1. Record Nr. UNINA9910337589203321

Autore	Zohuri Bahman
Titolo	Thermodynamics in Nuclear Power Plant Systems / / by Bahman Zohuri, Patrick McDaniel
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2019
ISBN	3-319-93919-X
Edizione	[2nd ed. 2019.]
Descrizione fisica	1 online resource (723 pages)
Disciplina	621.4831
Soggetti	Nuclear energy Thermodynamics Heat engineering Heat - Transmission Mass transfer Energy systems Nuclear Energy Engineering Thermodynamics, Heat and Mass Transfer Energy Systems
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Definitions and Basic Principles -- Properties of Pure Substances -- Mixture -- Work and Heat -- First Law of Thermodynamics -- The Kinetic Theory of Gases -- Second Law of Thermodynamics -- Reversible Work, Irreversibility, and Exergy (Availability) -- Gas Kinetic Theory of Entropy -- Thermodynamic Relations -- Combustion -- Heat Transfer -- Heat Exchangers -- Gas Power Cycles -- Vapor Power Cycles -- Circulating Water Systems -- Electrical System -- Nuclear Power Plants -- Nuclear Fuel Cycle -- The Economic Future of Nuclear Power -- Safety, Waste Disposal, Containment, and Accidents -- Appendix A: Table and Graphs Compilations -- Index.
Sommario/riassunto	This revised book covers the fundamentals of thermodynamics required to understand electrical power generation systems, honing in on the application of these principles to nuclear reactor power systems. This text treats the fundamentals of thermodynamics from the perspective

of nuclear power systems. In addition to the Four Laws of Thermodynamics, it discusses Brayton and Rankine power cycles in detail with an emphasis on how they are implemented in nuclear systems. Chapters have been brought up-to-date due to significant new results that have become available for intercooled systems and combined cycles and include an updated steam table. The book starts with basic principles of thermodynamics as applied to power plant systems. It then describes how Nuclear Air-Brayton systems will work. It documents how they can be designed and the expected ultimate performance. It describes several types of Nuclear Air-Brayton systems that can be employed to meet different requirements and estimates component sizes and performance criteria for Small Modular Reactors (SMR) based on the Air-Brayton concept. The book provides useful insight into the engineering of nuclear power systems for students and the tabular data will be of great use to practicing engineers. Focuses on the thermodynamic properties at work in nuclear plants; Full coverage of underlying scientific principles to applications throughout the nuclear cycle, from fuel processing to waste disposal; Gives in-depth consideration to thermodynamic fundamentals in Brayton and Rankine cycles for power generation.