**PH 409: Basic Analog and Digital Electronics (3-0-0:3)**

**Introduction and Survey of Network Theorems**

Thevnin, Norton theorems and network analysis, constant current and constant voltage sources, power supplies, AC and DC bridges, rectifier circuits, transistors at low and high frequencies. **[7L]**

**Electronic Devices**

Diodes, breakdown in diodes, zener diodes, tunnel diodes, Gunn diode, light-emitting diodes, photo-diodes, negative-resistance devices, p-n-p, n-p-n characteristics, transistors (BJT, JFET, MOSFET, Bipolar). **[8L]**

**Integrated Circuit**

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. **[8L]**

**Operational Amplifier**

Basic differential amplifier circuit, operational amplifier characteristics and applications, simple analog computer, analog integrated circuits, wave shaping circuits, multivibrators. **[5L]**

**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. **[8L]**

**Textbooks and References**

1. C. K. Alexander and M. N.O. Sadiku, “Fundamentals of Electric Circuits”, 6th edition, McGraw Hill Education, 2019..
2. J. Millman and A. Grabel, “Microelectronics”, 2nd edition, McGraw Hill, 2017.
3. J. J. Cathey, “Schaum's Outline of Electronic Devices and Circuits”, 2nd edition, McGraw Hill, 2002.
4. M. Forrest, “Electronic Sensor Circuits and Projects”, Master Publishing Inc, 2006.
5. W. Kleitz, “Digital Electronics: A Practical Approach”, 2nd edition, Prentice Hall, 1989.
6. A. Malvino, and D. Bates, “Electronic Principles”, 7th Edition, McGraw Hill Education, New Delhi, 2017.