

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Electronic & Telecommunication) VI Sem					
Subject Code & Name	Instructions Hours per Week			Marks					
3ET556 Design Workshop	L	T	P		Th	Cw	Sw	Pr	Total
	-	-	2	Max	-	-	50	50	100
Duration of Theory Paper: Only Internal Test				Min	-	-	25	25	50

Course Objective: To introduce the Design and Realization of Electronics systems to solve engineering problems; good engineering Design practice; tools and materials relevant to electronics and electrical engineering. To provide initial training in Design skills required by Professional Engineers.

Prerequisites: Understandability of methods for A/D and D/A conversion, including concepts of resolution and accuracy necessary for conversion. Knowledge of Power requirements and efficiency, Power conversion and consumption and power demands of ICs, Supply decoupling. Estimation of power consumption in system from data sheets. Design of simple power supplies.

CONTENT OF COURSE

Unit-I Review

Review of DC Circuits, Active Circuits, Diodes, Bipolar Junction Transistors, Field Effect transistors, Capacitance & Inductance (including transformers), 1st & 2nd order Circuits (overview) Laplace Transforms (overview), s-Domain Circuit Analysis

Unit-II Power supplies and components

Sources of power. Ideal and practical supplies: regulation. Batteries: primary and secondary, types, capacity and life. AC power supplies: rectification, simple, half-wave and full-wave; need for filter (capacitor) to reduce ripple. Zener diode regulator. Linear regulator circuits; dropout. Power dissipation: heat sinks, thermal resistance, calculation of heat sink required. Switching supplies: principle of operation, configurations. Passive components: specification, construction. Printed circuit boards (PCBs); effect of non-ideal PCB tracks; good grounding practice. Pin-through-hole (PTH) and surface mount (SMD) devices.

Unit-III Analog to digital and digital to analog conversion

Relation between analog and digital data: precision, resolution, range and accuracy. Types of classical analog to digital converters (ADC): successive approximation, pipeline. Reference sources. Signal conditioning, sample-and-hold circuit. Sampling rate, Nyquist criterion, aliasing and need for anti-aliasing filter, over sampling. Sigma-delta converters, principle of operation, effect of over sampling ratio.

Unit-IV Electronic Computer Aided Design

Computer-aided design for electronic circuits, graphical schematic capture, drawing standards for electronic systems, simulation using EDA software available, generation of part lists, printed circuit board layout and production.

Unit-V Electronics Design Project

System Design project: assembly, test and rework of printed circuit board; Design of Engineering system including analogue, digital and hybrid electronics and real-time software; use of test instruments including generated test patterns; software; integration of hardware and software.

Books Recommended:

- [1] P Horowitz and W Hill, *The Art of Electronics*, 2/e Cambridge, 1989
- [2] A S Sedra and K C Smith, *Microelectronic Circuits*, 5/e Oxford, 2004
- [3] B Baker A Baker's Dozen, *Real Analog Solutions for Digital Designers*, Newnes, 2005
- [4] W Jung, *Op Amp Applications Handbook*, Newnes, 2005
- [5] W Kester, *Mixed-signal and DSP Design Techniques*, Newnes, 2003
- [6] W Kester, *Data Conversion Handbook*, Newnes, 2004
- [7] R Mancini, *Op Amps for Everyone*, Newnes, 2003
- [8] S J Sangwine *Electronic Components and Technology*, StanleyThornes, 1998