

University of Jordan
Mechanical Engineering Department

COURSE OUTLINE

I. Course Description

0934909 ***Convection Heat Transfer*** *3 Credit Hours*

Introduction to convection heat transfer; flow and thermal boundary layers. laminar and turbulent boundary layers; convection in internal and external flows; empirical relations for forced convection heat transfer; natural convection systems; condensation and boiling; introduction to thermal radiation. Discussion.

II. Required Background or Experience

Prerequisites by course:

- 0904361: Fluid Mechanics
- 0301302: Engineering math (2)
Heat Transfer, (1)

Prerequisites by topic:

1. Differentiation and integration.
2. Concepts of fluid mechanics
3. *Heat transfer*

III. Course Objectives (letters in brackets indicate ABET educational objectives)

The objectives of this course is to help the students in understanding

1. Convective heat transfer : external and internal flow.
2. Free convective heat transfer [a]
3. Boiling and heat transfer phenomena.
4. Convection with Phase change.
5. Convection in porous media.

IV. Textbook(s) and Readings

1. BEJAN, A."CONVECTION HEAT TRANSFER", John Wiley & sons. NY. 1997, 3rd. edition.
2. All papers can be down loaded from the net, related to the subject.

V. Course Outline

The following topics will be covered in this course:

1. Fundamentals principles.
2. Laminar B. L. flow.
3. Laminar duct flow.
4. External natural convection.
5. Turbulent B. L. flow.
6. Turbulent duct flow.
7. Convection with change phase.
8. Convection in porous media.

VI. Evaluation of Outcomes

Evaluation will be done based on the following (percentages are up to the instructor):

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| 1. Class Attendance & Participation : | 00% |
| 2. <i>Presentation and discussion</i> | 20% |
| 3. Homework : | 15% |
| 4. Midterm Exam : | 30% |
| 5. Final Exam : | 40% |