



Internal Combustion Engines

MECHENG 5530

Credit Hours:

3.00

Course Levels:

Undergraduate (1000-5000 level)

Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

Design and operating characteristics of contemporary internal combustion engines, induction/exhaust breathing, boosting, variable valvetrains, combustion and knock, fuel economy, alternative fuels, and advanced powertrains.

Prerequisites and Co-requisites:

Prereq: 3501 or 3502 (502), or Grad standing in MechEng, or permission of instructor.

Course Goals / Objectives:

- Develop a comprehensive understanding of the design and operating characteristics of contemporary internal combustion engines
 - Develop an ability to apply the fundamental principles of thermo-fluid science toward modeling, analysis, and design of advanced powertrains
 - Develop an in-depth understanding of energy conversion through combustion in engines, with an emphasis on balancing performance, emissions, and fuel economy
 - Gain accurate knowledge of contemporary issues related to engines, including recent design trends in industry, new technologies, trade-offs among advanced concepts, alternative fuels, and pertinent simulation tools
 - Instill the critical recognition of engaging in life-long learning in rapidly evolving field of energy conversion
-

Course Topics:

- Engine Types and Their Operation
 - Engine Design and Operating Parameters
 - Thermochemistry of Fuel-Air Mixtures
 - Properties of Working Fluids
 - Alternative Fuels
 - Ideal Models of Engine Cycles
 - Gas Exchange Processes
 - Super/Turbo-Charging and Charge Motion in Engines
 - Combustion in Engines
 - Emissions and Control of Pollutants and Noise
 - Engine Heat Transfer
 - Engine Friction and Lubrication
 - Variable Valvetrains, Displacement, and Compression Ratio
 - Fuel Economy
 - Advanced Engine Design
 - Engine Simulation
-

Designation:

Elective