

1. EX475 Interdisciplinary Capstone Design I – Formula SAE

2. Credit Hours (3)/Contact Hours (4)

3. Course Director – Leonard J. Hamilton

4. George E. Dieter and Linda C. Schmidt, *Engineering Design, 5th Ed.* (New York: McGraw-Hill, 2013)

5. Specific course information

- a. This course is the first in a two-course sequence that provides the capstone experience for an interdisciplinary team of midshipmen designing, fabricating, and testing a small formula style racecar. During this semester, students will learn the formal design process from determining customer needs to developing a detailed design that meets all objectives. Students will become familiar with various vehicle subsystems and conduct extensive design, modeling, simulation and analysis using state of the art software tools. Work will be completed in a teaming environment focused on effective program management and students will complete a series of oral and written design reviews.
- b. Prerequisites: EM371 or or ES308 or permission of the EME Dept Chair. Permission of Major Dept Chair.
- c. Required for Nuclear and Mechanical Engineering Programs. Validates EX401.

6. Educational objectives for the course

- a. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- b. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- c. An ability to communicate effectively with a range of audiences
- d. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- e. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- f. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- g. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

7. Specific program outcomes addressed by this course

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Reinforced							
Mastered	X	X	X	X	X	X	X

8. Brief list of topics to be covered

- a. Problem Definition
- b. Quality Function Deployment
- c. Project Management
- d. Design Concept Generation
- e. Engineering Modeling
- f. Decision Making
- g. Concept Selection
- h. Embodiment Design
- i. Engineering Ethics
- j. Oral and Written Reports