Course Title	**Engineering Thermodynamics I**				
Course Code	**MME 215**				
Course Type	Compulsory				
Level	Undergraduate				
Year / Semester	2nd Year / 3rd Semester				
Teacher's Name	Stavros Kassinos				
ECTS	5	Lectures / week	3+1 hours	Laboratories / week	1 hour
Course Purpose and Objectives	An introduction to engineering thermodynamics. Fundamental conservation principles for mass, momentum and energy and the principle of the non-destruction of entropy are applied to the engineering analysis of open and closed thermodynamic systems. A well-organized engineering analysis through the method of "production accounting" is emphasized. Basic concepts such as work, heat, internal energy and entropy are clearly defined. The thermodynamic state postulate is introduced leading to the use of thermodynamic diagrams, tables and equations of state. The ideal gas model is discussed in detail including its range of applicability. Basic energy conversion and heating/refrigeration cycles are considered giving emphasis to energy availability and efficiency analysis.				
Learning Outcomes	• Define the concepts of energy, internal energy, heat, work, entropy thermodynamic property and state. • Comprehend the basic conservation laws and their application in thermodynamics in closed (control mass) and open (control volume) systems. • Utilize thermodynamic phase diagrams and tables in electronic or printed form to calculate changes in thermodynamic state. • Analyze simple thermodynamic systems and calculate their thermodynamic efficiency. • Combine the first and second law of thermodynamics in order to apply availability analysis to complex thermodynamic systems. • Comprehend the operation of classic thermodynamic cycles for the conversion of energy and for heating or cooling.				
Prerequisites	None	Required	None		
Course Content	Units, dimensions and measurements; basic properties (pressure, temperature); equation of state for perfect gas; calorimetry; specific heat capacities; energy, internal energy, heat, work, entropy. Conservations laws in closed (control mass) and open (control volume) systems. 1st and 2nd law of thermodynamics, implications. Thermodynamic phase diagrams & process paths. Cyclic thermodynamic processes, isothermal, adiabatic and polytropic processes. Thermodynamic cycles and efficiency. Vapour and gas-power cycles, Carnot cycle, Diesel & Otto cycles. Real substances, properties of steam. Basic computational simulation tools.				

	Laboratory Exercises • Heat Capacity of Gas from Pressure Volume and Temperature Data • Adiabatic Process • Isothermal Process • Operation of a Heat Engine / Otto Cycle • Matlab assignment using thermodynamic tables with applications on cycles
Teaching Methodology	• Lectures • Tutorial sessions • Laboratory exercises • Demonstrations • 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
Assessment	• Laboratory reports 15% • Computational assignment 10% • Midterm exam 25% • Final exam 50%
Language	Greek