UNIVERSITY of NICOSIA

Course Code	Course Title	ECTS Credits
MENG-290	Heat and Mass Transfer	6
Department	**Semester**	**Prerequisites**
Engineering	Fall, Spring	MATH-330
Type of Course	**Field**	**Language of Instruction**
Required	Mechanical Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
1st Cycle	2nd or 3rd	Dr Andreas Chrysanthou
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

The main objectives of the course are to:

- Introduce students to the basic modes of heat transfer and fundamental thermodynamics principles.
- Teach students to perform basic one dimensional calculations of Conduction, Convection, and Radiation.
- Guide students to analyze steady state heat transfer and mass transport problems using fundamental engineering methodologies.
- Introduce students to the basic concept of diffusion for dealing with mass transfer problems.
- Familiarize students with numerical calculations of External and Internal flow problems.
- Application of analytical and numerical methods in heat and mass transport applications.

Learning Outcomes:

After completion of the course students are expected to:

- Understand the basic modes of heat transfer (Conduction, Convection, and Radiation).
- Perform energy conservation calculations in control volumes and control mass systems.
- Understand the relevance of heat transfer.
- Handle numerical calculations of the conduction rate equation and heat diffusion equations.
- Understand the concept of boundary layers in heat transfer calculations.
- Develop the ability to analyze coupled problems (i.e., problems that involve more than one heat transfer mode).
- Understand mixture compositions and conservation of species in control volumes for mass transfer problems.
- Apply Fick's law for mass transferring in homogeneous reactions.

Course Contents:

- Introduction of basic modes of heat transfer.
- One dimensional steady state Conduction; thermoelectric effect.
- The Convection mechanism and transfer by free and forced convection.
- Radiation: process, properties and exchange between surfaces.
- Mass transfer via diffusion.
- External and Internal flows
- Heat and mass transfer applications including heat exchangers, phase change materials, thermal insulation, convective heat transfer, etc

Learning Activities and Teaching Methods:

Lectures, exercises, software packages, project, discussion.

Assessment Methods:

Homework, project assignment, mid-term tests, final exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Theodore L. Bergman, Adrienne S. Lavine, Frank P. Incropera, David P. DeWitt	Fundamentals of Heat and Mass Transfer 7th Edition	Wiley	2011	0470501979

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Mills A. F	Basic Heat and Mass Transfer 2nd Edition	Prentice Hall	1999	0130962473
Yunus A. Engel	Heat and Mass Transfer: A practical Approach 4th Edition	McGraw-Hill	2006	007125739X
Brian R. Hunt, Ronald L. Lipsman, Jonathan M. Rosenberg	A Guide to MATLAB for Beginners and Experienced Users	Cambridge University Press	2001	9780521803809
Bernard Liengme	A Guide to Microsoft Excel 2007 for Scientists and Engineers	Academic Press	2009	9780123746238