



“Physics in Canada”
Book Review

“La Physique au Canada”
Critique de livre

Basic Electronics for Scientists and Engineers, D. L. Eggleston, Cambridge University Press, 2011, pp: 251, ISBN 978 0 521 15430 7; Price: US\$65

The preface of the book clearly states the purpose and scope of the text. The book has been designed for a one semester course in basic electronics aimed at students who have completed introductory physics and calculus. In this reviewer’s opinion, Eggleston has done a nice job of achieving this objective. The topics covered are both interesting and relevant. The presentation progresses neatly with early topics forming the foundation for later material.

The range of topics covered includes AC circuits and complex analysis, band theory and semiconductor devices, small signal analysis, operational amplifiers, oscillators, and digital circuits. Eggleston’s presentation includes many practical circuits that emphasize the analysis methods and can be built and tested in the laboratory. These include filters, amplifiers, summing circuits, oscillators, and analog-to-digital converters. The presentation of digital circuits is particularly enjoyable. Starting from basic digital gates, Eggleston first builds and analyzes a variety of flip-flop architectures. Chains of the flip-flop units are then used to build useful devices like counters, shift registers, and waveform synthesizers. Very quickly the reader has learnt to build rather sophisticated and useful digital circuits. Each step of the process is properly motivated and easy to follow. Throughout the text, the limits of operation of the circuits presented are discussed. It is impressive that all of this is accomplished in a relatively short 251 pages. It is also worth noting that the book is available as a paperback which keeps the cost and weight down.

Now, here are a few minor criticisms of the text. Eggleston very often writes of the “flow of current” through a circuit element when it is more appropriate to speak of the flow of charge through the element. Another pedantic point is that Eggleston occasionally writes of a circuit element’s desire, as in “the output wants to increase its voltage”. This reviewer would prefer to see this style of writing removed. All of the figures in the text are black and white which one can appreciate as it keeps the cost of the text down. The only time the absence of colour is noticeable is when the colour code for reading resistor values is described. For some topics, the presentation seems too short and could benefit from a more in-depth treatment. One assumes that the brevity results from efforts to keep the book a reasonable length for a one-semester course. One example is the treatment of the Thevenin and Norton equivalent circuits which is one page long. The theorems are stated, but the reader’s intuition is not developed and the values of the results are not emphasized. Occasionally, the reader will find it necessary to supplement topics of interest with additional readings.

Despite some minor criticisms, some of which are a matter of personal taste, this reviewer recommends Eggleston's work as a very good first text for persons studying introductory electronics. The scope of topics is broad and the treatments are efficient. It would be very natural to supplement the material covered in the text with laboratory practice.

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