

Recommended textbook for ME6204 Convective Heat Transfer

CONVECTIVE HEAT AND MASS TRANSFER, Fourth Edition

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**IN ME6204 PART I, WE WILL COVER CHAPTERS 1-14
(SOME CHAPTERS WILL BE COVERED PARTIALLY).**

**IN ADDITION THERE WILL BE SELECTED TOPICS TO
SUPPLEMENT AND EXTEND ANALYTICAL SOLUTIONS
WITH CFD RESULTS.**

CONTENTS OF TEXTBOOK

- 1 Introduction
 - 2 Conservation Principles
 - 3 Fluid Stresses and Flux Laws
 - 4 Differential Equations for the Laminar Boundary Layer
 - 5 Integral Equations for the Boundary Layer
 - 6 Differential Equations for the Turbulent Boundary Layer
 - 7 Laminar Internal Flows: Momentum Transfer
 - 8 Laminar Internal Flows: Heat Transfer
 - 9 Laminar External Boundary Layers: Momentum Transfer
 - 10 Laminar External Boundary Layers: Heat Transfer
 - 11 Turbulent External Boundary Layers: Momentum Transfer
 - 12 Turbulent External Boundary Layers: Heat Transfer
 - 13 Turbulent Internal Flows: Momentum Transfer
 - 14 Turbulent Internal Flows: Heat Transfer
 - 15 Influence of Temperature-Dependent Fluid Properties
 - 16 Convective Heat Transfer at High Velocities
 - 17 Convective Heat Transfer with Body Forces
 - 18 Convective Mass Transfer: Basic Definitions and Formulation of a Simplified Theory
 - 19 Convective Mass Transfer: Evaluation of the Mass-Transfer Conductance from the Conserved-Property(P) Equation
 - 20 Convection Mass Transfer: Examples for Application of the Simplified Method
- Appendix A Property Values
Appendix B Dimensions and Conversion to SI
Appendix C Some Tables of Functions Useful in Boundary-Layer Analysis

Appendix D Operations Implied by the Operator
Appendix E Detailed Derivation of the Simplified Mass-Diffusion and Energy Equation (P) for Convective Mass Transfer Problems and the Corresponding Boundary Conditions
Appendix F The TEXSTAN Boundary-Layer Code
Appendix G Blasius Flow--A Sample Data Set for TEXSTAN
Appendix H TEXSTAN Data Sets

Mass Transfer topics will not be part of this course.

Final examination will be OPEN BOOK.

Continuous assessment will consist of

- ***Class participation***
- ***Home assignment set***
- ***Term Paper***
- ***Mid-Term test***

Part II will be covered by Professor K C Ng.

A S Mujumdar ; November 2005

Notes will be provided ONLY for material not available in the textbook.

Selected Topics planned (subject to change)

- **Laminar and turbulent tube flow and heat transfer**
- **Laminar and turbulent free and confined impinging jets**
- **Convective cooling of electronic components**
- **Pulse combustion- basic models**