Course unit title:	Heat Transfer		
Course unit code:	ME 304		
Type of course unit:	Compulsory		
Level of course unit:	Bachelor (1st Cycle)		
Year of study:	3		
Semester when the unit is delivered:	6 (Spring)		
Number of ECTS credits allocated :	6		
Name of lecturer(s):	Dr. Marios M. Fyrillas		
Learning outcomes of the course unit:	1. Appreciate convection, conduction and radiation as well as their occurrence in engineering application. 2. Use equations developed for one-dimensional cases to perform simple heat transfer calculations. 3. Estimate convective transfer rates on the basis of geometric and dynamic similarity, and analogy between different convective transport processes. 4. Use the laws of radiation to compute heat transfer rates for surfaces, such as black bodies and diffuse grey surfaces, with appropriate approximations. 5. Perform thermal measurement techniques and describe applications for such measurements.		
Mode of delivery:	Face-to-face		
Prerequisites:	ME 200, ME 202	Co-requisites:	None
Recommended optional program components:	None		
Course contents:	• **Introduction to Heat Transfer:** Modes of heat transfer, conduction, convection and radiation. • **Conduction:** Thermal conductivity, Fourier's law of conduction. One-dimensional steady-state conduction through simple and composite flat and cylindrical walls • **Convection:** Boundary layers. Forced convection. Dimensionless groups controlling forced convection heat transfer. Natural convection, Nusselt number. • **Transient Heat Conduction:** Lumped Capacitance Method, Biot Number, Heisler Charts. • **Two-Dimensional Heat Conduction**: Shape Factor • **Combined heat transfer modes for analysis:** Practical examples, heat exchangers • **Radiation:** Introduction. Radiative properties. Black/grey body. Stefan-Boltzmann and Kirchoff's Laws. View factors • **Laboratory Work:** Small group experiments performed within the Heat Transfer laboratory. Experiments include the measurement of specific heat capacity, thermal conductivity and other thermal properties of materials. Demonstration of a Thermoelectric Converter.		
Recommended and/or required reading:	Fundamentals of Heat and Mass Tranfer. F.P. Incropera & D.P. DeWitt.		
Textbooks:	• Introduction to Heat Transfer. Theodore L. Bergman, .Frank P. Incropera, David P. DeWitt, Adrienne S. Lavine, John Wiley and Sons, Jun 7, 2011 • Heat and Mass Transfer, A practical Approach, Yunus A. Cengel, McGraw-Hill, 3rd Edition, 2006 • Heat Transfer, Mills, A. F., Prentice-Hall, 1999		
References:	• Applied Thermodynamics for Engineering Technologists. T. D. Eastop and A. McConkey; Longman, 1997. • Fundamentals of Thermodynamics. Sonntag, Borgnakke, & van Wylen; John Wiley & Sons, 6th Edition, 2002. • Fundamentals of Engineering Thermodynamics, 4th edition, by M. Moran and H. Shapiro		

	Wiley & Sons,
Planned learning activities and teaching methods:	The taught part of course is delivered to the students by means of lectures, conducted with the help of computer presentations. Lecture notes and presentations are available through the web for students to use in combination with the textbooks. Lectures are supplemented with laboratory sessions with aim to get acquainted with lab equipment and instruments for measuring temperatures, specific heat capacities, thermal conductivities and other thermal properties.
Assessment methods and criteria:	• Tests: 30% • Laboratory Work: 20% • Final Exam 50%
Language of instruction:	English
Work placement(s):	No