

1. Record Nr.	UNINA9910832952703321
Autore	Lienhard John H. <1930->
Titolo	A Heat Transfer Textbook // John H. Lienhard
Pubbl/distr/stampa	Newburyport, : Dover Publications, 2013
ISBN	9780486318370 0486318370 9781628700732 1628700734
Edizione	[4th edition.]
Descrizione fisica	1 online resource (1161 p.)
Collana	Dover Civil and Mechanical Engineering
Disciplina	621.4022
Soggetti	Heat - Transmission Mechanical Engineering Engineering & Applied Sciences Mechanical Engineering - General
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di contenuto	Cover; Title Page; Copyright Page; Contents; Preface; I The General Problem of Heat Exchange; 1 Introduction; 1.1 Heat transfer; 1.2 Relation of heat transfer to thermodynamics; 1.3 Modes of heat transfer; 1.4 A look ahead; 1.5 Problems; Problems; References; 2 Heat conduction concepts, thermal resistance, and the overall heat transfer coefficient; 2.1 The heat diffusion equation; 2.2 Solutions of the heat diffusion equation; 2.3 Thermal resistance and the electrical analogy; 2.4 Overall heat transfer coefficient, U ; 2.5 Summary; Problems; References; 3 Heat exchanger design 3.1 Function and configuration of heat exchangers 3.2 Evaluation of the mean temperature difference in a heat exchanger; 3.3 Heat exchanger effectiveness; 3.4 Heat exchanger design; Problems; References; II Analysis of Heat Conduction; 4 Analysis of heat conduction and some steady one-dimensional problems; 4.1 The well-posed problem; 4.2 The general solution; 4.3 Dimensional analysis; 4.4 An illustration of dimensional analysis in a complex steady conduction problem; 4.5 Fin design; Problems; References; 5 Transient and multidimensional heat conduction; 5.1 Introduction

5.2 Lumped-capacity solutions5.3 Transient conduction in a one-dimensional slab; 5.4 Temperature-response charts; 5.5 One-term solutions; 5.6 Transient heat conduction to a semi-infinite region; 5.7 Steady multidimensional heat conduction; 5.8 Transient multidimensional heat conduction; Problems; References; III Convective Heat Transfer; 6 Laminar and turbulent boundary layers; 6.1 Some introductory ideas; 6.2 Laminar incompressible boundary layer on a flat surface; 6.3 The energy equation; 6.4 The Prandtl number and the boundary layer thicknesses
6.5 Heat transfer coefficient for laminar, incompressible flow over a flat surface6.6 The Reynolds analogy; 6.7 Turbulent boundary layers; 6.8 Heat transfer in turbulent boundary layers; Problems; References; 7 Forced convection in a variety of configurations; 7.1 Introduction; 7.2 Heat transfer to and from laminar flows in pipes; 7.3 Turbulent pipe flow; 7.4 Heat transfer surface viewed as a heat exchanger; 7.5 Heat transfer coefficients for noncircular ducts; 7.6 Heat transfer during cross flow over cylinders; 7.7 Other configurations; Problems; References
8 Natural convection in single-phase fluids and during film condensation8.1 Scope; 8.2 The nature of the problems of film condensation and of natural convection; 8.3 Laminar natural convection on a vertical isothermal surface; 8.4 Natural convection in other situations; 8.5 Film condensation; Problems; References; 9 Heat transfer in boiling and other phase-change configurations; 9.1 Nukiyama's experiment and the pool boiling curve; 9.2 Nucleate boiling; 9.3 Peak pool boiling heat flux; 9.4 Film boiling; 9.5 Minimum heat flux; 9.6 Transition boiling and system influences
9.7 Forced convection boiling in tubes

Sommario/riassunto

This introduction to heat transfer offers advanced undergraduate and graduate engineering students a solid foundation in the subjects of conduction, convection, radiation, and phase-change, in addition to the related topic of mass transfer. A staple of engineering courses around the world for more than three decades, it has been revised and updated regularly by the authors, a pair of recognized experts in the field. The text addresses the implications, limitations, and meanings of many aspects of heat transfer, connecting the subject to its real-world applications and developing students' ins
