 is not an option, consider self-study resources that are available to learn MATLAB from MathWorks, MIT Open Courseware, ITunes U and others.
https://matlabacademy.mathworks.com/
https://www.tutorialspoint.com/matlab/
www.learningmatlab.com/videos/

Application specific MATLAB resources for particular courses are also available.
http://rotorlab.tamu.edu/Dynamics_and_Vibrations/Other docs/MATLAB_Handbook.pdf (vibrations)
http://www.colorado.edu/mechanical/programs/undergraduate/matlab_tutorials/ (fluids and heat transfer)
Books and notes are also available.  
http://www.academia.edu/5838447/Lecture_on_MATLAB_for_Mechanical_Engineers

What do I do if I have a conflict with Chem 1 Lab?
Fall sophomore students with a Chem 151 / ESE 230 conflict can take ESE 326 in the fall
and ESE 230 in the spring.

Is Math L24 3200 equivalent to ESE 326?
Math L24 3200 (or L24 320) does NOT satisfy the ESE 326 requirement.

What are Engineering Math A and Engineering Math B?
For FL2013 and later SEAS has replaced the 4 unit ESE 317 by two 3-unit courses, ESE
318 (Engineering Math A) and 319 (Engineering Math B). Both are required for the
BSME degree.

What is the prerequisite for MEMS E37 411 Mechanical Engineering Design?
E37 MEMS 3110 Machine Elements is a prerequisite for E37 MEMS 411 Mechanical
Engineering Design Project.

In which extracurricular activities do ME’s participate?
The faculty and administration encourage participation in extracurricular activities. Ask
your advisor on how to get involved with AIAA, ASME, EWB, FSAE, or IEEE (the
dance floor for Vertigo has been a popular project that involves students from many
departments). Take the first step to learn about the profession and apply your studies to
“real-world” problems through extra curricular 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 web site for the curriculum checklist by catalog year.
https://mems.wustl.edu/undergraduate/programs/Pages/BS-in-Mechanical-Engineering.aspx

How do I become a professional engineer?
Professional licensure in engineering is an option for seniors to consider; the initial step
in that process is 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
http://ncees.org/exams/fe-exam/
http://ncees.org/about-ncees/
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.

Where can I find information on popular minors?
Information on the following popular technical minors may be found at: [https://mems.wustl.edu/undergraduate/programs/Pages/minors.aspx](https://mems.wustl.edu/undergraduate/programs/Pages/minors.aspx)
- Aerospace Minor
- Energy Engineering 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

**Biomechanics**
- BME 459 Intermediate Biomechanics
- MEMS 5563 Orthopedic Biomechanics-Bones and Joints
- MEMS 5564 Orthopedic Biomechanics-Cartilage/Tendon
- 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 5515 Numerical Simulation in Solid Mechanics I
- MEMS 5516 Numerical Simulation in Solid Mechanics II
- MEMS 5412 Computational Fluid Dynamics
- MEMS 5413 Advanced Computational Fluid Dynamics
- MATH 429 Linear Algebra

**Energy Systems**
- MEMS 5422 Solar Energy Thermal Processes
- MEMS 5423 Sustainable Environmental Building Systems
- MEMS 5424 Thermo-Fluid Modeling of Renewable Energy Systems
- MEMS 5705 Wind Energy Systems
- MEMS 5420 HVAC I Analysis and Design
- MEMS 5421 HVAC II Analysis and Design
- ESE 437 Sustainable Energy Systems

**Materials Science**
- MEMS 3601 Materials Engineering
- MEMS 5102 Materials Selection in Design
- MEMS 5507 Fatigue and Fracture Analysis
- MEMS 5601 Mechanical Behavior of Materials
- MEMS 5602 Non-metallics
- 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 5609 Electronic Materials Processing
- MEMS 5610 Quantitative Materials Science and Engineering

**Thermal System**
- MEMS 4401 Combustion and Environment
- MEMS 5101 Analysis and Design of Fluid Power Systems
- MEMS 5401 General Thermodynamics
- MEMS 5402 Radiation Heat Transfer
- MEMS 5403 Conduction and Convection Heat Transfer
- MEMS 5404 Combustion Phenomena
- MEMS 5410 Fluid Dynamics I
- MEMS 5411 Fluid Dynamics II
What are the requirements for the 9 units of MEMS senior electives? Only 3 units of Independent Study (MEMS 400) are allowed as a MEMS 3xx/4xx elective. An independent study proposal must be submitted and approved before the first day of classes of the semester. 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.

One of the MEMS (3xx/4xx) electives (3 units) may be taken from another department with permission. Transfer credit may be used as one of the MEMS (3xx/4xx) electives (3 units) with permission. Please see the list below for approved courses or see Prof Jerina for approval of other courses.

**Graduate courses (5xx) may be taken by undergraduates as electives.** Seniors should venture into the graduate courses for their electives. Seniors are well qualified to take graduate classes with what they have learned in their undergraduate curriculum. Taking one or more of these courses will give students an opportunity to see that graduate education is an extension of undergraduate education. Other courses that enhance MEMS education can be considered a MEMS elective with prior approval. NOTE: These courses often do not list prerequisites, so the student should check with the instructor to determine the level of material to be covered. *WEBSTAC will reveal independent study and internship sections if the “hide” box is unchecked (the default is to hide these sections).*

Approved BSME senior elective courses:

- E37 MEMS 3601 Materials Engineering
- 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 4401 Combustion and the Environment
- E37 MEMS 463 Nanotechnology Concepts and Applications
- E37 MEMS 5001 Optimization Methods in Engineering
- E37 MEMS 5101 Analysis and Design of Fluid Power Systems
- 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 5401 General Thermodynamics
- E37 MEMS 5402 Radiation Heat Transfer
- 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 5413 Advanced Computational Fluid Dynamics
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<td>E37 MEMS 5416</td>
<td>Turbulence</td>
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<td>E37 MEMS 5420</td>
<td>HVAC I Analysis and Design</td>
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<td>E37 MEMS 5421</td>
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<td>E37 MEMS 5424</td>
<td>Thermo-Fluid Modeling of Renewable Energy Systems</td>
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<td>E37 MEMS 5500</td>
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<td>E37 MEMS 5504</td>
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<td>E37 MEMS 5506</td>
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<td>E37 MEMS 5507</td>
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<td>E37 MEMS 5516</td>
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<td>E37 MEMS 5520</td>
<td>Advanced Analytical Mechanics</td>
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<td>E37 MEMS 5560</td>
<td>Interfaces and Attachments in Natural and Engineered Structures</td>
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<td>E37 MEMS 5561</td>
<td>Mechanics of Cell Motility</td>
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<td>E37 MEMS 5562</td>
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<td>Quantitative Materials Science and Engineering</td>
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<td>E37 MEMS 5611</td>
<td>Principles and Methods of Micro- and Nanofabrication</td>
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<td>E37 MEMS 5612</td>
<td>Atomistic Modeling of Materials</td>
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<td>527 Design of Artificial Organs</td>
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<td>E62 BME</td>
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