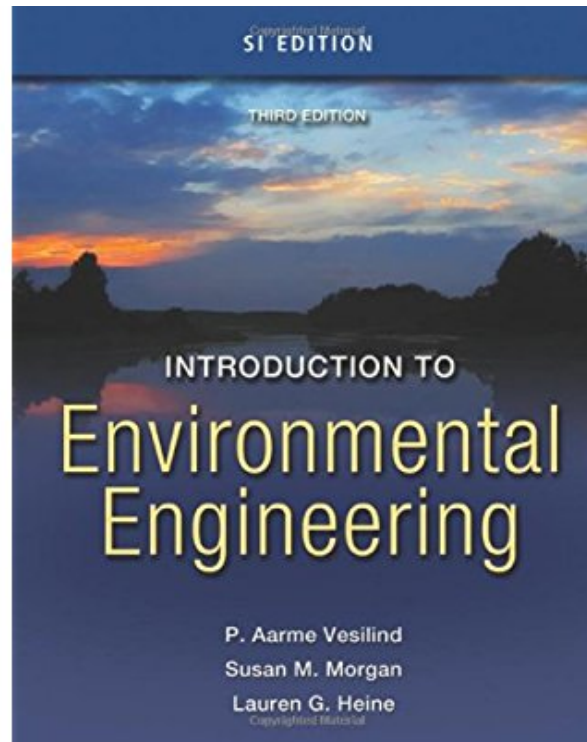


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Synopsis :

Review Part One - Environmental Engineering 1 - Identifying and Solving Environmental Problems What is Environmental Engineering / The Holy Cross College Hepatitis Outbreak / The Disposal of Wastewater Sludge / The Donora Episode / Jersey City Chromium / The Discovery of Biological Wastewater Treatment / The Garbage Barge / Sustainability and Cradle-to-Cradle Design / End Notes Part Two - Fundamentals 2 - Engineering Decisions Decisions Based on Technical Analyses / Decisions Based on Cost-Effectiveness Analyses / Decisions Based on Benefit/Cost Analyses / Decisions Based on Risk Analyses / Decisions Based on Alternatives Assessment / Decisions Based on Environmental Impact Analyses / Decisions Based on Ethical Analyses / Continuity in Engineering Decisions / Problems / End Notes 3 - Engineering Calculations Engineering Dimensions and Units / Approximations in Engineering Calculations / Information Analysis / Problems / End Notes 4 - Material Balances and Separations Material Balances with a Single Material / Material Balances with Multiple Materials / Material Balances with Reactors / Problems / End Notes 5 - Reactions Zero-Order Reactions / First-Order Reactions / Second-Order and Noninteger-Order Reactions / Half-Life and Doubling Time / Consecutive Reactions / Problems / End Notes 6 - Reactors Mixing Model / Reactor Models / Problems 7 - Energy Flows and Balances Units of Measure / Energy Balances and Conversion / Energy Sources and Availability / Problems 8 - Ecosystems Energy and Material Flows in Ecosystems / Human Influence on Ecosystems / Problems / End Notes Part Three - Applications 9 - Water Quality Measures of Water Quality / Assessing Water Quality / Water Quality Standards / Problems / End Notes 10 - Water Supply and Treatment The Hydrologic Cycle and Water Availability / Water Treatment / Distribution of Water / Problems / End Notes 11 - Wastewater Treatment Wastewater / Preliminary and Primary Treatment / Secondary Treatment / Tertiary Treatment / Sludge Treatment and Disposal / Selection of Treatment Strategies / Problems / End Notes 12 - Air Quality Meteorology and Air Movement / Major Air Pollutants / Sources and Effects of Air Pollution / Air Quality Standards / Problems / End Notes 13 - Air Quality Control Treatment of Emissions / Dispersion of Air Pollutants / Control of Moving Sources / Problems / End Notes 14 - Solid Waste Collection of Refuse / Generation of Refuse / Reuse and Recycling of Materials from Refuse / Combustion of Refuse / Ultimate Disposal of Refuse: Sanitary Landfills / Reducing the Generation of Refuse: Source Reduction / Integrated Solid Waste Management / Problems / End Notes 15 - Hazardous Waste Defining Hazardous Waste / Hazardous Waste Management / Radioactive Waste Management / Sustainable Materials Management / Hazardous Waste Management and Future Generations / Problems / End Notes 16 - Noise Pollution Sound / Measurement of Sound / Effect of Noise on Human Health / Noise Abatement / Noise Control / Problems / End Notes 17 - Ethics of Green Engineering Green Engineering / Motivations for Practicing Green Engineering / Conclusions / End Notes Read more About the Author P. Aarne Vesilind received his undergraduate degree in civil engineering from Lehigh University and his Ph.D. in environmental engineering from the University of North Carolina. He spent a post-doctoral year with the Norwegian Institute for Water Research in Oslo and a year as a research engineer with Bird Machine Company. He joined the faculty of Duke University in 1970 where he served as chair of the Department of Civil and Environmental Engineering. In 1999, he was appointed to the R. L. Rooke Chair of the Historical and Societal Context of Engineering at Bucknell University. He

served in this capacity until his retirement in 2006. Morgan received her B.S. in civil engineering from Southern Illinois University Carbondale. A recipient of a National Science Foundation Fellowship, she earned her Ph.D in environmental engineering from Clemson University. She joined the faculty in the Department of Civil Engineering at Southern Illinois University Edwardsville in 1996. From 1999-2007 she served as the Graduate Program Director for the Department. Currently she is a tenured professor and Department Chair. She is a licensed professional engineer in Illinois. Dr. Morgan has been active on the Environmental Technical Committee of the St. Louis Section of the American Society of Civil Engineers and in the St. Clair Chapter of the Illinois Society of Professional Engineers. She has received multiple awards including the National Society of Professional Engineers' Young Engineering of the Year Award in 2001. She is a member of several honor societies, including Chi Epsilon and Tau Beta Pi, as well as other engineering organizations. She has conducted research in a variety of areas. Currently her focus is on stormwater management, particularly through the use of green roofs. Heine earned her doctorate in Civil and Environmental Engineering from Duke University. She is one of America's leading experts in applying green chemistry, green engineering, and design for the environment for sustainable business practices. As Senior Science Advisor for Clean Production Action and as Principal for the Lauren Heine Group, she guides organizations seeking to integrate green chemistry and engineering into their product and process design and development activities - eliminating toxics and the concept of waste and moving toward economic, environmental and community sustainability. Specific areas of expertise include the development of technical tools and strategies for identifying greener chemicals, materials, and products and facilitation of multi-stakeholder initiatives - particularly those that are technically based. [Read more](#)