



### **EM434 Additive Manufacturing (3-0-3)**

**Instructor – CDR Jonathan “Buddy” Slagger**

A modern and comprehensive class in Additive Manufacturing (AM) which is also called 3D printing. This class requires an introductory level of understanding of materials science which is taught in different disciplines covered in the prerequisites. Experience with Computer Aided Design (CAD), such as SolidWorks, is helpful but not required since core CAD concepts are also covered in the class. Modern 3D printing technologies are used hands-on during course projects and assignments, and students will learn skills that can be applied in other courses or projects. Techniques including Fused Deposition Modeling, Stereolithography, Selective Laser Sintering, Bound Metal Deposition and other techniques are covered. Lectures will include the use and future of AM. This class is particularly well suited to prepare engineering students who wish to use 3D printing as part of their capstone project or independent research project.

**Prereq:** An introductory materials science course, to include one of the following: EM217, EM221, EA222, EN380, EN222 or approval of Department Chair

### **EM476 Vehicle Dynamics (2-2-3)**

**Instructor – Prof. Len Hamilton**

The fundamentals of passenger vehicle and light truck design and vehicle dynamics are covered. The engineering principles associated with acceleration, braking, handling, ride quality, aerodynamics and tire mechanics are discussed, as well as suspension and steering design. There will also be several lab exercises where vehicle systems are evaluated by students.

**Prereq:** 1/C Engineering Major or approval of Department Chair

### **EM478 Fluid Flow in Biology (3-0-3)**

**Instructor – Prof. Cody Brownell**

A survey of fluid flow in natural systems. Major themes include the propulsion of fish and marine organisms, the human respiratory system, bird and insect flight, and locomotion of microorganisms. The course will introduce both experimental and computational approaches to studying fluid flow, and will build the vocabulary and physical understanding required to analyze selected flows. Course will have a final paper in lieu of an exam.

**Prereq:** EM316 or EM324

### **EM485E Sustainable Energy (2-2-3)**

**Instructor – Prof. Ethan Lust**

This course will begin with a summary of current global electricity demand and production technologies, and a description of the modern electrical grid. Next, the driving forces behind the transition to sustainable energy will be considered. Current sustainable energy conversion technologies will be examined in detail and demonstrated through hands-on modules. Future energy conversion technologies, including their potential timelines and impact, will also be discussed. The course will conclude with modeling energy systems, illustrating how to incorporate intermittent resources like wind and solar with more conventional sources and energy storage to meet the growing global demand for electricity, sustainably.

**Prereq:** 1/C Engineering Major or approval of Department Chair



### **EM495 Mechanical Engineering Research or Design Project (0-6-3)**

**Instructor – Various**

Students will coordinate with a professor to pursue a research topic that interests them. Students are required to submit a proposal in conjunction with the project and meet with their professor regularly throughout the semester. Projects may be a single-semester or last the duration of the year.

**Prereq:** Approval of Department Chair

## **Nuclear Engineering Courses**

The courses below are required for Nuclear Engineers, but may serve as electives for other majors.

### **ER301 Fundamentals of Nuclear Engineering (3-0-3)**

**Instructor – TBD**

An introductory course in the basics of nuclear engineering and radiological sciences. Subject areas include the basics in radiation physics, nuclear core physics, nuclear plant design, the fuel cycle and radiological health physics.

**Prereq:** General Physics (SP211) or equivalent

### **ER327 Applied Nuclear Physics (3-0-3)**

**Instructor – TBD**

Description: Introduction to the basic concepts of nuclear physics for engineering students. Emphasis is placed on the structure and stability of the nucleus, nuclear forces, decay processes, nuclear reactions, and interactions of radiation with matter. Nuclear Engineering applications are highlighted.

**Prereq:** Fundamentals of Nuclear Engineering (ER301)

**Coreq:** Differential Equations (SM212)

### **EM424 Analytical Methods Mechanics (3-0-3)**

**Instructor – TBD**

Review of solution methods to frequently encountered engineering problems such as cylindrical and spherical heat conduction, wave dynamics, boundary layers and vibrations. The solutions methods focus on problems encountered in solid mechanics, fluids mechanics and heat transfer. Includes both analytical and numerical problem-solving techniques.

**Prereq:** Differential Equations (SM212)

### **ER468 Nuclear Plant Engineering (3-0-3)**

**Instructor – TBD**

Fundamentals of the thermodynamics, fluid mechanics and heat transfer associated with the design, operation and safety of nuclear power plants are analyzed. Thermal hydraulic fundamentals are applied to the reactor core, primary and secondary systems. Effects of reactor transients are also analyzed.

**Prereq:** Nuclear Plant Design (ER371) and Fundamentals of Nuclear Engineering (ER301)