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M. Chakrabarti* (chakrabm@gvsu.edu), Department of Mathematics, Grand Valley State University, Allendale, MI 49401. *Innovations in teaching a rings first abstract algebra course.*

We discuss some novel approaches to teaching the first half of a year-long course in abstract algebra for mathematics majors at a four-year university. For many of these students — in particular those that are seeking a teacher certification — this course will be the first and the last course on this subject. One of the goals of such a course is to convey a feel for the subject to these prospective teachers of mathematics in spite of the limited scope of the engagement — thus necessitating an interplay of the concrete and the abstract to convey the main ideas. In addition, some unique challenges arise due to the sequencing of rings before groups in this course. Students are forced to jump into rings before being formally introduced to groups. In contrast, in most traditional year-long sequences where the first course deals with groups to be followed by rings in the second semester, by the time the student is exposed to rings, a certain mathematical maturity can be assumed at that point.

Among the innovations that we will discuss to address these challenges are 1) motivating the concept of a ring using classical examples from college algebra, calculus and linear algebra, 2) a novel way to “explain” the direct sum construction $R \oplus S$ for rings, and 3) use of technology. (Received September 26, 2006)