ANDHRA KESARI UNIVERSITY ::ONGOLE

Model Syllabus for Electronics (Minor) in consonance with Curriculum framework w.e.f. AY 2025-26

COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
II	III	1	Circuit theory and electronic devices	3	3
			Circuit theory and electronic devices Practical Course	2	1
	IV	2	Digital Electronics	3	3
			Digital Electronics Practical Course	2	1
III	V	3	Analog circuits and Communication	3	3
			Analog circuits and Communication Practical Course	2	1
		4	Microprocessor system	3	3
			Microprocessor system Practical Course	2	1
	VI	5	Micro controller and Interfacing	3	3
			Micro controller and Interfacing Practical Course	2	1
		6	Industrial Electronics	3	3
			Industrial Electronics Practical Course	2	1

PRINCIPAL
T.R.R. Govt. Degree College
KANDUKUR - 523105
Prakasam Dist.

SEMESTER-III

COURSE 1: CIRCUIT THEORY AND ELECTRONIC DEVICES

Theory **Credits: 3** **3 hrs/week**

Course Objectives:

1. To explain the basic concepts and laws of DC and AC electrical networks and solve them using mesh and nodal analysis techniques.
2. To analyze circuits in time and frequency domain.
3. To synthesize the networks using passive elements.
4. To understand the construction, working and VI characteristics of electronic devices.
5. To understand the concept of power supply.

UNIT- 1: (9 Hrs)

SINUSOIDAL ALTERNATING WAVEFORMS:

Definition of current and voltage. The sine wave, general format of sine wave for voltage or current, phase relations, average value, effective (R.M.S) values. Differences between A.C and D.C. Phase relation of R,L and C

UNIT-II: (9 Hrs)

PASSIVE NETWORKS AND NETWORKS THEOREMS (D.C):

Branch current method, Nodal Analysis, star to delta & delta to star conversions. Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power, Milliman and Reciprocity theorems.

UNIT-III: (9 Hrs)

RC, RL AND RLC CIRCUITS:

Frequency response of RC and RL circuits, their action as low pass and high pass filters. Passive differentiating and integrating circuits. Series resonance and parallel resonance circuits, Q – Factor.

UNIT-IV: (9 Hrs)

BJT, FETand UJT:

BJT: Construction, working, and characteristics of CE Configurations. Hybrid parameters and hybrid equivalent circuit of CE Transistor,

FET: Construction, working and characteristics of JFET and MOSFET. Advantages of FET over BJT.

UJT: Construction, working and characteristics of UJT. UJT as a

Relaxation oscillator.

UNIT-V: (9 Hrs)

POWER SUPPLIES & PHOTO ELECTRIC DEVICES

Rectifiers: Half wave ,full wave rectifiers - Efficiency-ripple factor- Filters- L-section&π-section filters. Three terminal fixed voltage I.C. regulators (78XX and &79XX). Light Emitting Diode – Photo diode and LDR.

TEXT BOOKS:

1. Introductory circuit Analysis (UBS Publications) Robert L. Boylestad.
2. Electronic Devices and Circuit Theory Robert L. Boylestad &
3. Louisashelsky.
4. Circuit Analysis by P.Gnanasivam- Pearson Education
5. Electronic Devices and Circuit Theory Robert L. Boylestad &
6. Louis Nashelsky.
7. Electronic Devices and Circuits I – T.L.Floyd- PHI Fifth Edition

REFERENCE BOOKS:

1. Engineering Circuit Analysis By: Hayt & Kemmerly - MG.
2. Networks and Systems – D.Roy Chowdary.
3. Unified Electronics (Circuit Analysis and Electronic Devices) byAgarwal- Arora
4. Electric Circuit Analysis- S.R. Paranjothi- New Age International.
5. Integrated Electronics – Millmam & Halkias.
6. Electronic Devices & Circuits – Bogart.
7. Sedha R.S., A Text Book Of Applied Electronics, S.Chand & Company Ltd

SEMESTER-III

COURSE 1: CIRCUIT THEORY AND ELECTRONIC DEVICES

Practical **Credits: 1** **2 hrs/week**

Course Outcomes:

1. Apply concepts of electric network topology, nodes, branches, loops to solvecircuit problems including the use of computer simulation.
2. Apply time and frequency concepts of analysis.
3. Synthesize the network using passive elements.
4. Know about amplifier circuits, switching circuits and oscillator circuits theirdesign and use in electronics.
5. Design and construction of a power supply.

List of Experiments :

1. Thevenin's Theorem-verification
2. Norton's Theorem-verification
3. Maximum Power Transfer Theorem-verification
4. LCR series resonance circuit.
5. BJT input and output characteristics
6. FET Output and transfer characteristics
7. UJT VI characteristics
8. LDR characteristics
9. IC regulated power supply(IC-7805)

Lab experiments are to be done on breadboard and simulation software and output values are to be compared and justified for variation.

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SEMESTER-IV

COURSE 2: DIGITAL ELECTRONICS

Theory **Credits: 3** **3 hrs/week**

Course Objectives:

1. To understand the number systems, Binary codes and Complements.
2. To understand the Boolean algebra and simplification of Booleanexpressions.
3. To analyze logic processes and implement logical operations usingcombinational logic circuits.
4. To understand the concepts of sequential circuits and to analyzesequential systems in terms of state machines.
5. To understands characteristics of memory and their classification.
6. To implement combinational and sequential circuits using VHDL.

Unit – I (9Hrs)

NUMBER SYSTEM AND CODES: Decimal, Binary, Hexadecimal, Octal. Codes: BCD, Gray and Excess-3 codes- code conversions- Complements (1's, 2's,9's and 10's), Addition -Subtraction using complement methods.

Unit- II (9Hrs)

BOOLEAN ALGEBRA AND THEOREMS: Boolean Theorems, De-Morgan's laws. Digital logic gates, Multi level NAND & NOR gates. Standard representation of logic functions (SOPand POS), Minimization Techniques (Karnaugh Map Method: 2,3 variables).

Unit-III (9Hrs)

COMBINATIONAL DIGITAL CIRCUITS:

Adders-Half & full adder, Subtractor-Half and full subtractors, Parallel binary adder, Magnitude Comparator, Multiplexers (4:1)) and Demultiplexers (1:4), Encoder (8-line-to-3- line) and Decoder (3-line-to-8-line).

UNIT-IV (9Hrs)

SEQUENTIAL DIGITAL CIRCUITS:

Flip Flops: S-R FF , J-K FF, T and D type FFs, Master-Slave FFs, Excitation tables, Registers:- Serial In Serial Out and Parallel In and Parallel Out, Counters Asynchronous-,Mod-8,Mod- 10, Synchronous-4-bit &Ring counter.

UNIT- V (9Hrs)

MEMORY DEVICES:

General Memory Operations, ROM, RAM (Static and Dynamic), PROM, EPROM, EEPROM,EAROM,

TEXT BOOKS:

1. M.Morris Mano, " Digital Design " 3rd Edition, PHI, New Delhi.
2. Ronald J. Tocci. "Digital Systems-Principles and Applications" 6/e. PHI.New Delhi. 1999.(UNITS I to IV)
3. G.K.Kharate-Digital electronics-oxford universitypress
4. S.Salivahana&S.Arivazhagan-Digital circuits and design
5. Fundamentals of Digital Circuits by Anand Kumar

Reference Books :

1. Herbert Taub and Donald Schilling. "Digital Integrated Electronics" .McGraw Hill. 1985.
2. S.K. Bose. "Digital Systems". 2/e. New Age International. 1992.
3. D.K. Anvekar and B.S. Sonade. "Electronic Data Converters :Fundamentals & Applications". TMH. 1994.
4. *Malvino and Leach. " Digital Principles and Applications". TMG Hill Edition.*

SEMESTER-IV

COURSE 2: DIGITAL ELECTRONICS

Practical **Credits: 1** **2 hrs/week**

Course Outcomes:

1. Develop a digital logic and apply it to solve real life problems.
2. Analyze, design and implement combinational logic circuits.
3. Classify different semiconductor memories.
4. Analyze, design and implement sequential logic circuits.
5. Simulate and implement combinational and sequential logic circuits using VHDL

LIST OF EXPERIMENTS :

1. Verification of IC-logic gates
2. Realization of basic gates using discrete components (resistor, diodes & transistor)
3. Realization of basic gates using Universal gates (NAND & NOR gates)
4. Verify Half adder and full adder using gates
5. Verify Half subtractor and full subtractor using gates.
6. Verify the truth table Multiplexer and demultiplexer.
7. Verify the truth table Encoder and decoder.
8. Verify the truth table of RS , JK, T-F/F using NAND gates
9. 4-bit binary parallel adder and subtractor using IC 7483
10. BCD to Seven Segment Decoder using IC -7447/7448