June 1, 2017

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.

E37 MEMS	1001 Machine Shop Practicum
E37 MEMS	1003 Mechanical Engineering Design and Build
E37 MEMS	101 Intro to Mechanical Engineering and Mechanical Design

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://**matlab**academy.mathworks.com/
https://ocw.mit.edu/resources/res-18-002-introduction-to-**matlab**-spring-2008/
https://www.**tutorial**spoint.com/**matlab**/
www.**learningmatlab**.com/videos/

Application specific MATLAB resources for particular courses are also available.
http://ctms.engin.umich.edu/CTMS/index.php?aux=Home (controls)
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
https://www.mathworks.com/support/books/book49095.html

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?
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
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

E37 MEMS	5414 Aeroelasticity
E37 MEMS	5416 Turbulence
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	5500 Elasticity
E37 MEMS	5501 Mechanics of Continua
E37 MEMS	5502 Plates and Shells
E37 MEMS	5504 Fracture Mechanics
E37 MEMS	5506 Experimental Methods in Solid Merchanics
E37 MEMS	5507 Fatigue and Fracture Analysis
E37 MEMS	5510 Finite Element Analysis
E37 MEMS	5515 Numerical Simulation in Solid Mechanics I
E37 MEMS	5516 Numerical Simulation in Solid Mechanics II
E37 MEMS	5520 Advanced Analytical Mechanics
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	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	5609 Electronic Materials Processing
E37 MEMS	5610 Quantitative Materials Science and Engineering
E37 MEMS	5611 Principles and Methods of Micro- and Nanofabrication
E37 MEMS	5612 Atomistic Modeling 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	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
E62 BME	465/565 Biosolid Mechanics
E62 BME	468/568 Cardiovascular Dynamics
E62 BME	504 Light Microscopy and Optical Imaging

E62 BME	527 Design of Artificial Organs
E62 BME	559 Intermediate Biomechanics
E44 EECE	513 Topics in Nanotechnology
E44 EECE	412 Sustainability Exchange: Community and University Practicums
E44 EECE	512 Combustion Phenomena
L24 Math	309 Matrix Algebra
L24 Math	429 Linear Algebra