

**United States Naval Academy
Mechanical Engineering Department**

Catalog Description: EX485F (EX475) Formula SAE Capstone I **Credit:** 3 (2-2-3)
Listed as EX485F Interdisciplinary Capstone Design I

Designation: Required, engineering design, capstone course (part 1)

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.

Prerequisites: EM371 Introduction to Design or department chair approval

Corequisites: None

Textbooks: Dieter, G. E., & Schmidt, L. C. (2012). *Engineering Design, 5th Ed.* New York: McGraw-Hill.

Course Director: Prof. L. J. Hamilton

Course Content:

The design process, program management topics and specific vehicle subsystems are introduced through formal lectures. Students are required to present three design reviews and produce companion design reports during the semester.

Assessment Methods:

		YES	NO
A	Quizzes	X	
B	Homework	X	
C	Exams		X
D	Laboratory Reports		X
E	Oral Presentations	X	
F	Design Reports/Notebooks	X	
G	Prototypes/Demonstrations	X	
H	Projects		X
I	Other		X

Course Outcomes:

1. Employ modern techniques such as computer-aided design and analysis software required for engineering design
2. Complete a major design experience following the engineering design process.
3. Demonstrate an understanding of project management.
4. Identify and formulate engineering problems which involve the applications of mechanical systems, thermal fluid systems and materials selection for such systems.
5. Work in and lead teams in the solution of engineering problems.
6. Communicate effectively through written reports.
7. Communicate effectively through oral reports.
8. Apply engineering fundamentals as a basis to learn about and understand other technical topics not explicitly covered in the mechanical engineering curriculum.

	1	2	3	4	5	6	7	8
Program Outcomes								
(a)	X	X	X		X			X
(b)		X		X	X			X
(c)		X		X				X
(d)			X		X			
(e)	X			X				
(f)		X						X
(g)						X	X	
(h)		X						
(i)		X						
(j)		X						
(k)	X							

Date of Latest Revision: 29 OCT 2017, Prof. L.J. Hamilton