M.Sc. Course					SC514T Basic Electronics					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	0	0	3	3	25	50	25	--	--	100

COURSE OBJECTIVES

- To introduce and analyse the operation of various electronic.
- To make students aware about the basic concepts and processing of analog and digital signals, ability of semiconductors in electronic components and to familiarize about the transmission line.
- To analyse about instrumentation concepts which can be applied to Control systems.
- To study the application of power electronics and create skills to set-up own designed circuits as per the requirement.

12 Hrs.

UNIT 1: ANALOG AND DIGITAL CIRCUITS

Flip-Flop Counters, resistors, memory devices, Logic family, RTL family, DTL, TTL, I2L families, microprocessor 8085 introduction, architecture and instruction sets.

UNIT 2: PHYSICS OF SEMICONDUCTOR DEVICES **10 Hrs.**

Carrier concentrations in semiconductors; Dynamic diffusion capacitances; Ebers-Moll equation. Semiconductor junctions: Schottky barriers; Rectifying contacts; Ohmic contacts; Typical Schottky barriers.

UNIT 3: EXPERIMENTAL DESIGN **08 Hrs.**

Transducers (Basic), desired characteristics, temp. transducer, pressure transducer, RTD and thermal transducer, Scintillation detectors; Solid state detectors (Si and HPGe), Measurement of energy and time using electronic signals from the detectors and associated instrumentation, Noise analysis in experimental design: Thermal noise, short noise, 1/f noise, phase detection and lock in amplifier.

UNIT 4: TRANSMISSION LINE **12 Hrs.**

Transmission line equation and solution; Reflection and transmission coefficient; Standing wave and standing wave ratio; Line impedance and admittance; Smith chart, wave guide, antenna, radiation due to short dipole etc.

Max. <42> Hrs.

COURSE OUTCOMES

After completion of this course students will be able to;

CO1: Construction and working of various circuits using different electronic components and power supply.

CO2: Develop the skills to structure various digital filters and analyse their frequency response.

CO3: Analyse the stability and response of closed and open loop systems.

CO4: Apply minimization techniques for the simplification of Boolean functions.

CO5: Elucidate the nomenclature, concept and technology of memory devices and logic circuits.

CO6: Create concepts and methodologies to design controllers for electric drives which achieve the regulation of torque, speed or position in various machineries

TEXT/REFERENCE BOOK

1. Micheal Sayer and A. Mansingh, Measurement Instrumentation And Experiment Design In Physics
2. and Engineering.
3. J.D. Ryder: Network, Lines and Fields
4. J.P. Holmann, Experimental methods for engineers
5. J. Millman and C. Halkias: Integrated Electronics
6. J.D. Ryder: Electronic Fundamental and Applications
7. J. Millman and A. Grabel: Microelectronics
8. B.G. Streetman, S. Banerjee: Solid State Electronic Devices
9. Sedra and Smith: Microelectronic Devices
10. Taub and Schilling: Digital Integrated Electronics
11. S.Y. Liao: Microwave Devices and Circuits
12. S.M. Sze: Physics of Semiconductor Devices

Course Delivery Methods

Lecture by use of boards/LCD projectors/OHP projectors	Yes
Tutorials/Assignments	Yes
Seminars	Yes
Mini projects/Projects	No
Laboratory experiments/teaching aids	Yes
Industrial/guest lectures	Yes
Industrial visits/in-plant training	No
Self- learning such as use of NPTEL materials and internets	Yes
Simulation	Yes

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment:

	Assessment Tool	% Contribution during CO Assessment	Maximum Marks	Exam Duration
Internal Assessment Examiantion	Assignment	15 %	-	-
	Quiz	10 %	-	-
	Mid Semester Examination	25%	50	2 hours
	End Semester Examination	50%	100	3 hours

Assessment Components	CO1	CO2	CO3	CO4	CO5	CO6
Mid Sem Examination Marks	Yes	Yes	Yes	Yes	No	No
End Sem Examination Marks	Yes	Yes	Yes	Yes	Yes	Yes
Assignment	Yes	Yes	Yes	Yes	Yes	Yes

Indirect Assessment :

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping of Course Outcomes onto Program Outcomes

Course Outcome	Programme Outcome PO1	PO2	PO3	PO4	PO5
CO1: Construction and working of various circuits using different electronic components and power supply.	H	H	H	M	M
CO2: Develop the skills to structure various digital filters and analyse their frequency response.	H	H	M	H	H
CO3: Analyse the stability and response of closed and open loop systems.	H	M	H	H	H
CO4: Apply minimization techniques for the simplification of Boolean functions.	H	M	H	M	H
CO5: Elucidate the nomenclature, concept and technology of memory devices and logic circuits.	H	H	H	M	L
CO6: Create concepts and methodologies to design controllers for electric drives which achieve the regulation of torque, speed or position in various machineries.	L	H	H	H	H

Lecture wise Lesson planning Details:

Week No.	Lect. No.	Unit No.	Topics To be covered	CO Mapped	Remarks by Faculty
1	1	1	Flip-Flop Counters, resistors, memory devices		
	2-3		Logic family, RTL family		
2	4-6		DTL, TTL, I2L families		
	7-8		microprocessor 8085 introduction		
3	9-10		architecture and instruction sets		
	11-12	2	Carrier concentrations in semiconductors;		
4	13		Carrier concentrations in semiconductors; Dynamic diffusion capacitances;		

	14-15		
5	16		Ebers-Moll equation.
	17-18		Semiconductor junctions: Schottky barriers
6	19-20		Rectifying contacts; Ohmic contacts
7	21-22		Typical Schottky barriers
8	23-24		Transducers (Basic), desired characteristics, temp. transducer
	25-26		pressure transducer, RTD and thermal transducer,
9	27	3	Scintillation detectors; Solid state detectors (Si and HPGe) Measurement of energy and time using electronic signals from the detectors and associated instrumentation
10	28-29		Noise analysis in experimental design: Thermal noise, short noise,
	30		1/f noise, phase detection and lock in amplifier.
11	31-33		Transmission line equation and solution;
12	34-36		Reflection and transmission coefficient;
	37-38	4	Standing wave and standing wave ratio;
13	39-40		Line impedance and admittance; Smith chart, wave guide,
14	41-42		antenna, radiation due to short dipole etc.