SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by NAAC with "A" Grade – 3.32 CGPA, Recognized under 2(f) & 12(B) of UGC Act 1956, Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada
Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT OF ROBOTICS

TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
23RB3T02	ANALOG AND DIGITAL ELECTRONICS	III	ROBOTICS ENGINEERING	5	2024-25	30.07.2024

COURSE OUTCOMES

1	**Demonstrate** the characteristics of different semiconductor diodes and its applications. [K2]
2	**Illustrate** the Half-wave, full-wave rectifiers. [K3]
3	**Describe** the junction transistor characteristics and biasing. [K1]
4	**Compare** the JFET, MOSFET and MOSFET biasing [K2]
5	**Construct** the logic circuits and various combinational circuits [K3]
6	**Demonstrate** the behaviour of various sequential circuits. [K2]

UNIT	Outcomes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
I	CO1: **Demonstrate** the characteristics of different semiconductor diodes and its applications. [K2], CO2. **Illustrate** the Half-wave, full-wave rectifiers. [K3]		**UNIT-I Semiconductor Diodes and Its Applications**			
		1.1	Band Structure of p-n Junction, Diode Current components.	T1, R1	03	Chalk and talk /ppt /quiz/ PBL/ Videos/ Animation
		1.2	V-I Characteristics of Diode	T1, R1	01	
		1.3	Transition and Diffusion capacitance of p-n junction diode	T1, R1	01	
		1.4	Breakdown of junction, Zener and Avalanche breakdown	T1, R1	01	
		1.5	Tunnel diode construction, operation and characteristics.	T1, R1	02	
		1.6	Diode as a switch rectifiers – Half-wave, Full-wave, Center-tap, and Bridge-type. Analysis for different parameters PIV, TUF, Efficiency, ripple factor, regulation etc.	T1, R1	05	
		1.7	Capacitive filter analysis for ripple factor and Regulation	T1, R1	01	

Content beyond Syllabus			Introduction of P-type and N-type Semiconductor materials		01	
		Total			**15**	
II	CO3: **Describe** the junction transistor characteristics and biasing. [K1]	**UNIT-II: JUNCTION TRANSISTOR CHARACTRISTICS & BIASING**				
		2.1	PNP and NPN junction transistor characteristics of the current flow across the base regions	T1, R1	02	Chalk and talk /ppt/web resources/PBL/ Videos/ Animation
		2.2	Transistor as a device in CB, CE, and CC configurations and their characteristics	T1, R1	02	
		2.3	The operating point. DC and AC load lines.	T1, R1	01	
		2.4	Fixed bias and Problems	T1, R1	01	
		2.5	Collector feedback bias and problems	T1, R1	02	
		2.6	Emitter feedback bias and problems	T1, R1	01	
		2.7	Stabilization, various stabilization circuits, transistor as a switch	T1, R1	02	
Content beyond Syllabus			Identification of diode and transistor terminals		01	
			Total		**12**	
III	CO 4: **Compare** the JFET, MOSFET and MOSFET biasing [K2]	**UNIT-III: JFET and MOSFET**				
		3.1	Types, construction, operation, characteristics, parameters of JFET.	T1, R1	03	Chalk and talk /ppt/web resources/PBL/ Videos/ Animation
		3.2	MOSFET construction, characteristics and comparative study of enhancement and depletion MOSFET.	T1, R1	02	
		3.3	Comparison between JFET and MOSFET.	T1, R1	01	
		3.4	Biasing, introduction, fixed bias configuration, self bias configuration, voltage divider biasing and stabilization, relevant problems.	T1, R1	04	
Content beyond Syllabus			Applications of JFET and MOSFETs		01	
Total					**11**	

IV	CO5: **Construct** the logic circuits and various combinational circuits [K3]	**UNIT-IV: COMBINATIONAL LOGIC CIRCUITS**				
		4.1	Priority encoders	T2, T3	01	Chalk and talk /ppt/web resources/videos
		4.2	Decoders	T2, T3	01	
		4.3	Multiplexers	T2, T3	01	
		4.4	Demultiplexers	T2, T3	01	
		4.5	Realization of Boolean function using decoders and multiplexers	T2, T3	03	
		4.6	Memory devices: Random access memory, Read only memory, Programmable Read only memory.	T2, T3	02	
		4.7	Programmable logic devices – Programmable logic array	T2, T3	01	
		4.8	Programmable array logic	T2, T3	01	
Content beyond Syllabus			Memory devices in a personal computer		01	
				Total	**12**	
V	CO 6: **Demonstrate** the behaviour of various sequential circuits. [K2]	**UNIT-V: SEQUENTIAL LOGIC CIRCUITS**				
		5.1	Latches, Flip-Flops – RS flip-flop	T2, T3	02	Chalk and talk /ppt/web resources/PBL/ Videos/ Animation
		5.2	JK flip-flop, Master-Slave JK flip-flop	T2, T3	02	
		5.3	D-type and T-type flip-flops	T2, T3	02	
		5.4	Flip-flop Conversions	T2, T3	02	
		5.5	Asynchronous and synchronous counters	T2, T3	02	
		5.6	Shift Registers – SISO, SIPO, PISO, PIPO	T2, T3	01	
Content beyond Syllabus			Hands on experience – Lab equipment demonstration		01	
				Total	**12**	
					62	

Text Books:

Sl. No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
T1	J. Millman & C. Halkias – 'Electronic devices & Circuits' – Tata McGraw Hill Publication – II Edition, 2003 (Units – 1, 2, 3)
T2	Pulse Digital and Switching Waveforms – J. Millman and H. Taub, McGraw-Hill, II Edition, 1991. (Units – 4, 5)
T3	M. Morris Mano, "Digital Design", 4th Edition, Prentice Hall of India Pvt. Ltd., 2008 / Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.

Reference Books:	
Sl. No.	**AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION**
R1	Sanjeev Gupta – 'Electronic devices & circuits' – Dhanpat Rai Publication. IV Edition, 2012.
R2	A. Anand Kumar – Pulse and Digital Circuits, PHI. – IV Edition, 2005.
R3	John F. Wakerly, "Digital Design", Fourth Edition, Pearson / PHI, 2008.
R4	John. M Yarbrough, "Digital Logic Applications and Design", Thomson Learning, 2006.
Web Details	
	1. https://en.wikipedia.org/wiki/Diode 2. https://en.wikipedia.org/wiki/MOSFET 3. https://study.com/academy/lesson/basic-combinational-circuits-types-examples.html 4. https://en.wikipedia.org/wiki/Sequential_logic

		Name	Signature with Date
i.	Faculty	Mr. V. KRANTHI KUMAR	
ii.	Course Coordinator	Mr. V. KRANTHI KUMAR	
iii.	Module Coordinator	Dr. M FRANCIS LUTHER KING	
iv.	Programme Coordinator	Dr. A. GOPI CHAND	

Principal