Mechanical Engineering Stem & Technical Electives  
Catalog #139: 2016-2017  
(rev. July 2016)

**Stem Courses (6 hours)**
Select two (2) of the following 3 courses
- MEEN 421 – Thermo-Fluids Analysis and Design. Prerequisites: MEEN 461; MEEN 315; junior or senior classification.
- MEEN 431 – Advanced System Dynamics and Controls. Prerequisites: MEEN 364; junior or senior classification.
- MEEN 475 – Materials in Design. Prerequisites: CVEN 305; MEEN 360.

**Technical Electives (9 hours)**
At least 3 hours must be from the MEEN Technical Electives below

**MEEN Technical Electives**

**Materials and Manufacturing**
- MEEN 430 – Nanomaterials. Prerequisites: Junior or senior classification or approval of instructor.
- MEEN 451 – Viscoelastic Materials. Prerequisite: CVEN 305.
- MEEN 455 – Engineering with Plastics. Prerequisite: MEEN 222 or approval of instructor.
- MEEN 458 – Processing and Characterization of Polymers. Prerequisite: MEEN 222.
- MEEN 460 – Corrosion Engineering. Prerequisite: MEEN 360 or equivalent.
- MEEN 467 – Mechanical Behavior of Materials. Prerequisite: MEEN360.
- MEEN 471 – Elements of Composite Materials. Prerequisites: MEEN 368 and 360 or approval of instructor.
- MEEN 475 – Materials in Design. Prerequisite: MEEN 360; CVEN 305
- MEEN 476 – Nanoscale Issues in Manufacturing. Prerequisites: MEEN 222 or approval of instructor; junior or senior classification.
- MEEN 477 – Air Pollution Engineering. Prerequisite: CVEN 305.

**Dynamics and Controls**
- MEEN 408 – Introduction to Robotics. Prerequisite: MEEN 364 or equivalent; junior or senior classification.
- MEEN 411 – Mechanical Controls. Prerequisite: MEEN 364.
- MEEN 431* – Advanced System Dynamics and Controls. Prerequisite: MEEN 364; junior or senior classification.
- MEEN 433* – Mechatronics. Prerequisite: MEEN 364 or equivalent.
- MEEN 432 – Automotive Engineering. Prerequisite: MEEN 363.

**Thermo-fluid and Energy Systems**
- MEEN 410 – Internal Combustion Engines. Prerequisites: MEEN 344 or equivalent or approval of instructor.
- MEEN 414* – Principles of Turbomachinery. Prerequisite: MEEN 421 or approval of instructor; junior or senior classification.
- MEEN 421 – Thermal-Fluids Analysis and Design. Prerequisites: MEEN461; MEEN 315; junior or senior classification.
- MEEN 436 – Principles of Heating, Ventilation and Air Conditioning. Prerequisite: MEEN 461 or equivalent.
- MEEN 437 – Principles of Building Energy Analysis. Prerequisite: MEEN 315 or equivalent; junior or senior classification.
- MEEN 463* – Cogeneration Systems. Prerequisite: MEEN 421.
- MEEN 469 – Alternative Energy Conversion. Prerequisite: MEEN 315.
- MEEN 472 – Gas Dynamics. Prerequisite: MEEN 344.

**Design**
- MEEN 440 – Bio-Inspired Design. Prerequisite: MEEN 368 or BMEN 361 or BAEN 375.
- MEEN 441 – Design of Mechanical Components and Systems. Prerequisite: MEEN 368 or approval of instructor.
- MEEN 442* – Computer Aided Engineering. Prerequisite: MEEN 363 and MEEN 368.
- MEEN 444 – Finite Element Analysis in Mechanical Engineering. Prerequisite: MEEN 357 and MEEN 368 or equivalents.
- MEEN 445* – Engineering Applications of Solid Mechanics. Prerequisite: CVEN 305 and MEEN 368.
- MEEN 459* – Mechanical Vibrations. Prerequisites: MEEN 363; MATH 308.

**Special Topics – One time course offerings in a new interest area**
- MEEN 489 – Special Topics in Mechanical Engineering
  > Check Howdy for current offerings

* MEEN Stem course will qualify as a MEEN technical elective only after a student has taken at least two MEEN Stem courses prior.

0 May be offered stacked with a graduate course and taken as part of the Fast Track Program. See advisor for more details.

**Non-MEEN Technical Electives described on next page (backside)**
NON-MEEN Technical Electives (no more than 6 hours)

Students may take non-MEEN courses, either within or outside the College of Engineering, to satisfy technical elective requirements. All non-MEEN technical electives must be approved by the Undergraduate Advising Office, using the following set of criteria: 1. Course has a discipline-specific prerequisite, 2. Course content requires advanced math skills (i.e., Math 251), 3. Course uses formal analytical methods and requires quantitative coursework, and 4. Course material provides a deep understanding in a specific technical discipline.

Based on previous practice, the following courses are pre-approved as non-MEEN technical electives:

- **Energy Engineering Certificate**: 300 or 400-level engineering courses: [http://engineering.tamu.edu/academics/certificates/energy](http://engineering.tamu.edu/academics/certificates/energy)
- **Eng. Proj. Mgmt Cert.**: 300 or 400-level eng. courses: [http://engineering.tamu.edu/academics/certificates/engineering-project-management](http://engineering.tamu.edu/academics/certificates/engineering-project-management)
- **Polymer Specialty Cert.**: 300 or 400-level engineering or science courses: [http://engineering.tamu.edu/academics/certificates/polymer](http://engineering.tamu.edu/academics/certificates/polymer)
- **Safety Engineering Specialty Cert.**: 300 or 400-level engineering courses: [http://engineering.tamu.edu/academics/certificates/safety](http://engineering.tamu.edu/academics/certificates/safety)
- **ENGR 410** only when coupled with International Certificate: [http://engineering.tamu.edu/international/certificate](http://engineering.tamu.edu/international/certificate)
- **Architecture**: ARCH 619 (N.B., requires graduate credit approval form; see advisor for details).
- **Astronomy**: ASTR 314
- **Biological & Agricultural Engineering**: BAEN 412
- **Biochemistry**: BICH 410
- **Biomedical Engineering**: BMEN 458
- **Chemistry**: CHEM 227, 228, 315, 322.
- **Civil Engineering**: CVEN 322
- **Computer Science**: CSCE 312, 313, 314
- **Geology**: GEOL 404
- **Electrical Engineering**: ECEN 314, 325, and 441.
- **Engineering Design Graphics**: ENDG 407 (cannot be used toward the degree in combination with MEEN 442), ENDG 408 (only if a student had either ENDG 407 or MEEN 442 as pre-requisites)
- **Industrial & Systems Engineering**: ISEN 440 (prerequisite MATH 304)
- **Material Science**: MSEN 310
- **Mathematics**: MATH 304, 311, 323, 401, 407, 409, 411, 412, 433
- **Physics**: PHYS 222 (only if NOT taken as part of a Physics Minor)
- **Petroleum Engineering**: PETE 310, 311, 325, 353
- **Safety Engineering**: SENG 455.
- **Statistics**: STAT 211, 414
- **CO-OP**: 3 hours of ENGR 385 may be used.
- **Any (MEEN or non-MEEN) 485/491** (possibly up to 3 hours each) upon approval by Advising Office. Proposal required for review and approval by Advising Office before the first week of class; see an advisor for details. Both 485 and 491 can be reviewed and approved as 485H and 491H.