

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		Semester From Date: 15 Sept,2022 To Date: 22 Dec,2022 No.of Weeks: 15
Week	SN	Class Day	Theory Topics
	UNIT 1:- Entrepreneurship [10 Periods]		
1st	1	1 st	Concept and need of Entrepreneurship
	2	2 nd	Characteristics and Qualities of entrepreneur
	3	3 rd	Types and Functions of entrepreneur
	4	4 th	Barriers in entrepreneurship,Entrepreneurs vs. Manager
2nd	5	1 st	Forms of Business Ownership: Sole proprietorship, partnership forms and others
	6	2 nd	Forms of Business Ownership: others
	7	3 rd	Types of Industries, Concept of Start-ups
	8	4 th	Entrepreneurial support agencies at National, State, District Level: DIC, NSIC,OSIC
3rd	9	1 st	Entrepreneurial support agencies: SIDBI, NABARD, Commercial Banks, KVIC etc
	10	2 nd	Technology Business Incubators and Science and Technology Entrepreneur Parks
	UNIT 2:- Market Survey and Opportunity Identification (Business Planning) [8 Periods]		
	11	3 rd	Business Planning
	12	4 th	SSI, Ancillary Units, Tiny Units, Service sector Units
4th	13	1 st	Time schedule Plan for Project Implementation
	14	2 nd	Agencies to be contacted for Project Implementation
	15	3 rd	Assessment of Demand and supply
	16	4 th	Potential areas of Growth
5th	17	1 st	Identifying Business Opportunity
	18	2 nd	Final Product selection

	UNIT 3:- Project report Preparation [4 Periods]		
	19	3 rd	Preliminary project report
	20	4 th	Detailed project report
6th	21	1 st	Techno economic Feasibility
	22	2 nd	Project Viability
	UNIT 4:- Management Principles [5 Periods]		
	23	3 rd	Definitions of management
	24	4 th	Principles of management
7th	25	1 st	Functions of management (planning, organising, staffing)
	26	2 nd	Functions of management (directing and controlling etc.)
	27	3 rd	Level of Management in an Organisation
	UNIT 5:- Functional Areas of Management [10 Periods]		
	28	4 th	a) Production management:Functions, Activities,Productivity,Quality control
8th	29	1 st	Production Planning and control
	30	2 nd	b) Inventory Management:Need and Techniques of Inventory management
	31	3 rd	c) Financial Management:Functions,Management of Working capital,Costing
	32	4 th	Break even Analysis,Brief idea about Accounting Terminologies
9th	33	1 st	d) Marketing Management:Concept of Marketing and Marketing Management
	34	2 nd	Marketing Techniques (only concepts), Concept of 4P's
	35	3 rd	e) Human Resource Management:Functions of Personnel Management
	36	4 th	Manpower Planning, Recruitment, Sources of manpower, Selection process,
10th	37	1 st	Method of Testing, Methods of Training & Development, Payment of Wages
	UNIT 6:-Leadership and Motivation [6 Periods]		
	38	2 nd	Leadership :Definition and Need/Importance,Qualities and functions of a leader
	39	3 rd	Manager Vs Leader,Style of Leadership (Autocratic, Democratic, Participative)
	40	4 th	b) MotivationDefinition and characteristics,Importance, Factors affecting motivation
11th	41	1 st	Theories of motivation (Maslow),Methods of Improving Motivation
	42	2 nd	Importance of Communication in Business

	43	3 rd	Types and Barriers of Communication
	UNIT 7:- Work Culture, TQM & Safety [5 Periods]		
	44	4 th	Human relationship and Performance in Organization
12th	45	1 st	Relations with Peers, Superiors and Subordinates
	46	2 nd	TQM concepts: Quality Policy, Quality Management, Quality system
	47	3 rd	Accidents and Safety, Cause, preventive measures
	48	4 th	General Safety Rules , Personal Protection Equipment(PPE)
13th	UNIT 8:- Legislation [6 Periods]		
	49	1 st	a)Intellectual Property Rights(IPR),
	50	2 nd	Patents
	51	3 rd	Trademarks
	52	4 th	Copyrights
14th	53	1 st	b) Features of Factories Act 1948 with Amendment (only salient points)
	54	2 nd	c) Features of Payment of Wages Act 1936 (only salient points)
	UNIT 9:- Smart Technology [6 Periods]		
	55	3 rd	Concept of IOT, How IOT works
	56	4 th	Components of IOT, Characteristics of IOT
15th	57	1 st	Categories of IOT
	58	2 nd	Applications of IOT- Smart Cities, Smart Transportation
	59	3 rd	Applications of IOT- Smart Home, Smart Healthcare, Smart Industry,
	60	4 th	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-MOS inverter
	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 Inverter design with delay constraints – Two sample mask lay out for p-type substrate
	3.5	3.5 CMOS Inverter 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
12TH	4.10	Dynamic RAM, SRAM
	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: ER.Kshirabdhee Tanaya Dora
Subject:TH3 ANALOG & DIGITAL COMMUNICATION	No. of Days/per week class allotted: 5	Semester From Date: 15TH SEPTEMBER 2022 To Date: 22ND DECEMBER 2022 No.of Weeks:15
Week	Class Day	Theory Topics
1st		UNIT 1: Elements of Communication Systems
	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

		UNIT 3: Angle Modulation Systems
6th	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
		UNIT 4: AM & FM Transmitter & Receiver
8th	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
		UNIT 6: Digital Modulation Techniques
13th	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)
(15.09.2022 to 22.12.2022 - Academic Year 2022-23)**

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

WEEK	Class Day	TOPICS
Unit-1: WAVE PROPAGATION & ANTENNA [12 Periods]		
1ST	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
	1	Impedance matching & Stubs – single & double
	2	Derive equation for primary & secondary constant of X-mission line.
	Unit-3: TELEVISION ENGINEERING [13 periods]	
6TH	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
	1	State and explain the following terms.- Composite video signal, Synchronization pulses
7th	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,
14TH	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.
	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: 15 September, 2022 To 022 December, 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.
3RD WEEK	1st	9	1.6 Turn off methods of SCR (Line commutation and Forced commutation)
	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
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 part of 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 and NOT 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) Temperature Controller
	4th	60	5.14 Special control systems- Basics DCS & SCADA systems 5.15 Computer Control-Data Acquisition, Direct Digital Control System (Basics only)

SEM5 – ETC- ANALOG & DIGITAL COMMUNICATION LAB [PR-1]**3P/Week -15 Weeks, Tot - 45P****(15.09.2022 to 22.12.2022 - Academic Year 2022-23)****Faculty: JYOTI PATRA & KSHIRABDHEE TANAYA DORA**

WEEK	PERIODS	EXPERIMENT
1	1,2,3	1. Construct the circuit in AM transmitter & Detector Trainer Kit and observe the waveform at different test point & Determine percentage of Modulation Index of AM.
2	4,5,6	2. Construct the circuit in FM transmitter & Detector Trainer Kit & observe the waveform at different section.
3	7,8,9,	3. Construct the circuit in PCM transmitter & receiver Trainer Kit & observe the waveform at Different section.
4	10,11,12	4. Construct the circuit in ASK modulator & demodulator Trainer Kit & observe the waveform at different section.
5	13,14,15	5. Construct the circuit in FSK modulator & demodulator Trainer Kit & observe the waveform at different section.
6	16,17,18	Mid Evaluation and Viva
7	19,20,21	6. Construct the circuit in PSK modulator & demodulator Trainer Kit & observe the waveform at different section.
8	22,23,24	7. Construct the circuit in Delta modulator & demodulator Trainer Kit & observe the waveform at different section.
9	25,26,27	8. Construct the circuit in super heterodyne radio receiver & observe the waveform at different section & do the alignment (Self Study)
10	28,29,30	9. Study the principle of Stereophonic System (Self Study)
11	31,32,33	10. Simulate the AM Modulation using multisim .
12	34,35,36	11. Simulate the AM demodulation using multisim .
13	37,38,39	12. Simulate the FM Modulation using multisim.
14	40.41.42	13. Mini project: The students will collect the detail specification and Catalogue of all equipment used and submits at end of session. Perform a transmitter & receiver using array modulation system.
15	43,44,45	Evaluation and Viva
Total=45P		

SEM5 - ETC VLSI & EMBEDDED SYSTEM LAB [PR-2] 3P/Week -15 Weeks, Tot - 45P (15.09.2022 to 22.12.2022 - Academic Year 2022-23) Faculty: GOPAL CHANDRA BEHERA & KSHIRABDHEE TANAYA DORA		
WEEK	PERIODS	EXPERIMENT
1	1,2,3	Write VHDL code along with test bench for any of the following basic gates a. AND b. OR c. XOR
2	4,5,6	Write VHDL code along with test bench for MUX
3	7,8,9,	Write VHDL code along with test bench for DEMUX
4	10,11,12	Write VHDL code along with test bench for 4 bit UP COUNTER
5	13,14,15	Evaluation and Viva
6	16,17,18	Write VHDL code along with test bench for 4 bit BCD COUNTER
7	19,20,21	Write VHDL code along with test bench for ENCODER
8	22,23,24	Write VHDL code along with test bench for DECODER
9	25,26,27	Write VHDL code along with test bench for SHIFT REGISTER
10	28,29,30	Evaluation and Viva
11	31,32,33	Write VHDL code along with test bench for HALF ADDER
12	34,35,36	Write VHDL code along with test bench for FULL ADDER
13	37,38,39	Write VHDL code along with test bench for D Flip Flop
14	40.41.42	Write VHDL code along with test bench for SR Flip Flop
15	43,44,45	Evaluation and Viva
Total=45P		

SEM5 - ETC - WAVE PROPAGATION & COMMUNICATION ENGINEERING LAB [PR-3] 3P/Week -15 Weeks, Tot - 45P (15.09.2022 to 22.12.2022 - Academic Year 2022-23) Faculty: Jyoti Patra and Deepika Panda		
WEEK	PERIODS	EXPERIMENT
1	1,2,3	1.a. Study the Antenna and Antenna Trainer for different type of Antenna & find its gain.
2	4,5,6	2 . Draw the radiation pattern & find the characteristics of antenna (Yagi , Horn,)
3	7,8,9,	2 . Draw the radiation pattern & find the characteristics of antenna (Yagi , Horn, Rhombus , Dipole)

4	10,11,12	3. Draw the waveform of different lobe of different Antennas using antenna trainer
5	13,14,15	4. To study different types of Microwave components.
6	16,17,18	5. Measure VSWR of different types of load (Matched, Open, Shorted) using Microwave test bench.
7	19,20,21	Evaluation and Viva
8	22,23,24	6. Set up & installation of Dish TV.
9	25,26,27	7. Study the SMPS section and find out load & line regulation.
10	28,29,30	8. Study the basic common faults in LED TV.
11	31,32,33	Evaluation and Viva
12	34,35,36	10. Study basic principle of Flat screen picture tubes, LCD /LED.
13	37,38,39	9. Mini Project on above to Assembly Mono chrome/Colour TV set and detect its fault at different section. Connection of LCD/LED TV /HD TV with LCD/Computer and concept of HDMI &VGA cable (installation of Smart TV)- any one
14	40,41,42	10. Study & visit the Microwave Station/ TV Transmitter/Radio Transmitter & prepare a Project Report.
15	43,44,45	Evaluation and Viva
Total=45P		

SEM5 - ETC - POWER ELECTRONICS LAB [PR-4] 3P/Week -15 Weeks, Tot - 45P (15.09.2022 to 22.12.2022 - Academic Year 2022-23) Faculty: DEEPIKA PANDA AND POONAM PANDA		
WEEK	PERIODS	EXPERIMENT
1	1,2,3	1. Plot V-I characteristics of devices & trace the output waveform a) SCR b) DIAC
2	4,5,6	2. Plot V-I characteristics of devices & trace the output waveform c) TRIAC d) GTO e) MOSFET
3	7,8,9,	3. Study the Single Phase Series Inverter & trace the output waveform at different test points
4	10,11,12	Evaluation of record and Viva
5	13,14,15	4. Construct lamp dimmer using TRIAC using Trainer Board/Kit & trace the output waveform using Trainer Board/Kit
6	16,17,18	4. Construct the Single Phase Half wave Converter using Trainer Board/Kit for R load & RL load & trace the output waveform at different test points.

7	19,20,21	5. Construct the Single Phase Full wave Converter for R load & RL load using Trainer Board/Kit & trace the output waveform at different test points.
8	22,23,24	6. Construct the Chopper Circuit using Trainer Board/Kit at constant frequency with different duty cycle & trace the output waveform at different test points.
9	25,26,27	Evaluation of record and Viva
10	28,29,30	6.Study of UPS and observe the waveform of various section (ON, OFF & Line interactive)
11	31,32,33	7.Study of servo type voltage AC stabilizer
12	34,35,36	8.Study of SMPS circuit & trace the output waveform at different tests points.
13	37,38,39	Evaluation of record and Viva
14	40,41,42	9.Simulate the SI No 1-8 (Any 3) using the simulation tool like PSPICE/ multisim/orcad/tina.
15	43,44,45	10.Mini Project
Total=45P		