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BOOK REVIEW

LAM, T. Y. *A first course in noncommutative rings* (Graduate Texts in Mathematics 131, Springer-Verlag, Heidelberg 1991), xvi + 397 pp., 3 540 97523 3, £35.50.

This textbook grew out of a second-year graduate course in ring theory offered in Berkeley. Although the title is "A *first* course in noncommutative rings", the author assumes that students will have had a solid first-year graduate course in abstract algebra. In Britain there is almost nowhere where a course is taught that could use this book, so we should judge its effectiveness in two ways: (i) as a textbook for self-study by students, (ii) as a rapid source for reference by mathematicians who do not have the time to read the whole book. I think that the book succeeds admirably in both respects. There are many worked examples, the results are clearly stated, the proofs well-constructed, and many counter-examples are indicated.

There are eight chapters in the book: (1) Wedderburn–Artin theory, (2) Jacobson radical theory, (3) Introduction to representation theory, (4) Prime and primitive rings, (5) Introduction to division rings, (6) Ordered structures in rings, (7) Local rings, semilocal rings, and idempotents, (8) Perfect and semiperfect rings.

As the author says in the introduction, the path to basic ring theory is well-trodden: one could hardly write a book with this title and omit the material in Chapters 1, 2, 4 and 7 as well as a considerable portion of Chapters 3 and 5. However, there is a large amount of material here that might have been omitted, and the inclusion of much of this material enhances the value of the book. For example, in Chapter 3 in the section on Representations of Groups, some material on the modular case is included; also, a section is devoted to the important topic of linear groups. In Chapter 5, information is given on the case of division rings infinite dimensional over their centres rather than an immediate specialization to the case of division algebras finite dimensional over their centres.

The author promises a second volume following on from this book; this would certainly be welcomed, but even more welcome would be a zeroth volume, written in the style of this book, covering the first-year course in abstract algebra referred to at the start of this review.

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