Reference Books for Compact Modeling of Semiconductor Devices for High-Speed IC Design

No single text book is sufficient for this course. However, the following ones are useful. Moreover one requires to go through some journal papers to gain sufficient understanding of this course.

1. **M. Schroter and A. Chakravorty, Compact Hierarchical Bipolar Transistor Modeling with HICUM, World Scientific, 2010.** This is the book that I will follow to some extent. This book is the latest one in the field of bipolar transistor modeling. This involves the development, implementation, and parameter extractions of the modern HBT model HICUM.

2. **M. Reisch, High Frequency Bipolar Transistors: Physics, Modeling and Applications, Springer, 2003.** This book involves in-depth discussion on bipolar transistors modeling including the non-quasi-static effect, noise and self-heating. This is another useful book for this course. (Available in IITM Library)

3. **I. E. Getreu, Modeling Bipolar Transistor, Amsterdam: Elsevier Scient. Publ. Comp., 1978.** This is the first classic book on bipolar transistor modeling. Therefore, one can have some useful ideas from this book. The integral charge control relation (ICCR) is well described in this book. The old Eber-Moll model and the classical SPICE Gummel Poon model are described in detail. The advanced models of bipolar transistors are based on the classical ICCR concept.

4. **D. J. Roulston, Bipolar Semiconductor Devices, McGraw Hill, 1990.** This is an old classic on BJT technology and design. The underlying physics is described in detail. (Available in IITM Library)

5. **J. D. Cressler and G. Niu, Silicon Germanium Heterojunction Bipolar Transistors, Artech House, 2002.** This is a classic addition to the BJT documentations. This book is a highly focused one on silicon-germanium HBTs, its modern technologies and design issues including detailed physics discussions. (Available in IITM Library)

6. **F. M. Klassen and H.C. de Graaff, Compact Transistor Modeling for Circuit Design, Springer Verlag Wien New York, 1990.** This is another classic involving the basics of MOSFET and BJT modeling. This book elaborates more on MEXTRAM based bipolar model equations.

7. **J. Lindmayer and C. Y. Wringley, Fundamentals of Semiconductor Devices, Affiliated East-West Press Pvt. Ltd.** This is an old classic which covers lots of fundamental issues on various effects in semiconductor devices. If you plan to research on devices area, you may like to have a look into it. (Available in IITM Library)