Munkres, James R.
Elements of algebraic topology. (English) Zbl 0673.55001
Advanced Book Program. Redwood City, California etc.: Addison-Wesley Publishing Company, Inc. (The Benjamin/Cummings Publ. Co., Inc.). IX, 454 p. (1984).

This book is, as the author says, a text for a first year graduate course in algebraic topology. The list of contents is traditional for such a course: simplicial and singular homology (later extended to relative homology and cohomology, with cup products); simplicial approximation; some use of acyclic models, a little homological algebra, and a final chapter on duality with a brief mention of Čech theory.

The book has grown out of lectures given many times: indeed the content of the course is almost exactly what used to be given 30 years ago. Thus proofs are all presented with great attention to detail; the geometrical illustrations are the traditional ones (surfaces, spheres, projective spaces, lens spaces).

The reviewer feels that placing simplicial theory and topological invariance first is paid for by having to repeat several times through the book technical arguments based on simplicial approximation. Perhaps a more serious criticism in a book designed for graduate students is a somewhat narrow attitude to the subject. While great care is taken with details of proofs and internal motivation, there is little or no indication of the scope of the methods and ideas used for topics beyond the book. Even the mention of chain complex techniques in homology theory of groups and algebras is eschewed. There is a one-line mention of the fact that some people relate cohomology to differential forms; whereas it could well be argued that this is the most important approach to cohomology. Intersection cohomology is not mentioned, even by way of comment.

Within the limitations the author has set himself, the presentation is careful, with clear expositions throughout and a good selection of exercises. It can be strongly recommended to students at the appropriate stage.

Reviewer: C.T.C.Wall

MSC:

55-01	Introductory exposition (textbooks, tutorial papers, etc.) pertaining to algebraic topology	Cited in **532** Documents
55N10	Singular homology and cohomology theory	
55Mxx	Classical topics in algebraic topology	

Keywords:

simplicial and singular homology; cup products; simplicial approximation; acyclic models; duality