PH 404: BASIC ANALOG AND DIGITAL ELECTRONICS (3-0-0:3)

Introduction and Survey of Network Theorems
Thevnin, Norton theorems and network analysis, AC and DC bridges, rectifier circuits, transistors at low and high frequencies.

Electronic Devices
Diodes, breakdown in diodes, zener diodes, tunnel diodes, light-emitting diodes, photo-diodes, negative-resistance devices, p-n-p, n-p-n characteristics, transistors (BJT, JFET, MOSFET, Bipolar),

IC fabrication
Large signal and small signal behaviour of bipolar transistors, basic processes in integrated circuit fabrication, bipolar integrated circuit fabrication, MOS integrated circuit fabrication, single stage amplifiers, multistage amplifiers, feedback theory.

Operational Amplifier
Basic differential amplifier circuit, operational amplifier characteristics and applications, simple analog computer, analog integrated circuits, wave shaping circuits, multivibrators.

Digital Electronics
Gates, Boolean algebra, De Morgan's law, combinational and sequential digital systems, flip-flops, counters, registers, memories, multi-channel analyzer, A/D and D/A converters, micro-processors, memory and I/O interfacing, microcontrollers.

Textbooks and References:
1. P. Horowitz and W. Hill, "The Art of Electronics", Cambridge University Press.
2. J. Millman and A. Grabel, "Microelectronics", McGraw Hill.
3. J. J. Cathey, "Schaum's Outline of Electronic Devices and Circuits", McGraw Hill.
4. M. Forrest, "Electronic Sensor Circuits and Projects", Masre Publishing Inc.
5. W. Kleitz, "Digital Electronics: A Practical Approach", Prentice Hall.
6. J. H. Moore, C. C. Davis, and M. A. Coplan, "Building Scientific Apparatus", Adison Wesley.