SYLLABUS

ME 444/644 Principles of Internal Combustion Engines (4 credit hours)

INSTRUCTOR: Dr. P. R. Mawasha, Room 405 RC, Phone 775-5005
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TIME AND LOCATION: Tuesdays and Thursdays - 10:25 - 12:05 p.m., Room 406 RC

OFFICE HOURS: Russ 405H
OPEN (Call ahead to see if I am available)

CATALOG DATA: ME 444/644: Principles of Internal Combustion Engines, 4 Credits

Thermodynamics of I.C. Engines, Combustion Thermodynamcs, Heat and mass losses, and computer control of modern fuel-injected I.C. Engine. 3 hours lecture. Prerequisite: MATH 232, ME 315, ME 317.

GOALS: Apply the laws of thermodynamics, conservation of mass, combustion physics and chemistry, fluid flow, heat transfer, and processes that are relevant to internal combustion engines, and develop the techniques and tools necessary for the student to analyze and design Internal Combustion Engines.

TEXT: Internal Combustion Engines: Applied Thermosciences, 2nd Edition, Colin R. Ferguson, Allan T. Kirkpatrick

REFERENCES: Internal Combustion Engines: Applied Thermosciences, 2nd Edition and Air Pollution, Edward F. Obert, 3rd Edition, Intext Educational Publishers, 1973.
Internal Combustion Engine Fundamentals, John Heywood, McGraw-Hill Inc., 1988.
Introduction to Combustion Phenomena, Volume 2, A. Murty Kanury Gordon and Breach Science Publishers, 1975.

TOPICS COVERED:

a. Background – Thermodynamics
b. Basic engine types and their operation
c. Gas Cycles
d. Combustion thermodynamics
e. Fuel-air cycles (fuel-inducted and fuel injected engines)
f. Analysis of Actual Cycles
g. Engine Heat Transfer
h. Friction and Lubrication
i. Modeling Engine Flow and Combustion Process
j. Alternative Fuels for Vehicles (Fuel Cells)

HOMEWORK: Homework/Projects will be assigned in class and will be due one week after it is assigned. Late homework will receive a 50% grade reduction. Students may work together on their homework, but each student must contribute to the process and individually write out their solution, and reports. Problems should be done such that there is a **Given**, **Find**, and **Solution**. The solution to the problem should contain all the information stated in the problem in abbreviated form. Many times it is best to make a sketch of the problem and place the given information on this sketch. Do not recopy the problem statement! The Find section should briefly state the quantities being sought, symbol format is sufficient. Lastly, the Solution section should contain an orderly display of how you solved the problem. The solution should be such that it is easy for someone else to understand how you deduced your answers. All important equations should be written out in symbolic form, as well as showing the substitution of numbers into the equation. Assumptions should be clearly stated and any additional figures required should be shown.

QUIZ: Two quizzes (tests) will be given. On a quiz the student is responsible for the material discussed in class and the laboratory, as well as the assigned reading. Makeup exams will be given only under exceptional circumstances. All exams are to be the student's own work and no collaboration is allowed.

PROJECT: Two significant computer design project worth 40% of your grade will be assigned later in the quarter. This project will entail designing a combustion device from the principles learned in class. This project is to be the student's own work and no collaboration is allowed.

ATTENDANCE: Attendance for lecture class is not mandatory; however, the student is responsible for all the material presented in class, the material in the lecture notes, the material presented in the laboratory, as well as the assigned reading. Attendance for laboratory is mandatory as described next.

GRADING: The grading for the course is as follows:

Homework:	30%
Projects and Labs:	30%
Tests I & II:	30%
Final Exam:	10%