

## **ME 3141 Cutting Edge Engineering Seminar (Elective)**

**Catalog Description:** ME 3141 (3-0-3)  
Prerequisites: None

**Seminar course on advanced engineering technologies directed to a non-technical audience. Distinguished guest speakers.**

**Textbook:** None

### **Topics Covered (representative):**

1. Global Economic trends
2. Engineering Design
3. Thermal Energy Systems
4. Transportation
5. Fluid Mechanics
6. Dynamics and Acoustics
7. Manufacturing
8. Tribology
9. Mechanics of Materials
10. Mechanical systems and lifespan
11. Automation and mechatronics
12. Sensing and sensors, MEMS, nanotechnology
13. BioMedical Engineering
14. Medical Physics
15. Nuclear Engineering
16. Public Policy

### **Course Outcomes:**

Outcome 1. To provide students with an approach to economic, environmental, social, political, and health issues that permit the consideration and incorporation of a broad spectrum of technical engineering options.

- 1.1 Students will demonstrate their ability to consider alternative approaches and identify critical compromises and choices in problem definition.
- 1.2 Students will learn to use problem analysis to identify and formulate engineering problems.

Outcome 2. To enable students to learn to consider a variety of issues such as manufacturing, sustainability, quality, environmental issues for cutting-edge engineering.

- 2.1 Students will learn to consider a variety of issues that are critical to the successful solution of multidisciplinary problems using systems in the global economic context.

Outcome 3. To enhance a student's ability to communicate at personal and technical levels, in both oral and written fashions.

- 3.1 Students will give oral presentations analyzing the speaker's approach in relationship to competing ideas in addressing the engineering issue.
- 3.2 Students will provide written reports (including final and interim reports) detailing their discussions of economic, environmental, political and sustainability factors associated with the cutting edge technology.

Outcome 4. To provide students with a direct, personal experience permitting them to interview professors and researchers on the societal and ethical contexts.

4.1 Students will demonstrate the ability to discuss and critically analyze the application of mathematics, science, and engineering.

4.2 Students will learn the pace of new knowledge and speed of emerging solution in relation to the importance of life-long learning via interviews of the career paths of experienced professors and engineers.

Outcome 5. To enable students to have cogent discussions and debate issues critically.

5.1 Students will demonstrate the ability to communicate effectively in oral and written arguments via written and oral reports.

Outcome 6. To enable students to learn how to formulate and address open ended engineering problems, including problem definitions and specifications and the identification of functional requirements.

6.1 Students will demonstrate their ability to understand requirements for open ended engineering problems.

6.2 Students will learn how experts formulate specifications for an engineering problem based on functional requirements, customer needs and physical reality.

Outcome 7. To provide students with the opportunity to demonstrate basic concepts in mechanical systems via the application of engineering principals to address global problems.

7.1 Students will demonstrate a variety of mechanical system concepts and theories by presenting descriptions of cutting-edge mechanical systems based on fundamental principles.

Course Requirements – Analysis of speaker credentials and arguments. Interview skills.

Course deliverables – Weekly written reports on each speaker

Course Grading Policy – 50% class discussion  
50% written assignments