

***MODERN PHYSICS: FROM QUARKS TO GALAXIES***

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## Preface

At Simon Fraser University, the first-year physics program for students specializing in engineering and the physical sciences begins with 11 - 13 lectures on modern physics. This material is taught at a level that assumes a mastery of Grade 12 physics, but does not require calculus. The purpose of introducing modern physics at the beginning of the program is two-fold. First, it gives the student an overview of the physical world from the very small to the very large. Second, it lessens the difficulty of teaching calculus-based mechanics before derivatives and integrals are covered in the corequisite mathematics courses.

In a typical 12 lecture sequence, the material labelled "optional" in the Table of Contents of this monograph is not covered. Supplementary non-credit lectures on special relativity are given outside normal class hours in parallel with more conventional material on linear and angular kinematics. As well as worked examples, each chapter contains a summary, a list of references for further reading and a modest selection of problems. The problems are of varying difficulty; the more difficult ones are indicated with an asterisk. Solutions to the odd-numbered problems are given in Appendix D. A sample quiz (given after lecture 5) and midterm exam (given after lecture 12) are provided in Appendix E.

I thank Julian Shillcock for providing most of the solutions in Appendix D. Faculty who have taught Physics 120 recently, including John Bechhoefer, Chris Homes and Howard Trottier, have contributed problem sets and helped revise the notes. My thanks also go to the many students and teaching assistants who made valuable suggestions for improving earlier editions of these notes. Alex Boal drew many of the figures, and Ian Courtney put the problems into computer-based format.

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