

WINTER 2018

ME 657 INTERNAL COMBUSTION ENGINES II

Instructor: Dr. Peter Schihl

Location: XXXXX on Monday and Wednesday evenings from 7:30 PM – 9:17 PM

Office hours: instructor is available after class for discussions and otherwise by appointment; students are encouraged to email the instructor with questions

Contact Information: Schihl@oakland.edu or peter.schihl@yahoo.com or peter.j.schihl.civ@mail.mil

Prerequisite: ME 457/557: Introduction to Internal Combustion Engines

COURSE OBJECTIVES

To learn about combustion characteristics, fuels, materials and design of internal combustion engines including: combustion in spark and compression ignition engines; engine heat transfer; fuels and fuel systems; friction, lubrication and wear; valves and valvetrain; superchargers, turbochargers and auxiliary systems; variables affecting engine performance; engine design.

TENTATIVE COURSE OUTLINE

- Fuel properties and their effects on engine performance for both spark ignition and compression ignition applications
- Intake and exhaust flow modeling and analysis
- Valve sizing and selection processes for meeting engine performance targets
- Friction, wear, and lubrication of valvetrain, piston, and crankshaft assemblies
- Experimental methods in engines including low speed and high-speed measurements including heat release analysis methods
- Exhaust emission measurements and analysis for performance and Government regulation purposes including regulated and unregulated species, determination of in-cylinder air-fuel ratio, and combustion efficiency
- Spark ignition and diesel engine combustion characteristics and key engine design impacting parameters

BOOKS

- “Engineering Fundamentals of the Internal Combustion Engine”, Willard W. Pulkrabek, Second edition, 2004.
- “Internal Combustion Engines: Applied Thermosciences”, Ferguson, C. and Kirkpatrick, A., 3rd ed., John Wiley & Sons, 2016.

COURSE GRADING (tentative)

SEMESTER EXAMS (1)

PROJECT (1)

SPECIAL HOMEWORK S or QUIZZES: (2-3)

FINAL – April 27th from 7 PM until 10 PM

The project will be a semester long effort focused on a mutually agreed upon topic related to advanced engines. It will entail a written report and an in class twenty minute presentation (including a Q&A session) for sharing the student's findings with their peers.

POLICIES: Cheating will not be tolerated in this class. No use of laptops, cell phones, or any form of text messaging is allowed in the classroom without permission from the instructor.