



ME441 Internal Combustion Engines (Required Course)

Code and Name: ME441 Internal Combustion Engines

Credit Hours: 3 (Lecture: 3, Tutorial: 0)

Textbook:

- Internal Combustion Engine: Applied Thermosciences, Collin R. Ferguson, and Allan T. Kirkpatrick, 2nd Edition, Wiley, 2001.

Other References:

- Internal Combustion Engine Fundamentals, John Heywood, 2nd Edition, McGraw Hill, 2018.
- Specialized Journals: Automotive Engineering International (SAE monthly magazine)

Course Description:

Introduction to internal combustion engine systems and mechanical design. Consideration of factors affecting engine design and performance using principles of engineering science. Analysis of common engine systems for reciprocating and continuous flow internal combustion engines.

Pre-requisites: ME323 Thermodynamics-II

Co-requisites: None

Course Learning Outcomes:

With relation to ABET Student Outcomes (SOs: 1-7)

1. Describe the internal combustion engine systems, types and mechanical design. (1)
2. List the factors affecting engine design (1, 2)
3. Recognize engine friction and lubrication, Fuels and combustion process. (1)
4. Recognize Emissions Control System and evaluate performance of engines using principles of engineering science. (1, 4)
5. Analyze problems related to Internal Combustion Engines. (1)
6. Develop numerical and reasoning skills to solve these engine problems and interpret solutions. (1, 2)
7. Develop ability to use the software tools to solve the engineering problems. (1, 2, 6, 7)
8. Interpret confidently in oral, written, graphical and visual forms of solutions. (1, 3)
9. Demonstrate positive attitude, good judgment and responsibility (as required in engineering design) (4)
10. Demonstrate verbal and written communication skills. (3)

Topics to be covered:

- Thermodynamics Review
- Power Cycles
- Introduction, engine types and basic operation, Engine Design
- The Air Fuel Cycle Approximation
- Actual Fuel Cycle
- Fuels and Combustions
- Emissions Control System.
- Engine Friction and Lubrication
- Overall engine performance

Grading Policy:

The grading for the course are 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams, where each midterm exam is worth 20%. It also includes quizzes, homework, class performance, and projects for the remaining 20% that is modified by the course instructor.

