SEM3 - ETC - CIRCUIT THEORY [THEORY 2]
4P/Week -15 Weeks, Tot - 60P
(01.10.2021 to 08.01.2022 - Academic Year 2021-22)

Name of the Faculty: Deepika Panda(Lecturer, Electronics)

Week	Class Day	Topics
1st		**Unit-1: Circuit Elements and Energy Sources - (6P)**
	1	1.1 Circuit Elements(Resistance,Inductance,Capacitance),Scope of network analysis & synthesize
	2	1.2 Voltage Division & Current Division,Energy Sources
	3	1.3 Electric charge, electric current,Electrical energy,Electrical potential R-L-C parameters, Active & Passive Elements
	4	1.4 Energy Sources,Current and voltage sources and their transformation & mutual inductance
2nd	1	1.5 Star-Delta transformation
	2	Solving more network examples on above topics
		Unit-2: NETWORK THEOREMS(Application in dc circuits) - (12P)
	3	2.1 Nodal & Mesh Analysis of Electrical Circuits with simple problem(contd…)
	4	2.1.Solving sample circuits on Nodal & Mesh analysis
3rd	3	2.2 Thevenin's Theorem Statement,Explanation & Applications
	4	2.2 Solving examples on thevenin's theorem
	5	2.2 Norton's Theorem Statement,Explanation & Applications
	6	2.2 Solving examples on norton's theorem
4th	1	2.2 Superposition Theorem Statement,Explanation & Applications
	2	2.2 Solving examples on superposition theorem
	3	2.2 Millman Theorem statement,explanation,example solving
	4	2.2 Reciprocity Theorem statement,explanation,example solving
5th	1	2.3 Solve more numericals and doubt's solving
	2	2.3 Solve more numericals and doubt's solving
		Unit-3: Power Relation in AC circuits & Transient Response of passive circuits - (12P)
	3	3.1 Definition of frequency,Cycle,Time period,Amplitude

	4	3.1 Definition of Average Value,RMS value,Instantaneous power & Form Factor
6th	1	3.2 Phasor representation of alternating quantities
	2	3.3 Single Phase AC Circuit Behavious of A.C through pure Resistor,Inductor & Capacitor(contd..)
	3	3.3 (contd..)
	4	3.1 Apparent Power,Reactive Power,Power Triangle of AC Wave
7th	1	3.4 DC Transients-Behaviour of R-L ,
	2	3.4 DC Transients-Behaviour of R-C
	3	3.4 DC Transients-Behaviour R-L-C
	4	3.5 Define Time Constants of the above Circuits
8th	1	3.6 Solve numerical simple problems of above Circuit
	2	3.6 Solve numerical simple problems of above Circuit
	Unit-4: Resonance and Coupled Circuits-(10P)	
	3	4.1 Introduction to resonance circuits & Resonance tuned circuit
	4	4.2 Series & Parallel Resonance
9th	1	4.3 Expression for series resonance,Condition for Resonance,Frequency of Resonance(contd…)
	2	4.3 (contd…) Impedance,Current,Voltage,Power,
	3	4.3(contd…)Q Factor and Power Factor of Resonance, Bandwidth in term of Q
	4	4.4 Parallel Resonance RL derive expression
10th	1	4.4 Parallel Resonance RC) derive expression
	2	4.4 Parallel Resonance (RLC) derive expression
	3	4.5 Comparison of Series & Parallel resonance & applications
	4	4.6 Sample Problems and doubt solving sessions
	Unit-5: Laplace Transform & It's Applications - (8P)	
11th	1	5.1 Laplace Transformation (Introduction),impulse and unit step signal
	2	5.1 Laplace Transformation ,Analysis and derive the equation for circuit parameteres of Step Response of R-L circuit
	3	5.2 Analysis and derive the equation for circuit parameteres of Step Response of R-C circuit
	4	5.2 Analysis and derive the equation for circuit parameteres of Impulse Response of R-L circuit
12th	1	5.2 Analysis and derive the equation for circuit parameteres of Impulse Response of R-C circuit
	2	5.1 Analysis and derive the equation for circuit parameteres of Step Response of R-L-C circuit

	3	5.2 Analysis and derive the equation for circuit parameteres of Impulse Response of R-L-C circuit
	4	Solving more circuits using Laplace transform
13th	**Unit - 6.Two Port Network Analysis - (5P)**	
	1	6.1 Network Elements,ports in Network(One port,two port)
	2	6.2 Network Configurations(T & pie)
	3	6.3 Open Circuit(Z- Paramenters),short Circuit(Y-Parameters) its conversion
	4	6.4 h- parameter representation
14th	1	6.5 Define T-network & Pie- Network
	Unit-7: Filters & Attenuators -(7P)	
	2	7.1Ideal & Practical filters & it's applications,cutoff frequency ,passband and stop band.
	3	7.2 Classification of filters LPF,HPF(Contd….)
	4	7.2 Classification of filters BPF,BSF(Contd….)
15th	1	7.2 Charactirstics of filters
	2	Butterworth Filter Design
	3	7.4 Attenuation and Gain,Bel,Decibel & neper & their relations
	4	7.5 Attenuators & its applications,Classification T-Type & PI-Type attenuators
Total No of Hrs Required For The Course: 60		

3rd SEM - ETC-Digital Electronics [THEORY 3] (4P/Week -15 Weeks, Tot - 60P) (01.10.2021 to 08.01.2022 - Academic Year 2021-22)			
Name of the Faculty: Paramananda Gouda(Lecturer, Electronics)			
WEEKS	No. of Days/per week Class allotted: **4**		Syllabus To be Covered
1ST WEEK	**Unit - 1 : Basics of Digital Electronics [12 Period]**		
	1st	1	Number System-Binary, Octal, Decimal, Hexadecimal
	2nd	2	Conversion from one system to another number system.
	3rd	3	Arithmetic Operation-Addition, Subtraction, Multiplication, Division

	4th	4	1's & 2's complement of Binary numbers& Subtraction using complements method
2ND WEEK	1st	5	Digital Code & its application & distinguish between weighted & non- weight Code, Binary codes, excess-3 and Gray codes.
	2nd	6	Logic gates: AND,OR,NOT,NAND,NOR, Exclusive-OR, Exclusive- NOR--Symbol, Function, expression, truth table & timing diagram
	3rd	7	Universal Gates & its Realisation
	4th	8	Universal Gates & its Realisation
3RD WEEK	1st	9	Boolean algebra, Boolean expressions, Demorgan's Theorems.
	2nd	10	Represent Logic Expression: SOP & POS forms
	3rd	11	Karnaugh map (3 & 4 Variables) & Minimization of logical expressions
	4th	12	Karnaugh map (3 & 4 Variables) don't care conditions
4TH WEEK	**Unit - 2: Combinational Logic Circuits [12 Period]**		
	1st	13	Half adder
	2nd	14	Full adder
	3rd	15	Half Subtractor
	4th	16	Full Subtractor
5TH WEEK	1st	17	Parallel Binary 4 bit adder.
	2nd	18	Serial adder
	3rd	19	Multiplexer (4:1)
	4th	20	De- multiplexer (1:4)
6TH WEEK	1st	21	Decoder, Encoder
	2nd	22	Digital comparator (3 Bit)
	3rd	23	Seven segment Decoder
	4th	24	Seven segment Decoder
7TH WEEK	**Unit-3: Sequential logic Circuits [12 Period]**		
	1st	25	Principle of flip-flops operation, its Types,
	2nd	26	Principle of flip-flops operation, its Types,
	3rd	27	SR Flip Flop using NAND Latch (un clocked)
	4th	28	SR Flip Flop using NOR Latch (un clocked)
8TH WEEK	1st	29	Clocked SR flip-flops-Symbol, logic Circuit, truth table and applications
	2nd	30	Clocked D flip-flops-Symbol, logic Circuit, truth table and applications
	3rd	31	Clocked JK flip-flops-Symbol, logic Circuit, truth table and applications
	4th	32	Clocked T flip-flops-Symbol, logic Circuit, truth table

			and applications
9TH WEEK	1st	33	Clocked JK Master Slave flip-flops-Symbol, logic Circuit, truth table and applications
	2nd	34	Clocked JK Master Slave flip-flops-Symbol, logic Circuit, truth table and applications
	3rd	35	Concept of Racing and how it can be avoided.
	4th	36	Concept of Racing and how it can be avoided.
10TH WEEK	**Unit-4: Registers, Memories & PLD [08 Period]**		
	1st	37	Shift Registers-Serial in Serial -out, Serial- in Parallel-out
	2nd	38	Shift Registers-Parallel in serial out and Parallel in parallel out
	3rd	39	Universal shift registers-Applications. Types of Counter & applications
	4th	40	Binary counter, Asynchronous ripple counter (UP & DOWN)
11TH WEEK	1st	41	Binary counter : Decade counter. Synchronous counter, Ring Counter.
	2nd	42	Binary counter : Ring Counter.
	3rd	43	Concept of memories-RAM, ROM, static RAM, dynamic RAM,PS RAM
	4th	44	Basic concept of PLD & applications
12TH WEEK	**Unit-5: A/D and D/A Converters [07 Period]**		
	1st	45	Necessity of A/D and D/A converters.
	2nd	46	D/A conversion using weighted resistors methods.
	3rd	47	D/A conversion using weighted resistors methods.
	4th	48	D/A conversion using R-2R ladder (Weighted resistors) network.
13TH WEEK	1st	49	D/A conversion using R-2R ladder (Weighted resistors) network.
	2nd	50	A/D conversion using counter method.
	3rd	51	A/D conversion using Successive approximate method
	Unit-6: LOGIC FAMILIES [09 Period]		
	4th	52	Various logic families & categories according to the IC fabrication process
14TH WEEK	1st	53	Various logic families & categories according to the IC fabrication process
	2nd	54	Characteristics of Digital ICs- Propagation Delay, fan-out, fan-in with Reference to logic families.
	3rd	55	Characteristics of Digital ICs- Power Dissipation, Noise

			Margin with Reference to logic families.
	4th	56	Characteristics of Digital ICs- Power Supply requirement with Reference to logic families.
15TH WEEK	1st	57	Characteristics of Digital ICs- Speed with Reference to logic families.
	2nd	58	Features, circuit operation & various applications of TTL (NAND)
	3rd	59	Features, circuit operation & various applications of CMOS (NAND)
	4th	**60**	Features, circuit operation & various applications of CMOS (NOR)

Discipline: Electronics and Telecommunication Engineering	**Semester:3**	**Name of the Teaching Faculty: ER. G.Ch.Behera**
Subject:ELECTRONIC MEASURMENT & INSTRUMENTS	**No. of Days/per week class allotted: 4**	**01.10.2021 to 08.01.2022 - Academic Year 2021-22** **No.of Weeks:15**
Week	**Class Day**	**Theory Topics**
	CHAPTER 1:QUALITIES OF INSTRUMENT	
1st	1st (1)	DISCUSS STATIC CHARACTERSTICS
	2nd (2)	ACCURACY,SENSITIVITY,ERRORS
	3rd (3)	DYNAMIC CHARACTERSTICS
	4th (4)	ERRORS OF INSTRUMENT
2nd	1st (5)	SPEED OF INSTRUMENTS
	CHAPTER 2:INDICATING INSTRUMENT	
	2nd (6)	INTRODUCTION OF INDICATOR, TYPES
	3rd (7)	PRINCIPAL OF INDICATING INSTRUMENT
	4th (8)	PMMC INSTRUMENTS

3rd	1st (9)	MI INSTRUMENTS
	2nd (10) ,	AC AND DC AMMETER
	3rd (11)	AC AND DC VOLTMETER
	4th (12)	SERIES AND SHUNT OHNMETER
4th	1st (13)	ANALOG MULTIMETER AND ITS APPLICATIONS
	2nd (14)	DIGITAL TACHOMETER,MEASUREMENT OF FREQUENCY
	3rd (15)	Q METER
	CHAPTER 3: DIGITAL INSTRUMENT	
	4th (16)	PRINCIPLE OF DIGITAL VOLTMETER
5th	1st (17)	RESOLUTION AND SENSITIVITY OF DVM
	2nd (18)	WORKING AND APPLICATION OF DVM
	3rd (19)	OPERATION OF DIGITAL VOLTMETER
	4th (20)	MEASURMENT OF TIME
6th	1sT (21)	DIGITAL FREQUENCY METER
	2nd (22)	OPERATION OF DIGITAL TACHOMETER
	3rd (23)	MEARUMENT OF FREQUENCY
	4th (24)	OPERATION OF WORKING OF AUTOMATION IN DM
7th	1st (25)	BLOCK DIAGRAM OF LCR METER
	CHAPTER 4: OSCILLOSCOPE	
	2nd (26)	BLOCK DIAGRAM OF CRO
	3rd (27)	OPERATION OF CRO
	4th (28)	DUAL TRACE CRO

8th	1st (29)	LISSAJOUS FIGURE
	2nd (30)	MEASUREMENT OF AMPLITUDE, FREQUENCY USING CRO
	3rd (31)	APPLICATION OF OSCILLOSCOPE
	4th (32)	BLOCK DIAGRAM OF DSO
9th	1st (33)	OPERATION OF DSO
	CHAPTER 5:BRIDGES	
	2nd (34)	TYPES OF BRIDGES
	3rd (35)	WHEATONE BRIDGE
	4th (36)	MAXWELL'S BRIDGE
10th	1st (37)	DESAUTY'S BRIGDE
	2nd (38)	SCHERING BRIDGE
	3rd (39)	HAY'S BRIDGE
	4th (40)	Q METER CIRCUIT DIAGRAM
11th	1st (41)	MEASUREMENT OF IMPEDANCE
	2nd (42)	LCR METER
	3rd (43)	APPLICATION OF BRIDGES,
	4th (44)	FREQUENCY MEASUREMENT
	CHAPTER 6 TRANDUCER AND SENSOR	
12th	1st (45)	PARAMETER, METHOD OF SELECTING OF ELECTRICAL TRANSDUCER & RESISTIVE
	2nd (46)	WORKING PRINCIPLE OF STRAIN GAUGES, DEFINE STRAIN GAUGE
	3rd (47)	WORKING PRINCIPLE OF LVDT
	4th (48)	ADVANTAGE OF ELECTRICAL TRANSDUCER,STAIN GUAGE, LVDT

13th	1st (49)	WORKING PRINCIPLE OF CAPACITIVE TRANSDUCERS (PRESSURE)
	2nd (50)	WORKING PRINCIPLE OF LOAD CELL (PRESSURE CELL)
	3rd (51)	WORKING PRINCIPLE OF TEMPERATURE TRANSDUCER (RTD)
	4th (52)	OPTICAL PYROMETER, THERMOCOUPLE
14th	1st (53)	WORKING PRINCIPLE OF CURRENT TRANSDUCER AND KW TRANSDUCER.
	2nd, (54)	WORKING PRINCIPLE OF PROXIMITY & LIGHT SENSORS
	CHAPTER 7: SIGNAL GENERATOR AND WAVE ANALYSER	
	3rd (55)	CLASSIFICATION OF SIGNAL GENERATOR
	4th (56)	WAVE ANALYSER
15th	1st (57)	WORKING OF AF SINE
	2nd, (58)	SQUARE WAVE GENERATOR
	3rd (59)	FUNCTION OF WAVE ANALYSER
	4th (60)	BASIC CONCEPT OF DATA ACQUISITION SYSTEM (DAS)

Discipline: Electronics and Telecommunication Engineering	**Semester:3rd**	**Name of the Teaching Faculty: Er.JYOTI PATRA & Er. Poonam Panda**
Subject:TH5 Environmental studies	**No. of Days/per week class allotted: 4**	**Semester Duration: 01-10-2021 to 8-01-2022SEPTEMBER 2022 To Date: 22NDDECEMBER 2022 No.of Weeks:15**
Week	**Class Day**	**Theory Topics**
		UNIT 1:The Multidisciplinary nature of environmental studies
1st	1st (1)	Definition & introduction of environment

	2nd (2)	scope of environment
	3rd (3)	importance of environment
	4th (4)	Need for public awareness
2nd		**UNIT 2:Natural Resources**
	1st (5)	Forest resources
	2nd (6)	water resources
	3rd (7)	Mineral &food Resources
	4th (8)	Energy & land Resources
3rd	1st (9)	Land Resources: Land resource
	2nd (10)	land degradation,man induces land slides
	3rd (11)	Soil erosion
	4th (12)	desertification
4th	1st (13)	Role of individual in conservation of natural resources.
	2nd (14)	Equitable use of resources for sustainable life styles
		UNIT 3:SYSTEM
	3rd (15)	Concept of an eco system.
	4th (16)	Structure and function of an eco system.
5th	1st (17)	Producers, consumers,
	2nD (18)	decomposers & food chain
	3rd (19)	Energy flow in the eco systems
	4th (20)	Ecological succession.
6th	1st (21)	Introduction, types, characteristic features of the Forest ecosystem
	2nd (22)	structure and function of theForest ecosystem
	3rd (23)	Introduction, types, characteristic features of the aquatic ecosystem
	4th (24)	structure and function of the Aquatic ecosystems
7th	1st (25)	Biogeographically classification of India.
	2nd (26)	Value of biodiversity: consumptive use,
	3rd (27)	productive use, social ethical
	4th (28)	Biodiversity at global, national and local level.
8th	1st (29)	Threats to biodiversity: Habitats loss,
	2nd (30)	poaching of wild life, man wildlife conflicts.
		UNIT 5:Environmental Pollution:
	3rd (31)	Air pollution.

	4th	(32)	water pollution.
9th	1st	(33)	soil pollution.
	2nd	(34)	marine pollution.
	3rd	(35)	noise pollution.
	4th	(36)	thermal pollution.
10th	1st	(37)	nuclear hazards
	2nd	(38)	Solid waste Management:Causes, effects
	3rd	(39)	control measures of urban and industrial wastes.
	4th	(40)	Role of an individual in prevention of pollution
11th	1st	(41)	Disaster management:flood,drought
	2nd	(42)	land slide,earth quake
			UNIT 6:Social issues and the Environment:
	3rd	(43)	Form unsustainable to sustainable development
	4th	(44)	Urban problems related to energy.
12th	1st	(45)	water shed management
	2nd	(46)	water conservation
	3rd	(47)	rain water haevesting
	4th	(48)	Resettlement and rehabilitation of people; its problems and concern.
13th	1st	(49)	Environmental ethics: issue and possible solutions
	2nd	(50)	Climate change, global warming, acid rain,
	3rd	(51)	ozone layer depletion, nuclear accidents and holocaust, case studies
			unit 7:Human population and the environment
	4th	(52)	water act,air act
14th	1st	(53)	public awareness
	2nd	(54)	Population growth and variation among nations.
	3rd	(55)	Population explosion- family welfare program
	4th	(56)	Environment and humanhealth.
15th	1st	(57)	Human rights
	2nd	(58)	value education
	3rd	(59)	Role of information technology in environment .
	4th	(60)	Role of information technology in human health.

LESSON PLAN - SEM-5

SESSION:01-10-2021-08-01-2022
ACADEMIC YEAR: 2021-22

Discipline: ETC	**Semester: 5th**		**Name of the teaching faculty: JYOTI PATRA & POONAM PANDA**
Subject:TH 1 Entrepreneurship and Management & Smart Technology	**No. of Days/per week class allotted: 4**		**SESSION:01-10-2021-08-01-2022** **ACADEMIC YEAR: 2021-22** **No.of Weeks: 15**
Week	**SN**	**Class Day**	**Theory Topics**
	UNIT 1:- Entrepreneurship [10 Periods]		
1st	1	1st	Concept and need of Entrepreneurship
	2	2nd	Characteristics and Qualities of entrepreneur
	3	3rd	Types and Functions of entrepreneur
	4	4th	Barriers in entrepreneurship,Entrepreneurs vs. Manager
2nd	5	1st	Forms of Business Ownership: Sole proprietorship, partnership forms and others
	6	2nd	Forms of Business Ownership: others
	7	3rd	Types of Industries, Concept of Start-ups
	8	4th	Entrepreneurial support agencies at National, State, District Level: DIC, NSIC,OSIC
3rd	9	1st	Entrepreneurial support agencies: SIDBI, NABARD, Commercial Banks, KVIC etc
	10	2nd	Technology Business Incubators and Science and Technology Entrepreneur Parks
	UNIT 2:- Market Survey and Opportunity Identification (Business Planning) [8 Periods]		
	11	3rd	Business Planning

	12	4th	SSI, Ancillary Units, Tiny Units, Service sector Units
4th	13	1st	Time schedule Plan for Project Implementation
	14	2nd	Agencies to be contacted for Project Implementation
	15	3rd	Assessment of Demand and supply
	16	4th	Potential areas of Growth
5th	17	1st	Identifying Business Opportunity
	18	2nd	Final Product selection
	UNIT 3:- Project report Preparation [4 Periods]		
	19	3rd	Preliminary project report
	20	4th	Detailed project report
6th	21	1st	Techno economic Feasibility
	22	2nd	Project Viability
	UNIT 4:- Management Principles [5 Periods]		
	23	3rd	Definitions of management
	24	4th	Principles of management
7th	25	1st	Functions of management (planning, organising, staffing)
	26	2nd	Functions of management (directing and controlling etc.)
	27	3rd	Level of Management in an Organisation
	UNIT 5:- Functional Areas of Management [10 Periods]		
	28	4th	a) Production management:Functions, Activities,Productivity,Quality control
8th	29	1st	Production Planning and control
	30	2nd	b) Inventory Management:Need and Techniques of Inventory management
	31	3rd	c) Financial Management:Functions,Management of Working capital,Costing
	32	4th	Break even Analysis,Brief idea about Accounting Terminologies
9th	33	1st	d) Marketing Management:Concept of Marketing and Marketing Management
	34	2nd	Marketing Techniques (only concepts), Concept of 4P's

	35	3rd	e) Human Resource Management:Functions of Personnel Management
	36	4th	Manpower Planning, Recruitment, Sources of manpower, Selection process,
10th	37	1st	Method of Testing, Methods of Training & Development, Payment of Wages
	UNIT 6:-Leadership and Motivation [6 Periods]		
	38	2nd	Leadership :Definition and Need/Importance,Qualities and functions of a leader
	39	3rd	Manager Vs Leader,Style of Leadership (Autocratic, Democratic, Participative)
	40	4th	b) MotivationDefinition and characteristics,Importance, Factors affecting motivation
11th	41	1st	Theories of motivation (Maslow),Methods of Improving Motivation
	42	2nd	Importance of Communication in Business
	43	3rd	Types and Barriers of Communication
	UNIT 7:- Work Culture, TQM & Safety [5 Periods]		
	44	4th	Human relationship and Performance in Organization
12th	45	1st	Relations with Peers, Superiors and Subordinates
	46	2nd	TQM concepts: Quality Policy, Quality Management, Quality system
	47	3rd	Accidents and Safety, Cause, preventive measures
	48	4th	General Safety Rules , Personal Protection Equipment(PPE)
13th	**UNIT 8:- Legislation [6 Periods]**		
	49	1st	a)Intellectual Property Rights(IPR),
	50	2nd	Patents
	51	3rd	Trademarks
	52	4th	Copyrights
14th	53	1st	b) Features of Factories Act 1948 with Amendment (only salient points)
	54	2nd	c) Features of Payment of Wages Act 1936 (only salient points)
	UNIT 9:- Smart Technology [6 Periods]		
	55	3rd	Concept of IOT, How IOT works
	56	4th	Components of IOT, Characteristics of IOT

15th	57	1st	Categories of IOT
	58	2nd	Applications of IOT- Smart Cities, Smart Transportation
	59	3rd	Applications of IOT- Smart Home, Smart Healthcare, Smart Industry,
	60	4th	Applications of IOT- Smart Agriculture, Smart Energy Management etc.

Lesson Plan		Teaching Faculty**: Gopal Chandra Behera, Lecturer (Electronics)**
Total Periods**: 60** Periods/Week**: 4**		Subject: **VLSI & EMBEDDED SYSTEM** Subject Code: **TH2** Branch: **Electronics & Telecommunication Engineering**
Week	**No of Periods Allotted (60)**	**Syllabus To be Covered**
	1. Introduction to VLSI & MOS Transistor	
	1.1	Historical perspective- Introduction
1ST	**1.2**	Classification of CMOS digital circuit types
	1.3	Introduction to MOS Transistor& Basic operation of MOSFET.
	1.4	Structure and operation of MOSFET (n-MOS enhancement type) & CMOS
2ND	**1.5**	MOSFET V-I characteristics.
	1.6	Working of MOSFET capacitances.
	1.7	Modelling of MOS Transistors including Basic concept the SPICE level-1 models, the level-2 and level-3 model.
	1.8	Flow Circuit design procedures
3RD	**1.9**	VLSI Design Flow & Y chart
	1.10	Design Hierarchy
	1.11	VLSI design styles-FPGA, Gate Array Design, Standard cells based, Full custom
	1.11	VLSI design styles-FPGA, Gate Array Design, Standard cells based, Full custom
4TH	2. **Fabrication of MOSFET**	
	2.1	Simplified process sequence for fabrication
	2.2	Basic steps in Fabrication processes Flow
	2.3	Fabrication process of nMOS Transistor
	2.4	CMOS n-well Fabrication Process Flow
5TH	**2.5**	MOS Fabrication process by n-well on p-substrate
	2.5	MOS Fabrication process by n-well on p-substrate
	2.6	CMOS Fabrication process by P-well on n-substrate

	2.6	CMOS Fabrication process by P-well on n-substrate
6TH	**2.7**	Layout Design rules
	2.8	Stick Diagrams of CMOS inverter
	3. **MOS Inverter**	
	3.1	Basic NMOS inverters
	3.2	Working of Resistive-load Inverter
7TH	**3.2**	Working of Resistive-load Inverter
	3.3	Inverter with n-Type MOSFET Load – Enhancement Load, Depletion n-MOS inverter
	3.3	Inverter with n-Type MOSFET Load – Enhancement Load, Depletion n-MOSinverter
	3.4	CMOS inverter – circuit operation and characteristics and interconnect effects: Delay time definitions
	3.4	CMOS inverter – circuit operation and characteristics and interconnect effects: Delay time definitions
8TH	**3.5**	CMOS Inventor design with delay constraints – Two sample mask lay out for p-type substrate
	3.5	3.5 CMOS Inventor design with delay constraints – Two sample mask lay out for p-type substrate
	4. **Static Combinational, Sequential, Dynamics logic circuits & Memories**	
	4.1	Define Static Combinational logic, working of Static CMOS logic circuits(Two-input NAND Gate)
9TH	**4.2**	CMOS logic circuits (NAND2) Gate
	4.3	CMOS Transmission Gates (Pass gate)
	4.3	CMOS Transmission Gates (Pass gate)
	4.4	Complex Logic Circuits - Basics
10TH	**4,5**	Classification of Logic circuits based on their temporal behaviour
	4.6	SR Flip latch Circuit
	4.6	SR Flip latch Circuit
	4.7	Clocked SR latch only.
	4.7	Clocked SR latch only.
	4.8	CMOS D latch.
	4.9	Basic principles of Dynamic Pass Transistor Circuits
	4.10	Dynamic RAM, SRAM
12TH	**4.10**	Dynamic RAM, SRAM
	4.11	Flash memory
	5. **System Design method & synthesis**	
	5.1	Design Language (SPL & HDL) & HDL & EDA tools & VHDL and packages Xilinx
	5.2	Design strategies & concept of FPGA with standard cell-based design
	5.3	VHDL for design synthesis using CPLD or FPGA

		5.4	Raspberry Pi - Basic idea
		6. **Introduction to Embedded Systems**	
		6.1	Embedded Systems Overview, list of embedded systems, characteristics, example – A Digital Camera
		6.1	Embedded Systems Overview, list of embedded systems, characteristics, example – A Digital Camera
	14TH	**6.2**	Embedded Systems Technologies--Technology – Definition -Technology for Embedded Systems -Processor Technology -IC Technology
		6.2	Embedded Systems Technologies--Technology – Definition -Technology for Embedded Systems -Processor Technology -IC Technology
		6.3	Design Technology-Processor Technology, General Purpose Processors – Software, Basic Architecture of Single Purpose Processors – Hardware
		6.3	Design Technology-Processor Technology, General Purpose Processors – Software, Basic Architecture of Single Purpose Processors – Hardware
		6.4	Application – Specific Processors, Microcontrollers, Digital Signal processors(DSP)
15TH		**6.5**	IC Technology- Full Custom / VLSI, Semi-Custom ASIC (Gate Array & Standard Cell), PLD (Programmable Logic Device)
		6.5	IC Technology- Full Custom / VLSI, Semi-Custom ASIC (Gate Array & Standard Cell), PLD (Programmable Logic Device)
		6.6	Basic idea of Arduino micro controller

Discipline: Electronics and Telecommunication Engineering	**Semester: 5TH**	**Name of the Teaching Faculty:** **Jyoti Patra and Paramananda Gouda**
Subject:TH3 ANALOG & DIGITAL COMMUNICATION	**No. of Days/per week class allotted: 5**	**SESSION:01-10-2021-08-01-2022** **ACADEMIC YEAR: 2021-22** **No.of Weeks:15**
Week	**Class Day**	**Theory Topics**
		UNIT 1: Elements of Communication Systems

1st	1st (1)	Communication Process (Communication System elements and Block diagram)
	2nd (2)	Source of information & Communication Channels.
	3rd (3)	Classification of Communication systems (Line and wireless)
	4th (4)	wireless communication system
	5th (5)	Modulation Process, Need of modulation
2nd	1st (6)	Digital Signals & its conversion
	2nd (7)	classify modulation process
	3rd (8)	Basic concept of Signals & classification (Analog and Digital)
	4th (9)	Analog Signals & its conversion
	5th (10)	Bandwidth limitation
3rd		**UNIT 2: Amplitude (linear) Modulation System**
	1st	Amplitude modulation
	(11)	
	2nd (12)	Derive the expression for amplitude modulation signal
	3rd (13)	power relation in AM wave & find Modulation Index
	4th (14)	Generation of Amplitude Modulation(AM)- Linear level AM modulation only
	5th (15)	Demodulation of AM waves (liner diode detector)
4th	1st (16)	square law detector
	2nd (17)	Phase locked loop
	3rd (18)	SSB signal
	4th (19)	DSBSC signal
	5th (20)	Methods of generating & detection SSB-SC signal (Indirect method only)
5th	1st (21)	Methods of generation DSB-SC signal (Ring Modulator)
	2nd (22)	Detection of DSB-SC signal (Synchronous detection)
	3rd (23)	Concept of Balanced modulators
	4th (24)	Vestigial Side Band Modulation

	5th (25)	compare SSB,DSB and VSB

6th		**UNIT 3: Angle Modulation Systems**
	1st (26)	Concept of Angle modulation & its types (PM & FM)
	2nd (27)	Basic principle of Frequency Modulation & its Frequency Spectrum
	3rd (28)	Expression for Frequency Modulated Signal & Modulation Index and sideband of FM signal
	4th (29)	Explain Phase modulation - working principle with Block Diagram
	5th (30)	Difference of FM & PM
7th	1st (31)	Compare between AM and FM modulation (Advantages & Disadvantages)
	2nd (32)	Methods of FM Generation (Armstrong method with block diagram)
	3rd	working principle (Armstrong)
	(33)	
	4th (34)	Methods of FM Demodulator
	5th (35)	Forster-Seely & Ratio detector)- working principle with Block Diagram
8th		**UNIT 4: AM & FM Transmitter & Receiver**
	1st (36)	Classification of Radio Receivers
	2nd (37)	Terms Selectivity, Sensitivity, Fidelity and Noise Figure
	3rd (38)	AM transmitter (working with Block Diagram)
	4th (39)	Concept of Frequency conversion
	5th (40)	RF amplifier & IF amplifier
9th	1st (41)	Tuning, S/N ratio
	2nd (42)	super heterodyne radio receiver
	3rd (43)	FM Transmitter & Receiver with Block Diagram.
		UNIT 5: Analog To Digital Conversion & Pulse Modulation System
	4th (44)	Concept of Sampling Theorem
	5th (45)	Nyquist rate & Aliasing

10th	1st (46)	Sampling Techniques (Instantaneous, Natural, Flat Top)
	2nd (47)	Analog Pulse Modulation
	3rd (48)	Generation of PAM, PWM & PPM system
	4th (49)	detection of PAM, PWM & PPM system
	5th (50)	comparison of all system
11th	1st (51)	Concept of Quantization of signal & Quantization error
	2nd (52)	Generation of of PCM system
	3rd (53)	Demodulation of PCM system
	4th	applications of PCM
	(54)	
	5th (55)	Companding in PCM & Vocoder
12th	1st (56)	Time Division Multiplexing
	2nd (57)	TDM operation with circuit diagram
	3rd (58)	Generation & demodulation of Delta modulation
	4th (59)	Generation & demodulation of DPCM
	5th (60)	Comparison between PCM, DM , ADM & DPCM
13th		**UNIT 6: Digital Modulation Techniques**
	1st (61)	Concept of Multiplexing(TDM & FDM)
	2nd (62)	Transmitter & Receiver
	3rd (63)	Digital modulation formats
	4th (64)	Advantages of digital communication system
	5th (65)	Digital modulation techniques & types.
14th	1st (66)	Generation and Detection of binary ASK, FSK
	2nd (67)	Generation and Detection of binary PSK, QPSK
	3rd (68)	Generation and Detection of binary QAM, MSK, GMSK
	4th (69)	Working of T1-Carrier system

	5th (70)	Spread Spectrum & its applications
15th	1st (71)	Working operation of Spread Spectrum Modulation(DS-SS)
	2nd (72)	Working operation of Spread Spectrum Modulation(FH-SS)
	3rd (73)	Define bit, Baud, symbol,channel capacity formula (Shannon Theorems)
	4th (74)	Application of Different Modulation Schemes
	5th (75)	Types of Modem & its Application

5TH SEM - ETC- Wave Propagation and Broadband Communication Engineering [THEORY 4]
(4P/Week -15 Weeks, Tot - 60P)
(1.10.2021 to 8.1.2022 - Academic Year 2021-22)

Name of the Faculty: Deepika Panda(Lecturer, Electronics)

WEEK	Class Day	TOPICS
1ST		**Unit-1: WAVE PROPAGATION & ANTENNA [12 Periods]**
	1	Effects of environments such as reflection, refraction, interference, diffraction, absorption and attenuation (Definition only)
	2	Classification based on Modes of Propagation-Ground wave, Ionosphere
	3	Sky wave propagation, Spacewave propagation
	4	Definition – critical frequency, max. useable frequency, skip distance, fading
2ND	1	Definition – Duct propagation & Troposphere scatter propagation actual height and virtual height
	2	Radiation mechanism of an antenna-Maxwell equation
	3	Definition - Antenna gains, Directive gain, Directivity, effective aperture, polarization, input impedance,
	4	Definition-efficiency, Radiator resistance, Bandwidth, Beam width, Radiation pattern

3RD	1	Antenna -types of antenna: Mono pole and dipole antenna and omni directional antenna
	2	Operation of following antenna with advantage & applications. a) Directional high frequency antenna :Yagi & Rohmbus only
	3	Operation of following antenna with advantage & applications. b) UHF &Microwave antenna.: Dish antenna (with parabolic reflector) & Horn antenna
	4	Basic Concepts of Smart Antennas- Concept and benefits of smart antennas
4TH	**Unit-2: TRANSMISSION LINES. [10 periods]**	
	1	Fundamentals of transmission line.
	2	Equivalent circuit of transmission line ,General equivalent circuit &RF equivalent circuit
	3	Characteristics impedance, methods of calculations
	4	Characteristics impedance, simple numerical
5th	1	Losses in transmission line
	2	Standing wave – SWR, VSWR
	3	Reflection coefficient, simple numerical.
	4	Quarter wave & half wavelength line
6TH	1	Impedance matching & Stubs – single & double
	2	Derive equation for primary & secondary constant of X-mission line.
	Unit-3: TELEVISION ENGINEERINg [13 periods]	
	3	State and explain the following terms.- Aspect ratio, Rectangular Switching. Flicker,Resolution,
	4	State and explain the following terms.-Resolution, Video bandwidth, Interlaced scanning
7th	1	State and explain the following terms.- Composite video signal, Synchronization pulses
	2	Draw the block diagram of TV transmitter and explain the function of each block.
	3	Draw the block diagram of TV transmitter and explain the function of each block.
	4	Draw the block diagram of Monochrome TV Receiver and explain the function of each block.
	1	Draw the block diagram of Monochrome TV Receiver and explain the function of each block.
	2	Colour TV signals (Luminance Signal & Chrominance Signal,(I & Q,U & V Signals)

8th	3	Types of Televisions by Technology- cathode-ray tube TVs, Plasma Display Panels, Digital Light Processing (DLP),Liquid Crystal Display (LCD),Organic Light-Emitting Diode (OLED) Display, Quantum Light-Emitting Diode (QLED) – only Comparison based on application
	4	Types of Televisions by Technology- cathode-ray tube TVs, Plasma Display Panels, Digital Light Processing (DLP),Liquid Crystal Display (LCD),Organic Light-Emitting Diode (OLED) Display, Quantum Light-Emitting Diode (QLED) – only Comparison based on application
9TH	1	Discuss the principle of operation - LCD display, Large Screen Display
	2	CATV systems & Types & networks
	3	Explain (Digital TV Signals, Transmission of digital TV signals & Digital TV receivers Video programme processor unit.
	Unit-4: MICROWAVE ENGINEERING [15 periods]	
	4	Define Microwave Wave Guides.
10TH	1	Explain the operation of rectangular wave gives and its advantage.
	2	Explain the operation of rectangular wave gives and its advantage.
	3	Discuss propagation of EM wave through wave guide with TE&TM modes.
	4	Discuss propagation of EM wave through wave guide with TE&TM modes.
11TH	1	Explain circular wave guide.
	2	Discuss the operational Cavity resonator.
	3	Discuss the operational Cavity resonator.
	4	Discuss the operational of Directional coupler,Isolators & Circulator.
12TH	1	Discuss the operational of Directional coupler,Isolators & Circulator.
	2	Discuss the principle of operational of two Cavity Klystron.
	3	Discuss the principle of Travelling Wave Tubes
	4	Discuss the principle of Cyclotron
13TH	1	Discuss the principle of Tunnel Diode
	2	Discuss the principle of Gunn Diode
	Unit-5: BROADBAND COMMUNICATION [10 periods]	
	3	Fundamental concepts Components of Broadband communication system,
	4	Network architecture of Broadband communication system,
	1	Cable broadband data network architecture, importance & future of broadband telecommunication internet based network.
	2	Cable broadband data network architecture, importance & future of broadband telecommunication internet based network.

14TH	3	SONET(Synchronous Optical Network)-Signal frame components topologies advantages applications,and disadvantages
	4	SONET(Synchronous Optical Network)-Signal frame components topologies advantages applications,and disadvantages
15TH	1	ISDN - ISDN Devices interfaces, services, Architecture, applications
	2	ISDN - ISDN Devices interfaces, services, Architecture, applications
	3	BISDN -interfaces & Terminals, protocol architecture applications
	4	BISDN -interfaces & Terminals, protocol architecture applications
	TOTAL CLASSES = 60 (15 WEEKS,4 CLASSES/WEEK)	

Discipline: **5th SEM ELECTRONICS** and Telecommunication Engineering			Name of the Teaching Faculty: **Er. DEBI PRASAD PATNAIK**
Subject: - **TH - 5 Power Electronics & PLC**	No. of days per week class allotted: **04**		Semester From Date: **01.10.2021 To 08.1.2022** No. of Weeks: **15**
WEEKS	No. of Days/per week Class allotted: **4**		Syllabus To be Covered
	1. UNDERSTAND THE CONSTRUCTION AND WORKING OF POWER ELECTRONIC DEVICES [18 Periods]		
1ST WEEK	1st	1	1.1 Construction, Operation, V-I characteristics & application of power diode
	2nd	2	1.1 Construction, Operation, V-I characteristics & application of SCR
	3rd	3	1.1 Construction, Operation, V-I characteristics & application of DIAC, TRIAC
	4th	4	1.1 Construction, Operation, V-I characteristics & application of Power MOSFET,GTO & IGBT
2ND WEEK	1st	5	1.2 Two transistor analogy of SCR.
	2nd	6	1.3 Gate characteristics of SCR.
	3rd	7	1.4 Switching characteristic of SCR during turn on and turn off.
	4th	8	1.5 Turn on methods of SCR.
	1st	9	1.6 Turn off methods of SCR (Line commutation and Forced commutation)

3RD WEEK	2nd	10	1.6.1 Load Commutation, 1.6.2 Resonant pulse commutation
	3rd	11	1.7 Voltage and Current ratings of SCR. 1.8 Protection of SCR
	4th	12	1.8.1 Over voltage protection, 1.8.2 Over current protection, 1.8.3 Gate protection
4TH WEEK	1st	13	1.9 Firing Circuits, 1.9.1 General layout diagram of firing circuit
	2nd	14	1.9.2 R firing circuits
	3rd	15	1.9.3 R-C firing circuit
	4th	16	1.9.4 UJT pulse trigger circuit
5TH WEEK	1st	17	1.9.5 Synchronous triggering (Ramp Triggering)
	2nd	18	1.10 Design of Snubber Circuits
	2. UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS.		
	3rd	19	2.1 Controlled rectifiers Techniques (Phase Angle, Extinction Angle control),
	4th	20	2.1 Single quadrant semi converter, two quadrant full converter and dual Converter
6TH WEEK	1st	21	2.2 Working of single-phase half wave controlled converter with Resistive and R-L loads.
	2nd	22	2.3 Understand need of freewheeling diode.
	3rd	23	2.4 Working of single phase fully controlled converter with resistive and R- Lloads.
	4th	24	2.5 Working of three-phase half wave controlled converter with Resistive load
7TH WEEK	1st	25	2.6 Working of three phase fully controlled converter with resistive load.
	2nd	26	2.7 Working of single phase AC regulator.
	3rd	27	2.8 Working principle of step up & step down chopper.
	4th	28	2.9 Control modes of chopper

8TH WEEK	1st	29	2.10 Operation of chopper in all four quadrants.
	2nd	30	2.10 Operation of chopper in all four quadrants.
	3. UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS		
	3rd	31	3.1 Classify inverters.
	4th	32	3.2 Explain the working of series inverter.
9TH WEEK	1st	33	3.3 Explain the working of parallel inverter
	2nd	34	3.4 Explain the working of single-phase bridge inverter.
	3rd	35	3.5 Explain the basic principle of Cyclo-converter.
	4th	36	3.6 Explain the working of single-phase step up Cyclo-converter.
10TH WEEK	1st	37	3.6 Explain the working of single-phase step down Cyclo-converter.
	2nd	38	3.7 Applications of Cyclo-converter.
	4. UNDERSTAND APPLICATIONS OF POWER ELECTRONIC CIRCUITS		
	3rd	39	4.1 List applications of power electronic circuits.
	4th	40	4.2 List the factors affecting the speed of DC Motors.
11TH WEEK	1st	41	4.3 Speed control for DC Shunt motor using converter.
	2nd	42	4.4 Speed control for DC Shunt motor using chopper.
	3rd	43	4.5 List the factors affecting speed of the AC Motors.
	4th	44	4.6 Speed control of Induction Motor by using AC voltage regulator.
	1st	45	4.7 Speed control of induction motor by using converters and inverters (V/Fcontrol).
	2nd	46	4.8 Working of UPS with block diagram.

12TH WEEK	3rd	47	4.9 Battery charger circuit using SCR with the help of a diagram.
	4th	48	4.10 Basic Switched mode power supply (SMPS) - explain its working & applications
13TH WEEK	**5. PLC AND ITS APPLICATIONS**		
	1st	49	5.1 Introduction of Programmable Logic Controller(PLC), 5.2 Advantages of PLC
	2nd	50	5.3 Different parts of PLC by drawing the Block diagram and purpose of each partof PLC. 5.4 Applications of PLC
	3rd	51	5.5 Ladder diagram
	4th	52	5.6 Description of contacts and coils in the following states i)Normally open ii)Normally closed iii) Energized output iv)latched Output v) branching
14TH WEEK	1st	53	5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate.
	2nd	54	5.8 Ladder diagrams for combination circuits using NAND, NOR, AND, OR andNOT Gates
	3rd	55	5.9 Timers-i)T ON ii) T OFF and iii)Retentive timer
	4th	56	5.10 Counters-CTU, CTD 5.11 Ladder diagrams using Timers and counters
15TH WEEK	1st	57	5.12 PLC Instruction set
	2nd	58	5.13 Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii)Stair case lighting
	3rd	59	5.13 Ladder diagrams for following (iii) Traffic light Control (iv) TemperatureController
	4th	**60**	5.14 Special control systems- Basics DCS & SCADA systems 5.15 ComputerControl–Data Acquisition, Direct Digital Control System (Basics only)