Book Review

Plasma Engineering. By M. A. Kettani and M. F. Hoyaux. Halsted Press, New York (1973). 444 pp. $38.50.

We have been using the above book in our quarter-length elementary plasma course, required of all undergraduate engineers. I personally feel that it is an excellent book for plasma engineers, but we prefer to use it as a supplemental text rather than as the main book.

Our primary problem with the book as a text is that the theory is contained in the first few chapters while applications are concentrated in the latter part of the book. We think that our undergraduate engineers, who are inherently applications oriented, prefer to dive into these concrete applications as rapidly as possible. Therefore, we include applications and experiments early in the course. This could not be done if the text were followed as the authors recommend in their preface.

The book is excellent as a reference work, and surveys an incredible number of topics. Which reader would know of the gas-filled control tube, the plasmatron? (Read the book to find out.) The book ranges over such subjects as thermonuclear fusion, MHD, masers and lasers, solid-state plasmas, and astrophysics and space sciences. Of course, to cover such a wide range of subjects, the book cannot go very deeply into them. Additional material may be desirable if the teacher wishes to study any one topic in depth.

For readers interested in nuclear energy, the section on controlled thermonuclear fusion is clear, yet informative. A section on conditions for thermonuclear fusion discusses cross sections and confinement. One is led to a discussion of "open" and "closed" confinement systems that is quite comprehensive; a few of the devices discussed are no longer in operation however. The chapter ends with a discussion of a possible fusion power plant and future trends.

Other valuable aspects of the book include abundant up-to-date references, a clear and not overly mathematical text, abundant diagrams, and a glossary of symbols appearing at the end. The book contains, in my opinion, a reasonable number of quite difficult exercises.

I personally like the book a great deal and intend to keep using it in my introductory classes. It is unique in being broad, clear, applications-oriented, and not overly mathematical. The only comparable plasma engineering text I know of is the classic *Gaseous Discharges* by James Dillon Cobine, published in 1941, and now quite out-of-date.

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About the Reviewer: Igor Alexeff is professor of electrical engineering at the University of Tennessee. He earned his BA from Harvard and his MS and PhD from the University of Wisconsin, has studied in Switzerland, and has held visiting professorships in Nagoya, Japan, and at the College of William and Mary. Professor Alexeff has been employed at the Westinghouse Research Laboratories and the Oak Ridge National Laboratory, where he directed research in plasma. In addition to teaching, he is continuing research in plasma and is active in the Institute of Electrical and Electronic Engineers.