FL2019 PRE-REGISTRATION FAQs
Director of Undergraduate Studies: Emily Boyd (ejboyd@wustl.edu)

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 Director of Undergraduate Studies 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.

Is MEMS 101 Intro to Mechanical Engineering and Mechanical Design required?
No, but first year students are strongly encouraged to take it.

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. 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?
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. Planned future and past offerings can be found on the MEMS web site.
https://mems.wustl.edu/undergraduate/programs/Pages/BS-in-Mechanical-Engineering.aspx
MEMS 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 NSM attribute (natural sciences and mathematics).
University College U29 204 is not approved as a PLS elective. Some suggested courses are:

e62 BME
L31 Phys
L19 EPSc
L19 EPSc
L19 EPSc
L82 EnSt
L82 EnSt
L07 Chem
L07 Chem
L41 Bio
L41 Bio
L41 Bio
L31 Phys
314 Physics of the Heart
350 Physics of the Heart
201 Earth and the Environment
219 Energy and the Environment
323 Biogeochemistry
201 Earth and the Environment
272A Physics and Society
112A Chemistry II
261 Organic Chemistry
2960 Biology
2970 Biology
303A Human Biology
217 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.
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; FL2018 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 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.

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 applied to solve mechanical engineering problems.

MATLAB resources are listed below:
https://matlabacademy.mathworks.com/
www.learningmatlab.com/videos/

Application specific MATLAB resources for particular courses
http://www.colorado.edu/mechanical/programs/undergraduate/matlab_tutorials/ (fluids and heat transfer)
Books and notes
http://www.academia.edu/5838447/Lecture_on_MATLAB_for_Mechanical_Engineers

What do I do if I have a conflict with Chem I 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?
ESE 319 Engineering Math B is required. Students can choose between MEMS 201 Numerical Methods and Matrix Algebra and ESE 318 Engineering Math A.

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 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 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?
Student 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/undergraduate/programs/Pages/minors.aspx
- 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

**Mechanics and Biomechanics**
- BME 459  Intermediate Biomechanics
- MEMS 5500  Elasticity
- MEMS 5501  Mechanics of Continua
- MEMS 5506  Experimental Methods in Solid Mechanics
- MEMS 5515  NSIM I
- 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 5515  Numerical Simulation in Solid Mechanics I
- MEMS 5412  Computational Fluid Dynamics
- MEMS 5413  Advanced Computational Fluid Dynamics
- MEMS 5001  Optimization Methods in Engineering
- MEMS 5104  CAE-Driven Mechanical Design
- 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 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 5612  Atomistic Modeling of Materials
- MEMS 5613  Biomaterials Processing
- MEMS 5614  Polymetric Materials Synthesis and Modification

**Thermal Fluids Systems**
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/undergraduate/Pages/independent-study.aspx](https://mems.wustl.edu/undergraduate/Pages/independent-study.aspx). 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:

- 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 5410  Fluid Dynamics I
- MEMS 5411  Fluid Dynamics II
- MEMS 5412  Computational Fluid Dynamics
- MEMS 5413  Advanced Computational Fluid Dynamics
- MEMS 5425  Thermal Management of Electronics
- EECE 512  Combustion Phenomena
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
E37 MEMS  5414 Aeroelasticity
E37 MEMS  5420 HVAC I Analysis and Design
E37 MEMS  5421 HVAC II Analysis and Design
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  5425 Thermal Management of Electronics
E37 MEMS  5500 Elasticity
E37 MEMS  5501 Mechanics of Continua
E37 MEMS  5506 Experimental Methods in Solid Mechanics
E37 MEMS  5507 Fatigue and Fracture Analysis
E37 MEMS  5515 Numerical Simulation in Solid Mechanics I
E37 MEMS  5560 Interfaces and Attachments in Natural and Engineered Structures
E37 MEMS  5561 Mechanics of Cell Motility
E37 MEMS  5562 Cardiovascular Mechanics
E37 MEMS  5563 Orthopaedic Biomechanics-Bones and Joints
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  5602 Non-metallics
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  5611 Principles and Methods of Micro and Nano Fabrication
E37 MEMS  5612 Atomistic Modeling of Materials
E37 MEMS  5613 Biomaterials Processing
E37 MEMS  5614 Polymeric Materials Synthesis and Modification
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  5801 Micro-Electro-Mechanical Systems I
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
E62 BME  459 Intermediate Biomechanics
E62 BME  463 Orthopaedic Biomechanics-Bones and Joints
E62 BME  464 Orthopaedic Biomechanics-Cartilage/Tendon
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>E62 BME</td>
<td>465/565 Biosolid Mechanics</td>
</tr>
<tr>
<td>E62 BME</td>
<td>468/568 Cardiovascular Dynamics</td>
</tr>
<tr>
<td>E62 BME</td>
<td>504 Light Microscopy and Optical Imaging</td>
</tr>
<tr>
<td>E62 BME</td>
<td>527 Design of Artificial Organs</td>
</tr>
<tr>
<td>E62 BME</td>
<td>559 Intermediate Biomechanics</td>
</tr>
<tr>
<td>E44 EECE</td>
<td>513 Topics in Nanotechnology</td>
</tr>
<tr>
<td>E44 EECE</td>
<td>412 Sustainability Exchange: Community and University Practicums</td>
</tr>
<tr>
<td>E44 EECE</td>
<td>512 Combustion Phenomena</td>
</tr>
<tr>
<td>L24 Math</td>
<td>309 Matrix Algebra</td>
</tr>
<tr>
<td>L24 Math</td>
<td>429 Linear Algebra</td>
</tr>
</tbody>
</table>