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Musical Acoustics, 3rd Edition



Synopsis

Musical acoustics presents a unique opportunity to see science and art working together. This book is a balanced presentation of all aspects of musical acoustics. It explains how our ears and brains interpret musical events, and connects traditional physical analyses to musical reality. The purpose of the book is two fold: (1) To help students use simple physical concepts as tools for understanding how music works, and (2) To use students' interest in music to motivate the study and appreciation of scientific methods. Any given chapter will challenge students with several points that are not obvious on the first reading. Starred sections are optional and are not a prerequisite to later sections.

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Customer Reviews

This book is a thorough overview of physics behind music. In the first part of the book, Hall lays the foundation with an investigation into waves, sound propagation, sound measurement, and the human ear. The middle third of the book takes up families of instruments, and how they work to create musical sounds. The last part of the book investigates room acoustics, sound reproduction, and the perception of intervals, tunings, and musical structure. Each chapter includes references and suggestions for further reading, numerous mathematical exercises for practicing the concepts covered in the chapter, and a list of potential projects for further investigation. The book includes a glossary and answers to selected problems, as well as an index. I read quite a few textbooks for work and occasionally just for interest's sake, but this one really stands out. After reading the first

few chapters, I found myself wishing I could sit in on Hall's lectures. His style is intensely personal, and his explanations are incredibly clear. I'll admit that sometimes my eyes glossed over while slogging through some of the numbers and charts, but it was mainly my fault for not being a more active reader. In order to get the most from this book, you really need to read it with calculator in hand, or better yet, an Excel spreadsheet open, ready to try out the numbers and scenarios that Hall provides us with. Nevertheless, the math is kept quite simple- -no calculus; if you can do algebra, you should be able to get through the book. I've found the information in the book to be quite useful. Hall's description of how resonance works in drums has helped me make sense of my tabla teacher's pickiness about where my fingers strike the tabla heads.

This book is an excellent starting place for someone who wants a somewhat quantitative treatment of the science of sound as it relates to music, but does not have the advanced math background necessary to digest something like "The Physics of Musical Instruments". The chapters and sections in this third edition are the same as in the previous edition, however some changes have been made to the content. The book is updated with more current references to the end-of-chapter bibliographies, and there is some new material, especially in areas affected by the personal computer's role in the digital processing of sound. The author provides an integrated understanding of three major areas: the production of sound by various sources, the propagation of sound from source to listener, and the perception of sound by the human brain. For easier reading, each chapter starts with an introductory section that sets up the chapter. There are also summaries and lists of symbols, terms, and relations highlighting the most important terms and quantitative expressions in each chapter. There are realistic and interesting exercise sets containing both qualitative and quantitative questions for each chapter, with most chapters containing 20-25 exercises. There are also projects included that provide out-of-class assignments that generally require students to do research. There are approximately three of these in each chapter. Finally, several new photographs have been added to this third edition, particularly of the inner ear structure and of the vocal cords in motion. Like the previous reviewer, I make a habit of purchasing and reading several textbooks a year, and sometimes I am very disappointed and sometimes I am not. This is one of those purchases that I found most worthwhile.

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