List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department : *Electronics and Communication Engineering*

Programme Name : *B.Tech.*

Academic Year : 2018-19

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	EC01TBS01	Mathematics-II
02.	EC01TBS02	Chemistry
03.	EC01TES01	Programming for Problem Solving
04.	EC01TES02	Engineering Mechanics
05.	EC01PBS01	Chemistry Lab
06.	EC01PES01	Programming for Problem Solving Lab
07.	EC01PES02	Workshop Manufacturing & Practices
08.	EC01PES03	Engineering Mechanics Lab
09.	EC01PMC01	Induction Training Programme
10.	EC02TBS03	Physics
11	EC02TES01	Basic Electrical Engineering
12	EC02TBS04	Mathematics-I
13	EC02THS01	English
14	EC02TMC01	Environment Sciences
15	EC02PBS02	Physics Lab
16	EC02PES04	Basic Electrical Engineering Lab
17	EC02PES05	Engineering Graphics & Design Lab
18	EC3THS03	Engineering Economics
19	EC3TPC01	Signals and Systems
20	EC3TBS01	Engineering Mathematics-III
21	EC3TES01	Network Analysis And Synthesis
22	EC3TES02	Electronic Devices
23	EC3TPC02	Digital Logic Circuits
24	EC3PES02	Electronics Devices Lab
25	EC3PPC02	Digital Logic Circuits Lab
26	EC4TBS02	Numerical Analysis

27	EC4TPC03	Automatic Control Systems
28	EC4TPC04	Analog Circuits
29	EC4TPC05	Communication System-I
30	EC4TPC06	Electronics Measurements & Instrumentation
31	EC4PPC04	Analog Circuits Lab
32	EC4PPC05	Communication System-I Lab
33	EC4PPC06	Electronic Measurements & Instrumentation Lab
34	EC5TPC07	Lic & Its Application
35	EC5TPC08	Communication System- II
36	EC5TPC09	Electromagnetic Field Theory
37	EC5TPE01	Microprocessor & Its Application
38	EC5TPE02	Data Structure & Operating System
39	EC5TOE11	Computer Architecture
40	EC5TOE12	OOP in C++
41	EC5TOE13	Introduction to Information Security
42	EC5TOE14	Project Management
43	EC5TOE15	Rural Technology and Community Development
44	EC5PPC07	LIC & ITS APPLICATION Lab
45	EC5PPE01	Microprocessor & Its Application Lab
46	EC5PPC08	Communication System -II Lab
47	EC6TPC10	Digital Signal Processing
48	EC6TPC11	Antenna & wave prapogation
49	EC6TPE03	Data Communication & Computer Networking
50	EC6TPE04	Fundamental of VLSI Design
51	EC6T0E21	UNIX, Operating System
52	EC6T0E22	Probability & Stochastic Process
53	EC6TOE23	Advanced Instrumentation
54	EC6T0E24	Knowledge management
55	EC6T0E25	Engineering System Design Optimization
56	EC6PPE02	VHDL Lab
57	EC6PPC06	Digital Signal Processing Lab
58	EC6PSP01	Seminar
59	EC7TPC12	Microwave Engineering
60	EC7TPC13	Wireless Mobile Communication
61	EC7TPE05	Advance Hardware Design

62	EC7TPE06	Power Electronics
63	EC7TOE31	Wireless Sensor Network
64	EC7TOE32	Information theory and coding
65	EC7TOE33	Nanotechnology
66	EC7TOE34	Optical instrumentation and measurement
67	EC7TOE35	Neural Network and Fuzzy Logic
68	EC7TPPC12	Microwave Engineering Lab
69	EC7TPPE05	Comprehensive Viva
70	EC7PSP02	Project-I
71	EC8TPC14	Radar and Satellite Engineering
72	EC8TPC15	Optical Fiber Communication
73	EC8TPE07	VLSI Fabrication Methodology
74	EC8TOE41	Basic building block of Microwave Engineering
75	EC8TOE42	Principle of Management
76	EC8TOE43	Mobile Computing
77	EC8TOE44	Embedded System
78	EC8TOE45	Advanced Power Electronics
79	EC8TPPC15	Optical Fiber Communication Lab
80	EC8TPPC16	Advanced RF and Microwave Design lab
81	EC8TPSP03	Project-II
82	EC8TPSP04	Comprehensive Viva
83	IT7100	Research Methodology in engineering
84	ECE7102	Vaccume Technology
85	ECE7103	Finite Element Method
86	ECE7104	Sensors Measurement Science & Technology
87	ECE7105	Artificial Intelligence

विभागाध्यक्ष (इले. एवं संचार अभियांत्रिकी)
H.O.D. (Elect. & Comm. Engineering)
प्रौद्योगिकी संस्थान
Institute of Technology
गु. घा. वि., बिलासपुर (छ.ग.)
G. G. V. Bilaspur (C.G.)

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC7TOE33	3	0		3 hours	40	60	3

NANOTECHNOLOGY

CourseObjectives: Student will try to learn:

1.To foundational knowledge of the Nanoscience and related fields.

2.To make the students acquire an understanding the Nanoscience and Applications

3. To help them understand in broad outline of Nanoscience and Nanotechnology.

UNIT-1

Introduction to Nanotechnology: Essence of Nanotechnology, Nano in daily life, Brief account of nano applications, Properties of nano materials, Properties at nanoscale (optical, electronic and magnetic), Metal nano clusters, Semiconductor nano particles.

UNIT-2

Nano Materials-Metal and Semiconductor Nanomaterials, Quantum Dots, Wells and Wires, Molecule to bulk transitions.

UNIT-3

Carbon Nano Structures :Introduction, Carbon molecules, Carbon clusters, Carbon nanotubes, Applications of carbon nanotubes.

UNIT-4

Synthesis Of Nanomaterials :Top-down (Nanolithography, CVD), Bottom-up (Sol-get processing, chemical synthesis). Wet Depositiontechniques, Self-assembly (Supramolecular approach), Molecular design and modeling.

UNIT-5

Application: Solar energy conversion and catalysis, Molecular electronics and printed electronics Nanoelectronics, Polymers with a special architecture, Liquid crystalline systems,Linear and nonlinear optical and electrooptical properties, Applications in displays and other devices, Advanced organic materials for data storage, Photonics, Plasmonics, Chemical and biosensors,Nanomedicine and Nanobiotechnology.

SUGGESTED BOOKS &REFERENCE:-

1. Nanotechnology by Richard Booker, Earl Boysen, Wiley Publishing Inc., 2006.
2. Introduction to Nanotechnology by Charles P. Poole Jr., Frank J. Owens, John Wiley & Sons Publications, 2003.

3. Hari Singh Nalwa, "Nanostructured Materials and Nanotechnology", Academic Press, 2002

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC7TOE34	3	0		3 hours	40	60	3

Optical Instrumentation & Measurements

CourseObjectives: Student will try to learn:

1. The different types of optical sources and their characteristics.
2. The different aspects of optical instrumentation.
3. Study about different optical sensors.
4. Different methods to calculate the various parameter for optical fiber.

Unit 1. Light Sources: Introduction, LEDs, power, efficiency, types and structures of LEDs, characteristics and modulation, driver circuits, semiconductor lasers diodes, modulation characteristics, driving circuitry.

Unit 2. Optical Instrument: Optical time domain reflectometer, optical low coherence reflectometer,optical power and energy meter, monochrometer, CCD, optical spectrum analyzer, ellipsometer, Transducers, Lock-in-Amplifier, Box car averager.

Unit 3. Fiber optic components and devices: Direction couplers, beam splitters, switches modulations, connectors, couplers, polarizers, polarization controllers, amplifiers, fiber lasers, reflectors, wavelength filters, polarizing beam splitters, wavelength division multiplexers, fiber optic isolators etc.

Unit 4.Fibre optic sensors: Pressure, temperature, strain, magnetic and electric field sensors based on the characteristics like intensity, phase, polarization, frequency and wavelength of light wave.

Unit 5.Measurements methods in optical fibre: General experimental consideration, measurement of refractive index profile, numerical aperture, attenuation, pulse dispersion and bandwidth. Cut off wavelength, mode field diameter and birefringence of single mode fiber.

SUGGESTED BOOKS &REFERENCE:-

1. B. P. Pal : Fundamentals of Fibre Optics in Telecommunication and Sensor Systems, New Age, New Delhi, 1992.
2. A. K. Ghatak and K. Thyagarajan, Introduction to Fiber Optics, Cambridge, 1998.
3. S.M. Senior : Optical Fibre Communication: Principles and Practice, PHI, New Delhi, 2002.
4. A.K.Ghatak, M.R. Shenoy : Fibre Optics Measurements, Viva, New Delhi, 1995.

Course Outcome: After the successful completion of the course the students will be able to:
1. explain the basic concepts of optical transmitting and receiving

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2018-19 (CBCS)

NEURAL NETWORK & FUZZY LOGIC SYSTEM

Course Objectives: Students will try to learn:
1. Concepts and understanding of artificial neural networks
2. Fuzzy logic basic theory and algorithm formulation
3. To solve real world problems.

UNIT-I

Introduction to ANS Technology: Elementary Neurophysiology, Models of a Neuron, Neural Networks viewed as directed graphs, Feedback, from neurons to ANS, Artificial Intelligence and Neural Networks.

UNIT-II

Learning and Training: Hebbian, Memory based, Competitive, Error-Correction Learning, Credit Assignment Problem: Supervised and Unsupervised learning, Memory models, Recall and Adaptation. Network Architectures, Single-layered Feed-forward Networks, Multi-layered Feedforward Networks, Recurrent Networks, Topologies.

UNIT-III Algoritms for ANN: Activation and Synaptic Dynamics, Stability and Convergence. A Survey of Neural Network Models : Single-layered Perceptron – least mean square algorithm, Multi-layered Perceptrons – Back propagation Algorithm, XOR – Problem, The generalized Delta rule, BPN Applications, Adalines and Madalines – Algorithm and applications.

UNIT-IV

Applications: The Traveling salesperson problem, Talking Network and Phonetic typewriter : Speech Generation and Speech recognition, Character Recognition and Retrieval, Handwritten Digit rcognition.

UNIT-V

Adaptive Fuzzy Systems: Introduction to Fuzzy sets and operations, Examples of Fuzzy logic, Fuzzy Associative memories, Fuzziness in neural networks, Comparison of Fuzzy and neural Truck-Backer upper control systems.

SUGGESTED BOOKS &REFERENCE:-

1. Artificial Neural Networks by B. Yagna Narayan, PHI

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TPC14	3	1		3 hours	40	60	4

RADAR &SATELLITE COMMUNICATION

Course Objectives: Student will try to learn:

1.The fundamentals of satellite communication.
2. To provide them with a sound understanding of how a satellite communication system successfully transfers information from one earth station to another.
3. Working principle of different RADAR systems and their applications.

UNIT – I

INTRODUCTION: Origin and brief history of satellite communication; Element of satellite communication link; Current status of satellite communication.

ORBITAL MECHANISM AND LAUNCHING OF SATELLITE: Equation of orbit. Describing the orbit, Look angle determination, Azimuth and elevation calculation, Geostationary and other orbit, Orbital perturbation, Orbit determination, Mechanic's of launching a synchronous satellite, selecting a launch vehicle.

UNIT – II

SPACECRAFT: Satellite subsystem, power supply altitude and orbit control system, Telelmetry and Command, Thermal control system communication subsystem, Space craft antennas, Frequency re-use antennas.

UNIT – III

SATELLITE CHANNEL &LINK DESIGN: Basic transmission theory, Noise temperature, Calculation of system noise temperature. Noise figure, G/T Ratio of earth station, Design of down and uplink using C/N ratio, FM improvement factor for multi channel signal, Link design for FDM/FM, TV signal and Digital signals.

UNIT – IV

MULTIPLE ACCESS TECHNIQUES & EARTH STATION TECHNOLOGY: Frequency Division Multiple Access (FDMA), FDM/FM/FDMA, Time Division Multiple Access, Frame structure and synchronization, Code Division Multiple Access, Space qualification and Equipment Reliability, random Access, Earth station design requirement, earth station subsystem, Monitoring and control, Antenna noise temperature, Tracking, Design of

ELECTRONICS & COMMUNICATION ENGINEERING — Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TPC15	3	1		3 hours	40	60	4

OPTICAL FIBER COMMUNICATION

Course Objectives: Students will try to learn:

1. The basics of signal propagation through optical fibers,
2. Study about fiber impairments, components and devices and system design.

UNIT – I

Introduction to optical communication, Principles of light transmission, optical fiber modes and configurations, mode theory for circular wave-guides, single-mode fibers, multimode fibers, numerical aperture, mode field diameter, V-number, fiber materials, fiber fabrication techniques.

UNIT – II

Optical sources, LED´s, LASER diodes, Model reflection noise, Power launching and coupling, Population Inversion, Fiber Splicing, Optical connector, Photo detector, PIN, Avalanche detector, response time, avalanche multiplication noise.

UNIT – III

Signal degradation in optical fibers, attenuation losses, signal distortion in optical waveguides, material dispersion, wave guide dispersion, chromatic dispersion, inter-modal distortion, Pulse broadening in graded index fiber, mode coupling, advanced fiber designs: dispersion shifted, dispersion flattened, dispersion compensating fibers, design optimization of single mode fibers.

UNIT – IV

Coherent optical fiber communication, modulation techniques for homodyne and heterodyne system, optical fiber link design, Rise time budget and link power budget long haul systems, bit error rate, line coding, NRZ, RZ, Block codes, eye pattern.

UNIT – V

Advanced system and techniques, wavelength division multiplexing, optical amplifiers, semiconductor amplifier, EDFA, Comparison between semiconductor and optical amplifier, Gain bandwidth, photonic switching, optical networks, optical fiber bus, ring topology, star architecture, FDDI.

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TPE07	3			3 hours	40	60	3

VLSI Fabrication Methodology

CourseObjective: Student will try to learn:
1.The basic MOS Circuits
2. the MOS Process Technology.
3. To understand the operation of MOS devices.
4.To impart in-depth knowledge about analog and digital CMOS circuits.

Unit 1
Introduction, Processing steps of BJT, Processing steps of MOSFET, Control of threshold voltage of MOS, Ion implantation, CVD, Patterning of polysilicon by etching, Self aligned technology, Advantage of polysilicon and problems of metal gate process.

Unit 2
Si structure, Packing density, Hard sphere model, Mismatch with dopant atom & Misfit factor, Concept of different crystal planes of Si, Natural cleavage plane, Self limiting etching or V-groove etching. Crystal defects- Point, Dislocation, Volume defects

Unit 3
Si crystal growth by Reduction process, Bridgemann Process, Czochralski Technique, Control of defects in crystal, Zone Refining, Gettering process.

Unit 4

Si Epitaxy, 3 cardinal rule of hetero-epitaxy, Liquid Phase Epitaxy, Vapor Phase Epitaxy, Problems of VPE, Tilted sample holder, Reactor configuration, Optimization of temperature and pressure, LPCVD from Silicon epitaxy by Silane route, Surface catalysed reaction, Efficiency of deposition, Problems of Silane route.

Unit 5

Doping during Epitaxy, Autodoping, Junction shift, Pattern shift and distortion, Molecular Beam Epitaxy, Insitu cleaning, Oxidation, Kinetics of oxidation

SUGGESTED BOOKS &REFERENCE:-

1. VLSI Fabrication Principles by S K Ghandhi,
2. VLSI Technologyed S M Sze,
3. Silicon VLSI Technology by J D Plummer, M Deal, P D Griffin

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TOE41	3			3 hours	40	60	3

Basic Building Blocks of Microwave Engineering

CourseObjective: Student will try to learn
1. Rectangular and circular wave guides using field theory.
2. The theoretical principles underlying microwave devices and networks.
3. To design microwave components such as power dividers, hybrid junctions, Directional Couplers, microwave filters, Microwave Wave-guides and Components, Ferrite Devices.
4. about Microwave Solid-State Microwave Devices and Microwave Tubes.
5. about Microwave Measurement Techniques.

Unit 1: Concept of Mode, TEM, TE, TM and Impedance concept. Loss associated with microwave transmission –Coaxial line, Rectangular waveguide, Circular waveguide, Planar transmission line.

Unit2: Challenges of Microwave design-Smith Chart (1st tool), Measurement f unknown impedances, Need of impedance matching at Microwave frequencies, Lumped element based impedance matching network by Smith Chart, Distributed impedance matching by Smith Chart, Broadband impedance matching network.

Unit 3: Voltage and current at microwave frequency, Scattering parameter (2nd tool) Properties of scattering parameter, Network analyser, Problem solving by equivalent voltage and current in waveguide and on scattering parameters.

Unit 4: Coaxial connectors, Microwave power divider and combiner, Microwave Resonators, Attenuators, Switching diode.

Unit 5: Microwave tubes, Microwave solid state diode oscillators, and Amplifiers, Microwave transistors

SUGGESTED BOOKS &REFERENCE:-

1. Microwave Engineering, David M Pozar,
2. Microwave Devices & Circuits, Samuel Y Liao,
3. Antenna Theory, C A Balanis

CourseOutcome : After completion of course, the student will be able to understand :
1. Integrating a wide range of Microwave components into one design oriented frame work
2. Design and solve real world problems
3. Characterize microwave devices in terms of the directionality of communication.
4. Use a microwave test bench in analyzing various types of microwave measurements.

ELECTRONICS & COMMUNICATION ENGINEERING — Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TOE42	3			3 hours	40	60	3

PRINCIPLE OF MANAGEMENT

CourseObjectives: Student will try to learn:

1.The functions and responsibilities of managers.
2. To provide them tools and techniques to be used in the performance of the managerial job.
3. To enable them to analyze and understand the environment of the organization.
4. To help the students to develop cognizance of the importance of management principles.

UNIT – I Management concepts, Nature, Scope, Significance, Function and Principle of Management Concepts.

Evolution of Management: Early Contribution, Taylor and Scientific management, Fayol's administrative management, Bureaucracy, Hawthrone Experiments and Human Relations.

UNIT – II

Planning- Concepts, Objectives, Goals, Components and Steps involved in planning process, MBO, Decision making process, Individual and Group Decision Making.

UNIT – III

Organizing- principles, Organization theories, Line & Staff Authority, Centralization, Decentralization, Delegation, Employee's empowerment, Span of control, Departmentation, Authority and Responsibility.

UNIT – IV

Staffing: Recruitment & Selection, Training & Development, Performance Appraisal Directing: Concept, Direction and Supervision, Co-ordination.

UNIT – V

Communication: Communication Process, Importance of Communication, Barriers to Communication, Controlling: nature, scope, functions, steps and process, control techniques.

SUGGESTED BOOKS & REFERENCE:

1. *Management, Stoner & Freeman, PHI*
2. *Principles of Management, Koontz, O'Donnell Wechrich, McGraw Hill*
3. *The Practice of Management, P F Drucker, Allied Pub*
4. *Essentials of Management, Massie, AITBS*
5. *Principles of Management, Terry and Franklin, AITBS*
6. *Organization and Management, R D Agarwal, TMH*

ELECTRONICS & COMMUNICATION ENGINEERING — Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TOE43	3			3 hours	40	60	3

MOBILE COMPUTING

CourseObjective: Studentwill try to learn:
1.About the concepts and principles of mobile computing;
2.To explore both theoretical and practical issues of mobile computing.
3. To develop skills of finding solutions and building software for mobile computing applications.

UNIT – I

Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, Hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

UNIT –II

Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.

UNIT –III

Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

UNIT –IV

Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

UNIT –V

Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

ELECTRONICS & COMMUNICATION ENGINEERING — Effective From 2018-19 (CBCS)

EC8TOE44	**3**			**3 hours**	**40**	**60**	**3**

EMBEDDED SYSTEMS

Course Objective: Student will try to learn:
The modern embedded systems and to show how to understand and program such systems using a concrete platform built around.

UNIT-I Embedded system Introduction : Basic idea on system, definition of embedded system, characteristic of Embedded system,. Challenges in designing of an embedded system, characterization of embedded system.
UNIT-II Components of Embedded system : Difference between microprocessor and microcontroller, Functional building blocks of Embedded systems, processor and controller, Memory, ports and communication devices.

UNIT-III Methodologies, Life cycle and Modeling: Software Life cycle, Embedded Life cycle Water Fall Model , Spiral Model, RAD Model and Modeling of Embedded system. Simulation and Emulation.

UNIT-IV Layers of an Embedded system: Introduction, Need for Layering , The Middleware Layer, The Application Layer. Introduction to Real Time Operating Systems.

UNIT-V Networks for Embedded Systems : Serial Communication RS 232 model, I square Model, CAN and CAN Open, SPI and SCI, USB, HDLC, Parallel Communication Basics PCI interface and PCI X- interface. Device Driver Serial Port and Parallel Port.

SUGGESTED BOOKS &REFERENCES: -

1. H.Kopetz, "Real-Time Systems", Kluwer, 1997.
2. R.Gupta, "Co-synthesis of Hardware and Software for Embedded Systems", Kluwer 1995.

CourseOutcome: After completion of the course student will be able to:

1. Identify the hardware and software components of an embedded system
2. Choose appropriate embedded system architecture for the given application
3. Write programs for optimized performance of an embedded system and validate

ELECTRONICS & COMMUNICATION ENGINEERING — Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TOE45	3			3 hours	40	60	3

Advanced Power Electronics

Course Objectives: Student will try to learn:

1.Selected areas of power electronics in greater depth.
2. Learn recent developments in power electronics.
3. in detail applications of power electronics

UNIT I Phase Controlled Rectifiers: Principle of phase control, Single Phase Full wave controlled converters: Midpoint and bridge type, analysis of two pulse bridge converter with continuous current., Single phase two pulse converters with discontinuous current

Unit-II
DC to DC switch mode Regulators: Introduction, Review of linear power supply and basic dc-dc voltage regulator configurations, Buck converters, Boost converters, Buck-Boost converters and their analysis for continuous and discontinuous conduction mode, other converter configurations.

Unit-III Resonant Converters: Introduction, Need of resonant converters, Classification of resonant converters, Load resonant converters, resonant switch converters, Zero Voltage Switching DC-DC Converters, Zero Current Switching DC-DC Converters, Applications Of Resonant Converters.

Unit-IV Multi-level converters: Need for multi-level inverters, Concept of multi-level, Topologies for multi-level: Diode Clamped, Cascaded H-bridge multilevel Converters configurations; Features and relative comparison of these configurations applications.

Unit-V Review of Inverters and Controllers: Review of single-phase half bridge, full bridge, bipolar, unipolar, VSI and CSI, review of single phase ac to ac controllers, Phase-Controlled Three-Phase AC Voltage Controllers.

Text Books:

1. Ned Mohan, Tore M. Undeland and William P. Robbins, "Power Electronics – Converters, Applications and Design", John Willey & sons, Inc., 3rd ed., 2003.
2. Muhammad H. Rashid, "Power Electronics - Circuits, Devices and Applications", Prentice Hall of India, 3rd ed., 2009.
3. Modern Power Electronics and AC Drives –B. K. Bose-Pearson Publications, 2002.
4. L. Umanand, "Power Electronics Essentials and Applications", Wiley India Ltd., 2009

REFERENCEBOOKS:-

RESEARCH METHODOLOGY IN ENGINEERING

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ET7100	03	01	0	3 HRS	100	4

Introduction: Definition and objectives of Research — Types of research. Various Steps in Research process, Mathematical tools for analysis, developing a research question-Choice of a problem.

Literature review, Surveying, synthesizing, critical analysis, reading materials, reviewing, rethinking, critical evaluation. interpretation. Research Purposes, Ethics in rc.scarch APA Ethics code.

Quantitative Methods for problem solving: Statistical Modeling and Analysis. Time Series Analysis. Probability Distributions. Fundamentals of Statistical Analysis and Inference, Multivariate methods.

Concepts of Correlation and Regression_ Fundamentals of Time Series Analysis and Spectral Analysis, Error Analysis, Applications of Spectral Analysis.

Tabular and graphical description of data: Tables and graphs of frequency data of one variable. Tables and graphs that show the relationship between two variables Relation between frequency distributions and other graphs, preparing data for analysis.

Use of statistical sothvare,SPSS in research. Structure and Components of Research Report. Types of Report, Layout of Research Report, Mechanism of writing a research report, referencing in academic writing.

Reference Books

1. kothari, Research Methodology Methods and Techniques. 2/c, Vishwa Prakashan, 2006

2, Donald 1-1,McBum.cy, Research Methods, 5th Edition, Thomson Learning, ISEIN:31-3 L5- 0947-0, 2006

3, Donald R. Cooper, Pamela S. Schindler, Business Research Methods. &le, rata McGraw-Hill Co_ Ltd_ 2006.

PhD course work subjects:

1. Vacuum Technology

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE7102	3	1	0	3 HOURS	100	4

Unit-1: Fundamentals of Vacuum Technology: vacuum nomenclature and definitions, Gas properties, Molecular process and Kinetic theory, Throughput, Pumping speed, Evacuation rate, Outgassing rate, Leak rate, Gas flow, Conductance, Flow calculations.

Unit-2: Vacuum generation: Diaphragm pump, Rotary pump, Diffusion pump, Cryogenic pump, Turbomolecular pump, Sputter-ion pump and Getter pumps.

Unit-3: Vacuum Measurement scale, Gauges and Leak detection: U.H.V. techniques, Mass Spectrometer.

Unit-4: Surface Physics and its Relation to Vacuum Science: Adsorptions, Chemisorptions, Isotherms, Desorptions and Photoactivation.

Unit-5: Materials for Vacuum tubes, Chemical and Thermal Cleaning. Sputtering Techniques. Brazing. Spot, Arc, Electron beam and Laser weldings. Vacuum and Protected Atmosphere Furnaces. Jigs and Tools. Processing of Electron-Beam Devices.

References:

1. Vacuum Science and Technology, V V Rao, T B Ghosh, K L Chopra
2. Vacuum Journal, Science direct, Elsevier Publication
3. Journal of Vacuum Science and Technology A, IEEE Transaction
4. Journal of Vacuum Science and Technology B, IEEE Transaction

2. Finite Element Method

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE7103	3	1	0	3 HOURS	100	4

Unit I: Basic Principles of Structural Mechanics: Equations of equilibrium, Strain displacement relations, Stress strain relations, Plane stress and Plane strain problems, Boundary Conditions. Different steps involved in finite element method (FEM)

Unit II: Element Properties: Displacement models, Shape functions, Stiffness matrices, One dimensional bar element, two dimensional truss elements, two dimensional beam elements.

Unit III: Lagrangian interpolation, Pascal's triangle, Convergence criteria. Plane Stress and Plane Strain Problems: Analysis of plates using triangular CST elements, Rectangular elements, axy-symmetric elements.

Unit IV: Isoparametric Elements: four node, eight node elements, Numerical integration.

Unit V: Bending of plates by rectangular elements, triangular elements and quadrilateral elements.

References

1. R. D. Cook, Concepts and Applications of Finite Element Analysis, John Wiley& Sons, New York
2. C. S. Krishnamoorthy, Finite Element analysis-Theory and Programming, Tata McGraw Hill.
3. O. C. Zienkiewicz and R. L. Taylor, The Finite Element Method, McGraw Hill Publishing
4. J. N. Reddy, An introduction to Finite Element Method, Tata-Mc Graw Hill, New Delhi.
6. T. R. Chandrupatla & A. D. Belegundu, Intro. to Finite Elements in Engg,Prentice Hall of India Pvt. Ltd.,

3. Sensors & Measurement Science and Technology

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE7104	3	1	0	3 HOURS	100	4

Unit-1: Generalized Configurations and Functional Descriptions of Measuring Instruments: Functional elements, Transducers, Analog and Digital modes of operation, Input-Output configuration of Instruments and Measurement systems, Static and Dynamic Characteristics of Instruments, Static calibration.

Unit-2: Motion Sensor and Measurement: Fundamental Standards, Relative Displacements- Translational & Rotational, Relative Velocity, Relative Acceleration Measurements, Seismic Displacement Pickups, Seismic Velocity Pickups, Seismic Acceleration Pickups.

Unit-3: Force, Torque and Power Measurement: Methods of Force Measurement, Elastic Force Transducers, Torque Measurement on Rotating Shafts, Shaft Power Measurement, Vibrating-Wire Force Transducers.

Unit-4: Pressure Measurement: Methods of Pressure Measurements, Deadweight Gages, Manometers, Elastic Transducers, Vibrating Cylinder and other Resonant Transducers, Dynamic Testing of Pressure measuring Systems, High and Low Pressure Measurement systems.

Unit-5: Temperature Measurements: Standards and Calibration, Thermal-Expansion Methods, Thermoelectric Sensors, Electrical-Resistance Sensors, Junction Semiconductor Sensors, Digital Thermometers, Radiation Methods.

References:

1. Measurement Systems, E O Doebelin, D N Manik, McGraw Hill Publication
2. Sensor Technology Handbook, Jon S Wilson, Elsevier, 2004, ISBN-10: 0750677295
3. Journal of Sensors and Actuators, Science direct, Elsevier Publication
4. Journal of Sensors and Actuators A:Physical, Science direct, Elsevier Publication

4. Artificial Intelligence

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE7105	3	1	0	3 HOURS	100	4

Unit-1: Definition of AI, Brief history of AI, General problem Solving Approaches in AI-Learning Systems, Knowledge representation and reasoning, Planning, Knowledge Acquisition, Intelligence search, Logic Programming, Soft computing, Applications of AI techniques, Characteristic requirement for the realization of intelligent system, Programming languages for AI, Architecture for AI machine.

Unit-2: Cognitive perspective of pattern recognition- Template Matching, Prototype matching, feature based approach, Computational approach; Cognitive models of memory- Atkinson-Shiffrin's model, Tulving's model, Parallel distributed processing approach; Understanding of problem; Cybernetic view to cognition.

Unit-3: Production rules, Working memory, Control Unit/Interpreter, Conflict Resolution strategies, Types of production systems-Commutative Production system, Decomposable Production system, Forward verses Backward reasoning, Merits of a Production system- Isolation of knowledge and control strategy, Direct Mapping onto State-space, Modular Structure of Production rules, Knowledge base Optimization in production system.

Unit-4: Production Solving by Intelligent Search: General problem solving approaches-Breadth first search, depth first search, Iterative deepening search, Hill Climbing, Simulated annealing; Heuristic Search- for OR Graph, Iterative deepening algorithm, AND-OR Graph, Adversary Search- MINIMAX algorithm, Alpha-Beta heuristics.

Unit-5: Logic of Propositions and Predicates- Formal definition, Propositional Logic-Semantic method for theorem proving, Syntactic method for theorem proving, Resolution in Propositional Logic, Predicate Logic, Unification of Predicates, Robinson's Interference Rule, Types of Resolution, Soundness and Completeness of Logic.

References: