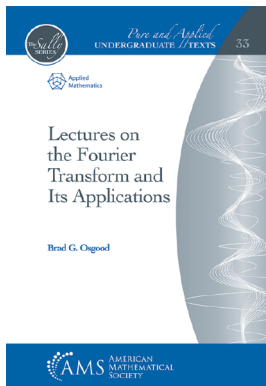




# AMS BOOKSHELF

The AMS Book Program serves the mathematical community by publishing books that further mathematical research, awareness, education, and the profession while generating resources that support other Society programs and activities. As a professional society of mathematicians and one of the world's leading publishers of mathematical literature, we publish books that meet the highest standards for their content and production. Visit [bookstore.ams.org](http://bookstore.ams.org) to explore the entire collection of AMS titles.



## Lectures on the Fourier Transform and Its Applications

By Brad G. Osgood

With few pre-requisites beyond multi-variable calculus and linear algebra, Osgood's book puts the theory of Fourier transforms together into a coherent whole for students who may have seen them in a variety of applied contexts. Students will "gain a facility with using the Fourier transform, both

specific techniques and general principles, and learning to recognize when, why and how it is used."

A masterful lecturer, Osgood has written this book in a way that conveys the experience of being in his class. He writes as if he is speaking directly to you, and it is not a complete exaggeration to say that the sections of each chapter flow like a musical composition, one theme developing into the next. There is a naturalness and charm to how the subject unfolds in his book. As Tom Körner from University of Cambridge puts it: this is "Fourier Analysis with a swing in its step."

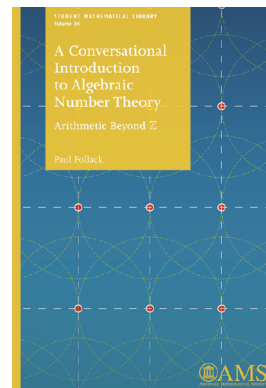
The book has two underlying aims: one is to show engineering students that Fourier Theory is relevant and useful, and the other is to convey the benefits of understanding the deeper mathematical underpinnings of the subject. Osgood succeeds in both: laying out topics of direct interest to engineers like signal processing and medical imaging, and explaining abstract theory in a down to earth way. Here is how Osgood invites students to higher dimensional analysis with the aid of a quote attributed to Euler: "I was just following my pencil."

*"...while your initial intuition may be confined to situations where you can draw a picture (two and three dimensions, say), most often the calculations work even when you can't draw a picture (n dimensions). Follow the words. Follow your pencil. Don't underestimate the power of this."*

For students and researchers from mathematics, physics,

The AMS BookShelf is prepared bimonthly by AMS Senior Editor Eriko Hironaka. Her email address is [exh@ams.org](mailto:exh@ams.org).

and engineering, this book is a joy to read and a useful resource to have on the bookshelf.



## A Conversational Introduction to Algebraic Number Theory: Arithmetic Beyond $\mathbb{Z}$

By Paul Pollack

Pollack's book, aimed at undergraduates with a basic undergraduate algebra and number theory background, introduces students to the field of algebraic number theory in a—true to its title—conversational, well-motivated, and accessible way. In structure

and in tone, the book makes you feel like you are hearing a captivating live lecture in real time.

The book focuses on the classical ideas of the eighteenth- and nineteenth-century giants Gauss, Dirichlet, Dedekind, and others that are now fundamental to research in algebraic number theory. Some of the main topics are: unique factorization of ideals, finiteness of the class number, and Dirichlet's unit theorem, and allusions are made to the modern theory in the exercises at the end of each section.

Potential instructors will appreciate the way the book is organized. The titles of chapters and sections work as teasers to spark the students' curiosity and start a train of thought. Chapters, some only five pages long, begin with an example, a general scenario, or a sequence of definitions, expand to a discussion and statements of important results, and finish with useful exercises that fill out the details.

In the first half of the book, Pollack covers the material solely in the context of quadratic field extensions of the rational numbers. He then follows this by a redo in the full setting of finite number fields. This overarching framework provides extra cohesion to the bite-size pieces presented in each chapter, and adds to the book's effectiveness as a textbook for an advanced undergraduate class or as a book for self-study.

Gauss famously called number theory the "Queen of Mathematics." This book provides an inviting entryway to this beautiful subject.