	Lebanese American University	**MEE**	**403**
School of Engineering		**Heat Transfer**	*Required*
Department of Industrial & Mechanical Engineering		3 lecture credits	ENG 404
Course syllabus		Instructor: M. Khoury	Spring 14
Syllabus prepared by: M. Khoury		Revised: Feb 18	

1.   Academic Catalogue Description and Course Prerequisites

This course covers the transfer of heat by conduction, radiation and convection, and the analysis of steady state, and simple transient heat processes, and the evaporation, boiling, and condensing, heat transfer.

Prerequisistes : MTH 304 Differential Equations , MEE311 Fluid Mechanics

2.   Course Learning Outcomes

Upon successful completion of this course, students should be able to:

1. fully understand the physical processes (identification of different modes) allowing heat transfer.
2. identify/develop the governing equations and boundary conditions for heat transfer problems.
3. develop the ability to formulate solutions to heat transfer problems in terms of appropriate formulae, empirical relations, and mathematical manipulations.
4. evaluate heat transfer solutions from a practical standpoint with respect to physical limitations, economics, and other factors pertinent to heat transfer design and therefore, to increase the ability to handle realistic engineering problems

3.   Relationship of Course to Program Outcomes (PO)

The course contributes to the delivery of the following program outcomes and performance indicators with different degrees of emphasis placed on each outcome. .

(a) ability to apply knowledge of mathematics, science, and engineering
      a.1 Apply knowledge of multivariate calculus, probability and statistics, differential
          equations, linear algebra, and numerical methods, to model systems and processes
      a.2 Apply engineering science principles as relevant to fluid-thermal science area.

(c) ability to design a system, component, or process to meet desired needs within realistic
       constraints such as economic, environmental, social, political, ethical, health and safety,
       manufacturability, and sustainability
      c.3 Selects and apply appropriate models, or simulations of the real world and analyzes output
      of models/simulations to provide information for design decisions

(e) ability to identify, formulate, and solve engineering problems
      e.1 Examines the scope of the problem and identifies problem variables and constraints
      e.2 Uses basic mathematical, science, and engineering knowledge to formulate (select and
          apply) a mathematical or computer model with appropriate scope and level of detail
      e.3 Uses analytical or numerical methods to generate solutions

Program outcomes are achieved through structuring and focusing the course on the course learning outcomes.   The course learning outcomes are attained by the students when 70% or more of the students (not counting withdrawals) pass the course

4.   Contribution of course to meeting the professional component

Professional Component	Credits
Mathematics and Basic Sciences	0
Engineering Topic	3
General Education	0

5.   Course Outline

Relevant Chapters	Course Content
1	Introduction
2	Introduction to Conduction
3	One-Dimensional, Steady-State Conduction
4	Two-Dimensional, Steady-State Conduction
5	Transient Conduction
6	Introduction to Convection
7	External Flow
8	Internal Flow
12	Radiation, processes and properties(if time permits)

6.   Required tools / software / skills

Any CAD software

7.   Textbook[s]

F.P. Incopera and D.P. DeWitt, "Fundamentals of Mass and Heat Transfer", 6th Ed., John Wiley, 2007.

8.   Additional References

J. P. Holman, "Heat Transfer", 7th Ed., McGraw-Hill, 1990.

9.   Tentative Grade Distribution

Two Midterm Examinations   20 lower 25 higher %
Project   20 %
Drop Quizzes   5 %
Final Examination   30 %

10.   General Comments

Instructor: Michel Elkhoury
Email & Extension: mkhoury@lau.edu.lb / 2167
Office & Office Hours: Bassil 406 / from 9:30 am till 11:00 am MWF or by appointment.

11.   Course Policies

No makeup midterm will be given. Furthermore, missing a final will result in a grade of zero. Exceptions would be made only to those who undergo surgery or suffer loss in immediate family members. Furthermore, missing 50% or more on the quizzes will result in a grade of zero on all drop quizzes (10%)

12.   General Rules & Regulations

▪ **A student can miss no more than 4 sessions of instruction. By the 5th session, the instructor may ask the student to drop the course.**
▪ Plagiarism: students caught cheating on an exam receive a grade of Zero on the exam in the first cheating attempt and a warning. Students caught cheating for the second time in the same course receive an F grade in the course and a second warning. A grade of zero on an exam resulting from cheating must be counted in the student's course grade. The zero cannot be dropped in computing the final grade in case the instructor has a policy of allowing students to drop their worst exam grade.
▪ Any student who receives 3 warnings will be suspended.