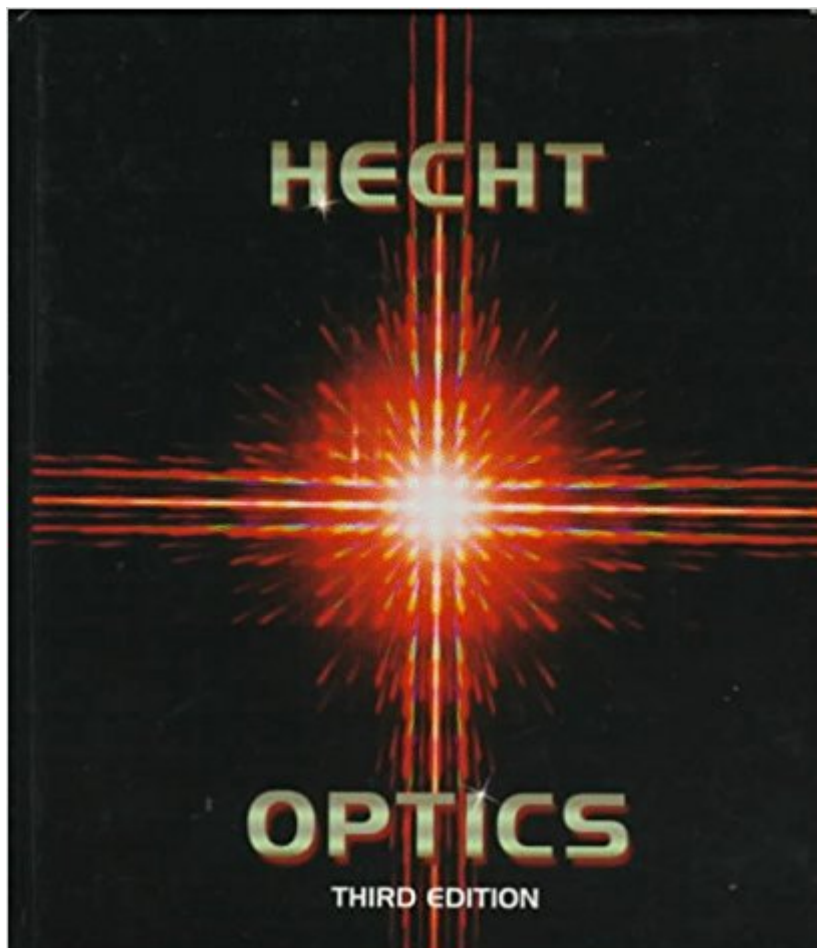


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# Optics



## Synopsis

Accurate, comprehensive and precise, this revision provides students with the most up-to-date coverage of optics. Responsive to students' needs, the focus of the revision was to fine tune the pedagogy, modernize the discourse, and update the content. The third edition continues the gradually modernizing treatment of the previous edition by imparting an appreciation of the central role of atomic scattering, providing an understanding of the insightful perspective offered by the Fourier Theory, and by, from the outset, explicating the underlying quantum mechanical nature of light. Additionally, the third edition addresses all of today's significant technological advances. As always, Hecht provides a good balance of theory and instrumentation, while also providing readers with classical background. The writing style is lively and colorful, with historical anecdotes and citations, and at the request of previous edition users, Hecht has included about 125 new problems, designed primarily to develop students' analytic skills.

## Book Information

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## Customer Reviews

Been looking around awhile for this one. Newer editions start in three figures, and as a high school physics teacher needing a reference text for my students, it didn't hardly seem worth that. Book was in great condition and has been a great reference text.

As an introductory book teaching classical (and some modern) optics, this wonderful book is difficult to beat. It prepares you remarkably well for any direction in optics you then want to set off in. The explanations are mostly crystal-clear, crafted with great care. Lots of words and diagrams, not too

much math, but enough math to facilitate useful calculations. An excellent under-graduate text, to my mind, the best available today.

Simply from the title and the description of this book, I believe it is hard to judge who the target audience is. I think if you are looking for an optics textbook at the high school or university freshmen level, you will be much better off reading a General Physics textbook. On the other hand, if you want a graduate text at the level of Born and Wolf, you will definitely be disappointed with the qualitative descriptions of many topics in Hecht. Overall, Hecht focuses on explaining the physics of light rather than the practical design of optical systems. As such, this book is targeted at undergraduate physics students, probably for junior and senior students who are more matured to appreciate the various aspects of light. I believe most physics students have learnt optics in some way. At a first sight, it seems like the book is talking about the same thing on geometrical and physical optics. It turns out that optics has more depth than I thought. For example, how light interact with the atoms in a material and how it affects light propagation, a deeper look of the Huygens principle, how atoms in an object emit light and the corresponding issue of spatial and temporal coherence. These topics are typically shoved under the carpet in general physics courses. The author has clearly thought out these issues, and I really enjoy his explanations throughout the book. The book is wrapped up by an introduction of Fourier optics, which links previous chapters together and opens up many possible applications of optics. Overall, I like this book. Quite often, I find that the book feels like a big block of words. I believe the underlying reason is that many topics are indeed quite complex, but instead of writing pages of formula, a more qualitative description is adopted for undergraduates. As a result, the book feels a bit too wordy. From the students' point of view, they might find it hard to revise their tests and exams using this book. The style of the book is like pages of text interlaced with a couple formula, and there are no examples. But still, Hecht is certainly a good read if you want to understand the physics of light.

I have now used Hecht as the primary text for four classes (physical optics, intro to geometric optics, geometric optics 1 and fourier optics) and have not been very happy with the book. The book lacks structure, especially on the subject of Fourier optics and lacks examples throughout. It is slightly compensated for by a plethora of diagrams, graphs, photos and the likes but--like most texts filled with pictures--they do not generally contribute significantly to the didactic success of the book. The treatment of geometric optics is suitable because the subject is all but obsolete in our age of lens design software and an engineer really needs only moderate knowledge of the third order theory

equations and more of an understanding of what aberrations are and why apertures help etc. The treatment of Fourier optics is unacceptable. For starters, the necessary information for a full treatment of Fourier optics is spread out over three chapters (7, 11 and 14 if memory serves me) and the meaning of the transform and all of the little tricks that can be done with it is all but completely lost. Fourier optics is a loosely defined subject as it is and with Hecht's treatment, it comes off as a bunch of unrelated phenomena. I may be complaining more about the structure of the course I was in which based itself almost entirely upon Hecht but the fact remains, Hecht is not a good text to learn Fourier from. I personally recommend Steward's text as an introduction because it avoids all of Hecht's pitfalls. Physical optics is probably the best treated subject of the subjects that I have learned from Hecht. Then again, it is a pretty straightforward subject on the simple level of interference that most freshman (as I was) are exposed to. That said, I must say that Hecht is the only text out there for an undergraduate studying optics in depth. Born wrote a great book but it is difficult to learn from. Jenkins and White is a bit too brief on many subjects. Fowles as well. Hecht remains, despite all of its flaws, really the only choice for undergraduate students of optics. At least, under one cover. Fishing around here and there, a library-adept student can piece together a better text but I would still say, if you are studying a lot of optics on the undergraduate level and are only going to buy one book, buy Hecht. But before you buy anything, fish around online. I found a text on archive.org from 1901 which dealt with geometric optics quite nicely. There are assorted pdfs, wikipedia articles and course sites which together can make up the better part of a textbook.

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