MECHANICAL ENGINEERING PROGRAM
THE CITADEL
LIST OF TECHNICAL ELECTIVES
EFFECTIVE AUGUST 2019-2020

Technical Electives are offered as part of the Mechanical Engineering Curriculum where students can meet various accreditation goals set forth by the ME assessment process and the Accreditation Board for Engineering and Technology’s (ABET) Criteria. ABET is the department’s accrediting parent organization.

The Mechanical Engineering curriculum requires that students include in their program a three credit technical elective. This elective normally falls in the fall semester, senior year. However, it is appreciated that various special situations may require it to be taken at another time. Many courses listed below are offered either routinely or if demand warrants, during the fall semester.

REFER TO CATALOG FOR COMPLETE COURSE INFORMATION.

MECHANICAL ENGINEERING

MECH 404  Advanced Materials: Prerequisites: MECH 304 with a “C” or higher
MECH 408  Composite Design: Prerequisites: MECH 304 with a “C” or higher
MECH 409  Composite Manufacturing w/lab: Prerequisites: MECH 304 with a “C” or higher
MECH 416  Mass and Energy Balances: Prerequisites: CHEM 152
MECH 417  Renewable Energy: Prerequisites: MECH 310
MECH 418  Energy Conversion Systems: Prerequisites: MECH 415 with “C” or higher
MECH 419  Mechanical Power Systems: Prerequisites: MECH 311
MECH 420  Nuclear Reactor Analysis: Prerequisites: MECH 415 with “C” or higher
MECH 425  Advanced Heat Transfer: Prerequisites: MECH 415 with “C” or higher
MECH 426  Air Conditioning: Prerequisites: MECH 311
MECH 430  Robotics Engineering w/Lab: Prerequisites: MECH 350
MECH 435  Finite Elements for Engineering Application: Prerequisites: CIVL 203, 304, MECH 310
MECH 440  Advanced Manufacturing Processes and their Application: Prerequisites: CIVL 203 and MECH 340 with “C” or higher
MECH 445  Manufacturing Design w/lab: Prerequisites: MECH 345 and MECH 440
MECH 452  Digital Logic and Circuits w/lab: Prerequisites: ELEC 208 or ELEC 201/202
MECH 455  Advanced Mechatronics w/lab: Prerequisites: MECH 450 with a “C” or higher
MECH 470  Introduction to Applied Aerodynamics: Prerequisites: MECH 311 with “C” or higher
MECH 475  Aircraft Performance and Static Stability: Prerequisites: MECH 470
MECH 476  Propulsion Systems: Prerequisites: MECH 311 with “C” or higher
MECH 477  Vibration Engineering: Prerequisites: CIVL 203
MECH 478  Lightweight Structures: Prerequisites: CIVL 304/307
MECH 497  Special Topics in Mechanical Engineering: Prerequisites: Department Head approval
MECH 498  Mechanical Engineering Internship: Prerequisites: Department Head approval
MECH 499  Advanced Independent Study in Mechanical Engineering: Prerequisites: Department Head approval
CIVIL AND ENVIRONMENTAL ENGINEERING
CIVL 309  Structural Analysis: Prerequisites: CIVL 304 with “C” or higher and MATH 132
CIVL 411  Engineering Management: Prerequisite: Completion of all Freshman, Sophomore, and Junior courses required for civil engineering, or approval of department head.
CIVL 416  Modeling of Civil Engineering Systems: Prerequisite: Completion of required CIVL courses through the Junior year, or permission of the department head.
CIVL 421  Subdivision Planning & Design: Prerequisites: CIVL 302, CIVL 321, and CIVL 408. CIVL 408 may be taken concurrently.

ENGINEERING LEADERSHIP and PROGRAM MANAGEMENT
PMGT 401  Project Management Career Skills: Prerequisites: Academic junior or senior in good academic standing

BIOLOGY
BIOL 308  Genetics: Prerequisites: BIOL 205, or approval of the instructor; STAT 160 strongly recommended
BIOL 310  Microbiology: Prerequisite: BIOL 205 or approval of instructor; STAT 160 strongly recommended
BIOL 406  Ecology: Prerequisite: BIOL 140/141.
BIOL 409  Marine Biology: Prerequisite: BIOL 140/141.
BIOL 424  Molecular Genetics: Prerequisite: BIOL 308, CHEM 208, CHEM 409 strongly suggested; BIOL 310 suggested.

CHEMISTRY
CHEM 300  Quantitative Analysis: Prerequisites: CHEM 152 and CHEM 162 and MATH 107 or the equivalent, or permission of department head.
CHEM 309  Current Topics in Chemistry: Prerequisite: Completion of a two semester sequence of Introduction to Chemistry, CHEM 103/104 or General Chemistry, CHEM 151/152.
CHEM 409  Biochemistry I: Prerequisite: CHEM 207, 208, 217, 218

ELECTRICAL AND COMPUTER ENGINEERING
ELEC 307  Nuclear Engineering: Prerequisite: PHYS 222 and PHYS 272
ELEC 316  Electromechanical Energy Conversion: Prerequisite: ELEC 309 or consent of department head
ELEC 427  Energy Systems Engineering: Prerequisite: MATH 131 and PHYS 221/271

MATHEMATICS AND COMPUTER SCIENCE
MATH 240  Linear Algebra: Prerequisite: MATH 132, or HONR 108
MATH 343  Applied Numerical Methods I: Prerequisite: MATH 234 or MATH 240 and knowledge of a Programming Language.
MATH 381  Deterministic Methods of Operations Research: Prerequisites: Two semesters of Calculus and one of MATH 240 or MATH 234
MATH 382  Probabilistic Methods of Operations Research: Prerequisites: Two semesters of Calculus and one semester of Statistics.
MATH 470  Mathematical Models and Applications: Prerequisite: Math 234.
MATH 490  Topics in Mathematics: Prerequisite: Permission of Instructor.
STAT  261  Introduction to Probability and Statistics: Prerequisite: Math 131 or Math 106

PHYSICS
PHYS 223  Modern Physics: Prerequisites: PHYS 221/222
PHYS 308  Optics: Prerequisites: PHYS 222 and PHYS 272, MATH 132
PHYS 315  Analytical Mechanics: Prerequisites: PHYS 222, PHYS 272, MATH 231
PHYS 316  Analytical Mechanics: Prerequisites: PHYS 222, PHYS 272, MATH 231
PHYS 320  Mathematical Physics: Prerequisites: PHYS 222, PHYS 272, MATH 231
PHYS 410  Thermodynamics: Prerequisites: PHYS 222, PHYS 272, and MATH 132

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