Mechanical Engineering Stem & Technical Electives
Catalog #137: 2014-2015
(rev. November 2015)

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 448 – Fundamentals of Nondestructive Testing. Prerequisite: MEEN 360.
♦ 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 432 – Automotive Engineering. Prerequisite: MEEN 363.
♦ MEEN 433 – Mechatronics. Prerequisite: MEEN 364 or equivalent.
♦ MEEN 434 – Dynamics and Modeling of Mechatronic Systems. Prerequisite: MEEN 364.

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 472 – Gas Dynamics. Prerequisite: MEEN 344.

Design
♦ 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 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.

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](#)
- **Biochemistry**: [BICH 410](#)
- **Chemistry**: CHEM 227, 228, 315, 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)
- **Mathematics**: MATH 304, 311, 401, 407, 409, 411, 412, 433
- **Physics**: PHYS 222 (only if NOT taken as part of a Physics Minor)
- **Petroleum Engineering**: PETE 310, 325, 353
- **Statistics**: STAT 211, 414
- **COOP**: 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.