

# MECHANICAL ENGINEERING (ENGM)

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## **ENGM 299 Internship 0 Credit Hour(s)**

**Offered:** Resident

## **ENGM 310 Materials Engineering 3 Credit Hour(s)**

**Prerequisite:** CHEM 121 and First Year Engineering Gate with a score of 5

A study of the atomic and molecular structure of materials and the effects on their various properties and applications. It provides understanding of how the microstructure composition of materials can be tailored to desired mechanical, electrical, optical, magnetic, and even smart properties. Emphasis is placed on the four most common categories of engineering materials: metals, plastics, ceramics, and composites. It also provides a survey on the abundance, selection, design, manufacturing, and designation of engineering materials.

**Note:** CHEM 121, First Year Engineering Gate courses consist of: MATH 131, MATH 132, PHYS 231, and ENGR 110 (or ENGR 115) with a grade of 'C' or higher

**Offered:** Resident

## **ENGM 350 Computer-Aided Engineering 3 Credit Hour(s)**

**Prerequisite:** ENGR 125 and ENGR 240 and MATH 334

This course emphasizes on creative design, application of physical laws, and hands-on virtual or physical projects. Review of kinematics/dynamics of commonly used planar mechanisms and programming techniques for motion simulation. Interdisciplinary projects will be assigned to assess students' design knowledge. Application of computer-aided techniques to the analysis of engineering problems utilizing governing equations of the systems. Students will be exposed to formulations of finite element methods of analysis. Emphasis is placed on practical aspects of structural FE.

**Offered:** Resident

## **ENGM 375 Thermal Fluids Design Lab 2 Credit Hour(s)**

**Prerequisite:** PHYS 320 and ENGR 315 and ENGR 360

To reinforce key concepts of thermal-fluid sciences and introduce thermal-fluids system design. To equip students to design and carry out experiments related to thermal-fluids systems, to analyze data, and report results in a professional manner. Students learn to operate equipment such as heat exchangers, centrifugal pumps, ducts and fittings, compressors, refrigerators, valves, dampers, etc. Additionally, students are introduced to thermal-fluids systems in nature. (Formerly ENGM 325)

**Offered:** Resident

## **ENGM 415 Design of Machine Components 3 Credit Hour(s)**

**Prerequisite:** ENGR 330

To provide common analytical approaches to design a wide variety of machine components. It emphasizes the engineering mechanics topics of failure theory and analysis. It provides reinforcement of finite element method and computer-aided engineering as techniques and tools to aid machinery design. Topics include: Cam design and analysis; static and fatigue failure theories; surface failure; shafts, keys, and couplings; bearings and lubrication; spur, helical, bevel and worm gears; spring design; screws and fasteners; clutches and brakes. (Formerly ENG 355)

**Offered:** Resident

## **ENGM 445 Material and Manufacturing Processing 4 Credit Hour(s)**

**Prerequisite:** ENGM 310

To introduce the physical fundamentals of manufacturing processes; with emphasis placed on those physical principles that are common to several, apparently unrelated, processes. Students learn material selection and processes, especially for metals, plastics, ceramics, and composites. Topics include: geometric attributes of manufactured parts, service attributes of manufactured products, materials in design and manufacturing, machining and nontraditional machining processes, joining processes, surface treatments, manufacturing of semiconductor devices, manufacturing systems, and dynamics of manufacturing in a globalized economy.

**Offered:** Resident

## **ENGM 499 Internship 1-6 Credit Hour(s)**

**Offered:** Resident