Course unit title:	*Heating Cooling & Air Conditioning*		
Course unit code:	*ME 408*		
Type of course unit:	Compulsory		
Level of course unit:	Bachelor (1st Cycle)		
Year of study:	4		
Semester when the unit is delivered:	7 (Spring)		
Number of ECTS credits allocated :			
Name of lecturer(s):	Dr. Karagiorgis George, Dr. Antoniou Antonis		
Learning outcomes of the course unit:	1. Perform heating load estimate. 2. Perform cooling load estimate. 3. Make calculations related to psychrometry. 4. Understand the refrigeration cycle and make calculations. 5. Make a preliminary design to match comfortable conditions of a building.		
Mode of delivery:	Face-to-face		
Prerequisites:	ME200, ME202	Co-requisites:	None
Recommended optional program components:	None		
Course contents:	• **Air-Conditioning Loads:** Calculate the heating load for a buildings (ASHRAE), describe, Understand heat transfer processes. And make calculations of the overall heat transfer coefficients (U values) for external walls, fenestration, windows, doors, roofs, floor etc. The students will learn how to calculate heat gain or loss from infiltration, how to perform Cooling load transient analysis (hourly), and estimate heat entering the space either from conduction convection radiation. • **Solar Radiation / Psychrometry:** The concepts of solar heat gain and solar load Will be defined and see how they can be estimated for various conditions. Introduction to important terms , definitions and principles used in the study of systems consisting of dry air and water and learn how to compute psychrometric properties. Understand how a variation in humidity will affect the comfortable conditions and how to use the properties of atmospheric air to provide a controlled atmosphere in buildings. Calculate relative / specific humidity, partial pressures of vapour and dry air, dew point, density of mixture etc. • **Comfort and Health:** Use correct range of temperatures to meet the comfortable conditions and maximise energy savings, define thermal comfort, thermal comfort parameters, clothing level, and metabolic rate. The students will be familiar and use all the above when calculating heating and cooling load for a building and select proper and efficient design conditions. • **Complete Air - Conditioning systems:** Describe some of the common types of refrigeration and heat pumps systems presently in use and to illustrate how such systems can be modelled thermodynamically. Students will learn how to classify Air conditioning systems. (All air systems, Terminal Units, All water systems, Package unit systems) and select the most applicable AC system for the given application. They should be able to design Air – Conditioning systems based on Direct Expansion systems and All Water fan coil units.		
Recommended and/or required reading:			
Textbooks:	• Faye C. McQuiston, Jeffrey D. Spitler, Jerald D. Parke, “Heating, Ventilating, and Air Conditioning: Analysis and Design”, Fifth Edition, John Wiley & Sons, 2000		

References:	• Andrew Parr, “Air Conditioning Principles and Systems: An Energy Approach”, Fourth edition Edward G. Pita Prentice Hall, 2001 • Ian C. Turner, “Engineering Applications of Pneumatics and Hydraulics”, Pearson.
Planned learning activities and teaching methods:	➢ Most part of course is delivered to the students by means of lectures and tutorials conducted with the help of power point presentations and hand notes. Lecture notes and presentations are available through the web (extranet) for students to use in combination with the textbooks. Laboratory experiments: Carried out in small groups.
Assessment methods and criteria:	• Assignments 10% • Lab 10% • Tests: 20% • Final Exam 60%
Language of instruction:	English
Work placement(s):	No