Course Title	**Thermal Engines**				
Course Code	**MME 318**				
Course Type	Compulsory				
Level	Undergraduate				
Year / Semester	3rd Year / 6th Semester				
Teacher's Name	Dimokratis G.E. Grigoriadis				
ECTS	6	Lectures / week	3+1 hours	Laboratories / week	1.5 hours
Course Purpose and Objectives	Introduction to Heat Engines so that students familiarize with basic principles, the structure, operation, existing technologies and performance characterization of thermal engines. Understanding the energy exchange during the operation of thermal engines and the thermodynamic cycles involved.				
Learning Outcomes	• Identify different phenomena and technologies involved in thermal engines. Examine, analyze, measure and report the torque, power and the emissions generated by thermal engines. • Classify and propose different types of thermal engines based on application, timing, type of fuel used, fuel delivery method etc. • Calculate, measure and report the kinematic characteristics and assembly of different thermal engines. • Calculate the thermodynamic performance of thermal engines using different cycles. • Differentiate and explain the differences between the theoretical and actual cycles of real thermal engines. • Identify the flow of energy in thermal engines and analyze the heat transfer rates in thermal engines.				
Prerequisites	MME 315	Required	None		
Course Content	Types, technologies and classification of thermal engines, thermodynamic cycles and performance Internal Combustion Engines (ICE), kinematics. Thermodynamic cycles and performance metrics. Timing, two-stroke and four-stroke ICE. Operating principles of Otto, Diesel, HCCI and gas turbines. Combustion of gas mixtures. Theoretical and actual cycles of reciprocating engines and gas turbines. Energy balance. Heat transfer, lubrication and cooling. Special conditions and problems of combustion of various fuels. Mixture Formation, load settings. Configuration of the combustion chambers and fuel injection. Pollutants & emissions. Turbocharging and supercharging. The course includes a series of laboratory exercises. **Laboratory Exercises** • Disassembly and assembly of an ICE engine • Torque and power output of a petrol engine • Emissions experiment using a diesel engine • PV diagram of a diesel engine				

Teaching Methodology	• Lectures • Tutorials • Exercises • Seminars • Laboratory exercises • Communicative, Collaborative • During the first week of the semester the students receive the course syllabus, which includes the course content, bibliography, learning outcomes, assessment and office hours.
Bibliography	• Course notes • Heywood, J.B., *Internal Combustion Engine Fundamentals*. McGraw-Hill, ISBN0-07-028637-X. • Pulkrabek, W.W., *Engineering Fundamentals of the Internal Combustion Engine*. Prentice-Hall.
Assessment	• Laboratory reports 15% • Computational assignment 10% • Midterm exam 25% • Final exam 50%
Language	Greek