

MEC 423/523: Internal Combustion Engines

Spring 2019

Course Description: Introduction to internal combustion engines and their operation. Analytical approach to the engineering problem and performance analysis of internal combustion engines. Topics include thermodynamics fundamentals; fuel-air cycle analysis; engine combustion; emission formation and control strategies. Includes both the relevant fundamental concepts and the extensive practical knowledge base on which engine research, development, and design depend.

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Office: 151 Light Engineering

Lectures: Tu, Th 11.30 AM – 12.50 PM (Frey 301)

Office Hours: M, W 10 AM – 12 PM (151 Light Engineering)

Prerequisites: MEC 305

Recommended Text: John Heywood, *Internal Combustion Engine Fundamentals*, McGraw-Hill, 1988. The textbook is not required for the class, just recommended. Detailed notes will be provided.

Homework: Six homework sets. In addition, there will be a laboratory project for the MEC 523 students.

Exams: One midterm exam (date TBD).
One final exam (date TBD).
No makeup exams, unless arranged prior to the exam.

Grading:	<u>MEC 423</u>	<u>MEC 523</u>
Homework:	40%	28%
Project:	--	12%
Midterm:	25%	25%
Final:	35%	35%

Learning Objectives:

1. Engine Classification
2. Engine Design and Operating Parameters
3. Ideal Models of Engine Processes and Cycles
4. Combustion Thermodynamics
5. Thermodynamic Properties of Engine Working Fluids
6. Fuel/Air Cycle Analysis
7. Spark-Ignition Engine Combustion Basics
8. Diesel Engine Combustion Basics
9. SI and Diesel Engine Emissions

Blackboard: All homework assignments and solutions will be posted on the Blackboard course account (<http://blackboard.sunysb.edu>). For problems logging in, go to the helpdesk in the Main Library SINC Site or the Union SINC Site, you can also call: 631-632-9602 or e-mail: helpme@ic.sunysb.edu

Disability Support Services (DSS): If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room 128, [\(631\) 632-6748](tel:631-632-6748). They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website:
<http://www.stonybrook.edu/ehs/fire/disabilities>

Academic Integrity: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at: <http://www.stonybrook.edu/uaa/academicjudiciary/>

Critical Incident Management: Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.

Allowed Calculators: Following the Mechanical Engineering Department's mandatory calculator policy, only the following calculators will be allowed to be used on the midterm and final exams. There will be no exceptions. This list of calculators is identical to that allowed for the *National Council for Examiners for Engineering and Surveying* (NCEES) Fundamentals of Engineering (FE) exam that many of you will take in your senior year, as well as the Professional Engineering (PE) exam that you may take several years from now. The sooner you become comfortable on one of these calculators, the better.

Casio: All fx-115 models. Any Casio calculator must contain fx-115 in its model name.

Hewlett Packard: The HP 33s and HP 35s models, but no others.

Texas Instruments: All TI-30X and TI-36X models. Any Texas Instruments calculator must contain either TI-30X or TI-36X in its model name.

The NCEES policy on calculators can be found here:

<http://www.ncees.org/exams/calculators/>