Course Title	**Engineering Thermodynamics II**				
Course Code	**MME 315**				
Course Type	Compulsory				
Level	Undergraduate				
Year / Semester	2nd Year / 4th Semester				
Teacher's Name	Stavros Kassinos				
ECTS	6	Lectures / week	3+1 hours	Laboratories / week	1 hour
Course Purpose and Objectives	This course is a continuation of Thermodynamics I considering the design and performance of advanced energy conversion systems. The thermodynamics of nonreactive mixtures are introduced giving emphasis to air-water-vapor mixtures and applications to air conditioning systems: psychrometry, comfort zones, accounting for thermal loads, design of air conditioning systems. Introduction to the thermodynamics of compressible fluid flow follows: speed of sound, Mach number, regimes in compressible flow, one-dimensional steady isentropic flow, choking in isentropic flow, shock waves, isentropic flow in convergent-divergent passages, compressibility effects with friction and heat transfer. A design competition for the optimization of a thermodynamic system using thermodynamics software is included.				
Learning Outcomes	• Perform thermodynamic analysis of complex engineering systems. • Design thermodynamic systems with the use of software and computers. • Understand the behaviour and properties of non-reacting mixtures with emphasis on mixtures of ideal gases. • Preform psychrometric analysis of air-conditioning systems. • Understand the thermodynamics of compressible flows and normal shock waves.				
Prerequisites	MME 215	Required	None		
Course Content	Behaviour and properties of non-reacting mixtures with emphasis on mixtures of ideal gases. Psychrometric analysis of air-conditioning systems. Origin of irreversibilities & entropy, properties of liquids and gases, process and cycle representation on T-s and h-s chart. Turbines, compressors and isentropic efficiency. Simple steam and gas turbine cycles (Rankine and Brayton), refrigeration cycles, combined cycles. Introduction to the thermodynamics of compressible flows: steady isentropic flows with choking, shock waves, convergent-divergent passages, compressibility effects with friction and heat transfer. Design of thermodynamic systems using computer software. **Laboratory Exercises** • Design competition for the optimization of a thermodynamic system using computer software. • Thermodynamics of the refrigeration circuit • Vapor pressure of water Boiling process • Heat pump for cooling / heating operation				

Teaching Methodology	• Lectures • Tutorial sessions • Laboratory exercises • Demonstrations • 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
Assessment	• Laboratory reports 15% • Computational assignment 10% • Midterm exam 25% • Final exam 50%
Language	Greek