How to Read This Book

Not all students, instructors, and practitioners of the field of experimental physics may have the inclination, the time, or the need to study this book in its entirety. Indeed, only a selected few may have the opportunity to read the book from cover to cover. This should not be a problem, however, because the material is organized in large blocks that are reasonably self-sufficient, and ample references to earlier or upcoming chapters, as the case may be, are included in the narrative. The book also includes a number of specialized or in-depth topics that may be skipped in a first reading. Such topics include, for instance, the formal definition of probability in §2.2, the notion of Fisher information discussed in §4.7, the technique of Kalman filtering introduced in §5.6 and for which a detailed example of application is presented in §9.2.3, as well as discussions of track and vertex reconstruction presented in §§ 9.2 and 9.3. This said, the book is designed to progressively develop and approach topics, and it should then be possible to study the material in a variety of ways, adapting the depth and breadth of coverage. The following are recommended lists of chapters and sections that should be covered given specific and targeted needs.

- Introductory course in probability and statistics:
  Chapters 2 (§§2.1, 2.3–2.11), 3 (§§3.1–3.13), 4 (§§4.1–4.6), 5 (§§5.1–5.5), 6 (§§6.1–6.6), 7 (§§7.1, 7.2, 7.4, 7.7), 13
- Advanced course in probability and statistics:
  Chapters 1, 2, 3, 4, 5, 6, 7, 13
- Introductory course in data analysis techniques (one semester):
  Chapters 1, 2 (§§2.1, 2.3–2.11), 3 (§§3.1–3.13), 4 (§§4.1–4.6), 5 (§§5.1–5.5), 6 (§§6.1–6.6), 8 (§§8.1–8.6), 9 (§§9.1, 9.2), 13
- Advanced course in data analysis techniques (two semesters):
  Chapters 1, 2 (§§2.1, 2.3–2.11), 3 (§§3.1–3.13), 4 (§§4.1–4.6), 5 (§§5.1–5.6), 6 (§§6.1–6.7), 7, 8 (§§81–8.6), 9 (§§9.1, 9.2), 12, 13, 14
- Course on correlation functions (one semester):
  Chapters 2 (§§2.5–2.13), 4 (§§4.3, 4.5, 4.6), 10, 11, 12, 13

Of course, instructors using this book should feel free to select and change the order of topics to suit their specific needs. For instance, Monte Carlo methods are formally introduced in Chapter 13 but it is often useful and inconvenient to use and discuss some of these concepts along with materials of the early chapters (e.g., Chapters 2–7).

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