

sponsible for the curriculum took these courses when they were students) and because every professor in the department insists that *his* particular specialty must be taught to everyone, essentially because he likes to teach it.

If we are serious about encouraging creativity for undergraduates, we must open up the curriculum and encourage at least our better students to become familiar with intellectual concepts and tools that are not now common in chemical engineering. Clearly, not all students will benefit from such exposure, and therefore we should have flexibility such that our average students will do more or less what they do now but where the student with unusual potential is permitted and encouraged to deviate from the norm and to direct at least a part of his imagination toward other intellectual disciplines.

For graduate education, where the curriculum is less rigid, we should insist that our students take some high-level courses in other departments. By high-level, I mean courses with significant intellectual content; that is, courses taken by majors in other fields, and not survey courses designed for general education. Further, we should encourage independence and develop self-confidence by insisting that in their second year of graduate study, our

PhD students pass an oral proposition examination where the candidate proposes an original research project on a subject remote from his PhD thesis. The student must defend his proposal to a committee of professors that should include one or two colleagues from departments other than chemical engineering. Except for remoteness from his thesis, there should be no restriction concerning the subject of the proposed research. The important point is that the student must choose the proposed research topic himself, that he receive minimum guidance in preparing his defense and that in judging the proposal, the examining committee insist on high intellectual standards, regardless of utility.

Given the job-oriented goals of the chemical engineering curriculum, it is not likely, nor is it desirable, that there be a major shift in the intellectual menu for most chemical engineering students. But for those students who have creative potential, I hope that we can relax our sectarian interests and expose them to intellectual vistas that at present have nothing to do with contemporary chemical engineering but that some day, through the inventive genius of our younger colleagues, may broaden and enrich the domain of our profession. □

ChE book reviews

ENGINEERING WITH POLYMERS

by Peter C. Powell

Chapman & Hall, 733 Third Ave., New York;
\$49.95 HB, \$25 PB (1983)

Reviewed by

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Engineering with Polymers by Peter C. Powell, Mechanical Engineering Department, Imperial College, London, is a text designed for final year undergraduate students in mechanical engineering. It assumes no prior knowledge of polymer science or chemistry on the part of the student. It is the author's stated intent to present the "minimum useful knowledge of engineering with polymers within a mechanical engineering degree course."

There are four main sections to the book: (1) The first four chapters provide an introduction to the language, terminology, and technology of polymers. This includes an introduction to polymer

physics, polymer materials science, and polymer processing. (2) Two chapters provide an introduction to the mechanical behavior of polymeric materials, one on stiffness and the other on strength. (3) One chapter outlines the mechanics of fiber reinforced composites, and (4) Two chapters provide an introduction to polymer fluid flow, heat transfer and the effect of processing on properties.

Given the mechanical engineering orientation and purpose of the book it is not surprising that the book's most comprehensive treatment is given to the mechanical behavior of polymers and the mechanics of composites. The treatment of polymer processing is largely descriptive and somewhat superficial. A valuable part of the book are the problems associated with each chapter and an outline of the solutions, which makes the book well suited for self-study. The sections on polymer and composite mechanics would be a useful adjunct to a first course in polymers for chemical engineers, which would probably provide a more comprehensive introduction to property-structure relationships and processing. □