गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर – 495009 (छ.ग.)

Guru Ghasidas Vishwavidyalaya
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Koni, Bilaspur – 495009 (C.G.)

List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department	: *Electronics and Communication Engineering*
Programme Name	: *B.Tech.*

Academic Year : 2016-17

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	ENATHS01	Professional Communication English
02.	CHATBS01	Engineering Chemistry
03.	MEATES01	Engineering Mechanics
04.	CSATES02	Fundamental of Computers
05.	EMATBS02	Engineering Mathematics-I
06.	CHALBS01	Engineering Chemistry Lab
07.	MEALES01	Engineering Mechanics Lab
08.	MEALES03	Engineering Drawing
09.	CHBTHS02	Environmental Studies
10.	MEBTES04	Engineering Thermodynamics
11	EEBTES05	Basic Electrical & Electronics Engineering
12	PHBTBS03	Engineering Physics
13	EMBTHS04	Engineering Mathematics-II
14	EEBLES05	Basic Electrical & Electronics Engineering Lab
15	PHBLBS03	Engineering Physics Lab
16	MEBLES06	Workshop Practices
17	EC3THS03	Engineering Economics
18	EC3TPC01	Signals and Systems
19	EC3TBS01	Engineering Mathematics-III
20	EC3TES01	Network Analysis And Synthesis
21	EC3TES02	Electronic Devices
22	EC3TPC02	Digital Logic Circuits
23	EC3PES02	Electronics Devices Lab
24	EC3PPC02	Digital Logic Circuits Lab
25	EC4TBS02	Numerical Analysis
26	EC4TPC03	Automatic Control Systems

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27	EC4TPC04	Analog Circuits
28	EC4TPC05	Communication System-I
29	EC4TPC06	Electronics Measurements & Instrumentation
30	EC4PPC04	Analog Circuits Lab
31	EC4PPC05	Communication System-I Lab
32	EC4PPC06	Electronic Measurements & Instrumentation Lab
33	ECETh3101	Lic & Its Application
34	ECETh3102	Electromagnetic Field Theory
35	ECETh3103	Microprocessor & Its Application
36	ECETh3104	Automatic Control System
37	ECETh3104	Communication System- II
38	ECEPr3101	Lic & Its Application Lab
39	ECEPr3102	Microprocessor & Its Application Lab
40	ECEPr3103	Communication System Lab
41	ECETh3201	Digital Signal Processing
42	ECETh3202	Data Communication
43	ECETh3203	Digital Hardware Design
44	ECETh3204	Antenna & Wave Propagation
45	ECETh3205	VLSI Fabrication Technology
46	ECEPr3201	Digital Signal Processing Lab
47	ECEPr3202	Advance Communication Lab
48	ECEPr3203	Digital Hardware Design Lab
49	ECETh4101	Wireless and Mobile Communication
50	ECETh4102	VLSI Design & VHDL
51	ECETh4103	Power Electronics
52	ECETh4104	Microwave Engineering
53	ECETh4105	Embedded System
54	ECETh4106	Multirate Systems and Filter Banks
55	ECETh4107	Speech Signal Processing
56	ECETh4108	Wireless Sensor Network
57	ECETh4109	Artificial Intelligence & Expert Systems
58	ECETh4110	Neural Network & Fuzzy Logic System
59	ECETh4111	Biomedical Instrumentation
60	ECETh4112	Semiconductor Devices Modeling & Simulation
61	ECEPr4101	Project-I

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62	ECEPr4102	Seminar
63	ECEPr4103	VLSI Design & VHDL Lab
64	ECEPr4104	Microwave Engineering Lab
65	ECETh4201	Radar & Satellite Communication
66	ECETh4202	Principle of Management
67	ECETh4203	Optical Fiber Communication
68	ECETh4204	Digital Image Processing
69	ECETh4205	Cryptography & Network Security
70	ECETh4206	Radar Engineering
71	ECETh4207	Mobile Computing
72	ECETh4208	Nano Technology
73	ECETh4209	Vacuum Technology
74	ECETh4210	Optimization Techniques
75	ECETh4211	Stochastic Process
76	ECEPr4201	Project-II
77	ECEPr4202	Comprehensive Viva-voce
78	ECEPr4203	Circuit Simulation Lab
79	ECEPr4204	Optical Fiber Communication Lab
80	IT7100	Research Methodology in engineering
81	ECE7102	Vaccume Technology
82	ECE7103	Finite Element Method
83	ECE7104	Sensors Measurement Science & Technology
84	ECE7105	Artificial Intelligence

विभागाध्यक्ष (इले. एव 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.)

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Sensor Network Challenges – Miniaturization, power management, scalability, standardization and security System Challenges, Tiny OS, Network Sensor Platforms

SUGGESTED BOOKS & REFERENCE:-
1. Building Wireless Sensor Networks by Robert Faludi Binding: Paperback Publisher: Oreilly Released: 2011
2. Wireless Sensor Networks by Zhao Feng, Guibas Leonidas Binding: Paperback Publisher: Elsevier India Released: 2004
3. Wireless Sensor Networks by C. S Raghavendra, Krishna M Sivalingam, Taieb Znati Binding: Paperback Publisher: Springer/bsp Books Released: Rpt.2010

5. ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS

UNIT – I

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 – II

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 – III

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 – IV

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 – V

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.

SUGGESTED BOOKS & REFERENCE:-
1. Artificial Intelligence and Soft Computing, Amit Konar
2. Journal of Artificial Intelligence, ScienceDirect, Elsevier Publication
3. IEEE Transaction on Computational Intelligence and AI
4. Artificial Intelligence By Elaine Rich and Kevin Knight, Tata McGraw Hill.
5. Introduction to AI and Expert Systems by Dan W.Patterson, PHI.

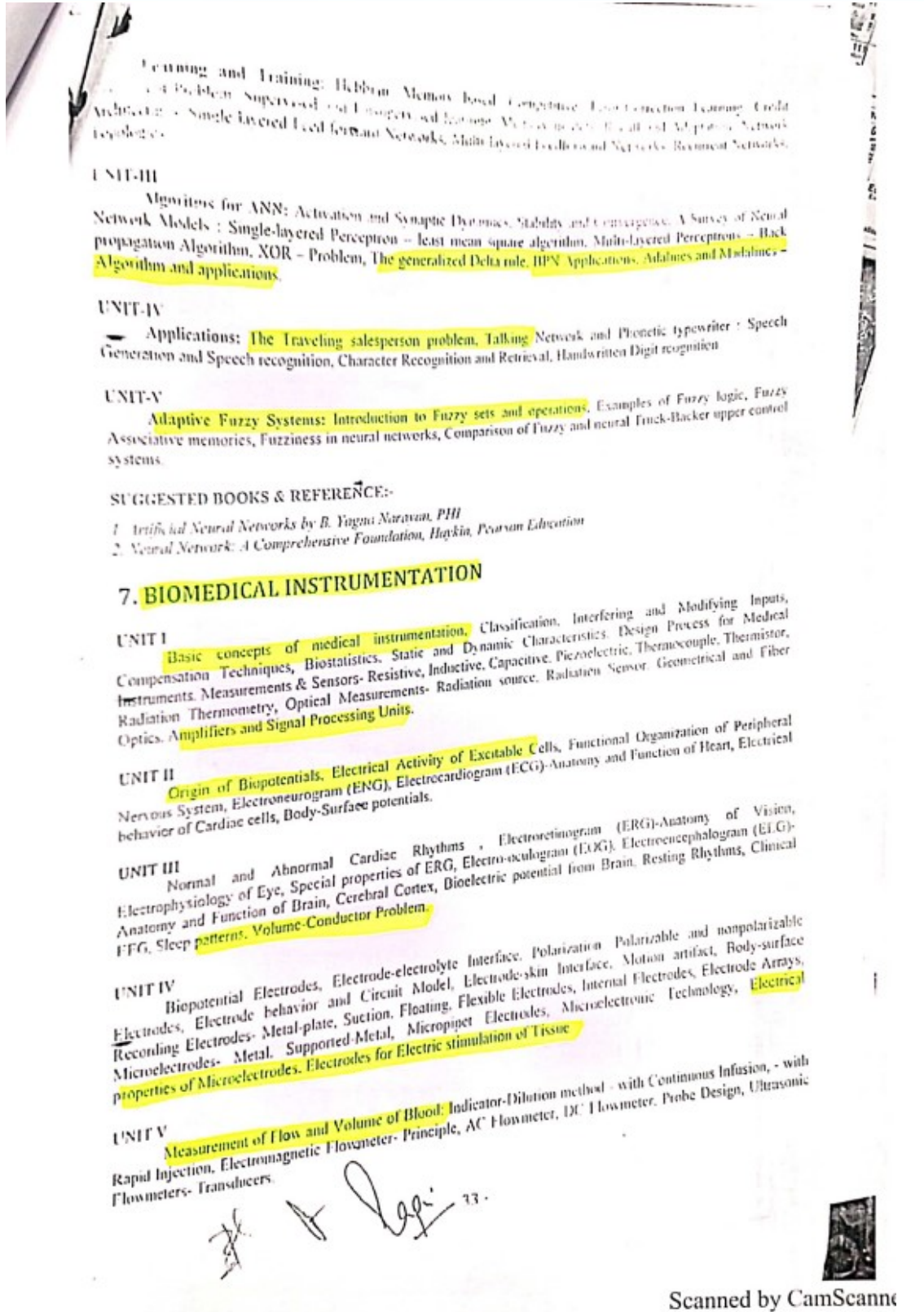## 6. NEURAL NETWORK & FUZZY LOGIC SYSTEM

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

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Learning and Training: Hebbian Memory based Competitive Learning Competitive Learning Credit Architecture - Single-Layered Feed forward Networks, Multi Layered Feedforward Networks, Recurrent Networks.

UNIT-III

Algorithm 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 recognition

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
2. Neural Network: A Comprehensive Foundation, Haykin, Pearson Education

7. BIOMEDICAL INSTRUMENTATION

UNIT I

Basic concepts of medical instrumentation, Classification, Interfering and Modifying Inputs, Compensation Techniques, Biostatistics, Static and Dynamic Characteristics, Design Process for Medical Instruments, Measurements & Sensors- Resistive, Inductive, Capacitive, Piezoelectric, Thermocouple, Thermistor, Radiation Thermometry, Optical Measurements- Radiation source, Radiation Sensor, Geometrical and Fiber Optics, Amplifiers and Signal Processing Units.

UNIT II

Origin of Biopotentials, Electrical Activity of Excitable Cells, Functional Organization of Peripheral Nervous System, Electroneurogram (ENG), Electrocardiogram (ECG)-Anatomy and Function of Heart, Electrical behavior of Cardiac cells, Body-Surface potentials.

UNIT III

Normal and Abnormal Cardiac Rhythms , Electroretinogram (ERG)-Anatomy of Vision, Electrophysiology of Eye, Special properties of ERG, Electro-oculogram (EOG), Electroencephalogram (EEG)- Anatomy and Function of Brain, Cerebral Cortex, Bioelectric potential from Brain, Resting Rhythms, Clinical EEG, Sleep patterns, Volume-Conductor Problem.

UNIT IV

Biopotential Electrodes, Electrode-electrolyte Interface, Polarization Polarizable and nonpolarizable Electrodes, Electrode behavior and Circuit Model, Electrode-skin Interface, Motion artifact, Body-surface Recording Electrodes- Metal-plate, Suction, Floating, Flexible Electrodes, Internal Electrodes, Electrode Arrays, Microelectrodes- Metal, Supported-Metal, Micropipet Electrodes, Microelectronic Technology, Electrical properties of Microelectrodes, Electrodes for Electric stimulation of Tissue

UNIT V

Measurement of Flow and Volume of Blood: Indicator-Dilution method – with Continuous Infusion, – with Rapid Injection, Electromagnetic Flowmeter- Principle, AC Flowmeter, DC Flowmeter, Probe Design, Ultrasonic Flowmeters- Transducers.

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STED BOOKS & REFERENCE:-

1. The Book of Biomedical Instrumentation, R S Khandpur, Tec Megraw Hill Publication
3. Medical Instrumentation- Application and Design J G Webster, Wiley Student Edition
4. Instrumentation, J G Webster, Wiley Student Edition
5. Related papers in journals in Elsevier.
6. Bio medical Instrumentation and Measurements, Leslie Cromwell.
6. Principles of Bio medical Instrumentation, Richard Aston

8. SEMICONDUCOTR DEVICE MODELING & SIMULATION

UNIT I

Semiconductor Electronics Review: Elements of Semiconductor Physics, Physical Operation of a *PN* Junction, MOS Junction, MS Junction.
PN–Junction Diode and Schottky Diode: DC Current-Voltage Characteristics, Static Model, Large-Signal Model, Small-Signal Model, Schottky Diode and its Implementation in SPICE2, Temperature and Area Effects on the Diode Model Parameters, SPICE3, HSPICE and PSPICE Models.

UNIT II

Bipolar Junction Transistor (BJT): Transistor Convention and Symbols, Ebers-Moll Static Model, Ebers-Moll Large-Signal Model, Ebers-Moll Small-Signal Model, Gummel-Poon Static Model, Gummel-Poon Large-Signal Model, Gummel-Poon Small-Signal Model, Temperature and Area Effects on the BJT Model Parameters, Power BJT Model, SPICE3, HSPICE and PSPICE Models

UNIT III

Junction Field-Effect Transistor (JFET): Static Model, Large-Signal Model and its Implementation in SPICE2, Small-Signal Model and its Implementation in SPICE2, Temperature and Area Effects on the JFET Model Parameters, SPICE3, HSPICE and PSPICE Models
Metal-Oxide-Semiconductor Transistor (MOST): Structure and Operating Regions of the MOST, LEVEL1 Static Model, LEVEL2 Static Model, LEVEL1 and LEVEL2 Large-Signal Model, LEVEL3 Static Model, LEVEL3 Large-Signal Model, The Effect of Series Resistances, Small-Signal Models, The Effect of Temperature, BSIM1, BSIM2, SPICE3, HSPICE and PSPICE Models

UNIT IV

BJT Parameter Measurements: Input and Model Parameters, Parameter Measurements.
MOST Parameter Measurements: LEVEL1 Model Parameters, LEVEL2 Model (Long-Channel) Parameters, LEVEL2 Model (Short-Channel) Parameters, LEVEL3 Model Parameters. Measurements of Capacitance, BSIM Model Parameter Extraction.
Noise and Distortions: Noise, Distortion.

UNIT V

Metal-Semiconductor Field-Effect Transistor (MESFET), Ion-Sensitive Field-Effect Transistor (ISFET) and Semiconductor-Controlled Rectifier (Thyristor): The MESFET, The ISFET, The Thyristor.

SUGGESTED BOOKS & REFERENCE:-

1. Paolo Antognetti and Giuseppe Massobrio, Semiconductor Device Modeling with SPICE, 2nd edn., McGraw-Hill, New York.
2. Richard S. Muller, Theodore I. Kamins, and Mansun Chan, Device Electronics for Integrated Circuits, 3rd edn., John Wiley and Sons, New York, 2003. ISBN. 0-471-59398-2.
3. H. Craig Casey, Devices for Integrated Circuits: Silicon and III-V Compound Semiconductors, John Wiley, New York.
4. Dieter K. Schroder, Semiconductor Material and Device Characterization John Wiley and Sons, New York.

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Sub. Code	L	T	P	Duration	IA	ESE	Credits
ECETH420L	3	1		3 hours	40	60	4

SATELLITE & RADAR COMMUNICATION

UNIT – I

INTRODUCTION: Origin and brief history of satellite communication. Elements 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, Mechanics of launching a synchronous satellite, selecting a launch vehicle.

UNIT – II

SPACE CRAFT: Satellite subsystem, power supply altitude and orbit control system, Telemetry 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 Small earth station, Low noise amplifier, high noise amplifier, VSAT'S, Satellite Television Receiver, INMARSAT& INSAT System.

UNIT – V

RADAR: Introduction, Radar block diagram and Operation, Radar Frequencies, Simple form of Radar Equation, Prediction of Range Performance, Minimum Detectable Signals, CW Radar, Tracking Radar, MTI Radar.

SUGGESTED BOOKS & REFERENCE:-
1. Pratt, T & Bastion, C.W. "Satellite Telecommunication", John Wiley & Sons.
2. Roddy, D. "Satellite communication", Prentice Hall, of India Private Limited, New Delhi.
3. Manojit Mitra "Satellite Communication" PHI

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Sub Code	L	T	P	Duration	IA	ESE	Credits
ECETh4202	3	1		3 hours	40	60	4

PRINCIPLE OF MANAGEMENT

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: Concep Direction and Supervision, Co-ordination.

UNIT – V
Communication: Communication Process, Importance of Communication, Barriers to Communicati 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
7. Management, H Koontz, McGraw Hill
8. Fundamentals of Management, Robbins & Dinzo, Pearson India

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Sub Code	L	T	P	Duration	IA	ESE	Credits
E....h4203	3	1		3 hours	10	60	4

OPTICAL FIBER COMMUNICATION

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.

SUGGESTED BOOKS & REFERENCE:-

1. Optical fiber communication, G Keiser
2. Optical communication, J Frames & V K Jun
3. Optical communication, A K Ghatak & K Thyagarajan

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LIST OF ELECTIVE SUBJECTS

Sub Code	L	T	P	Duration	IA	ESE	Credits
ECETh420	3	1		3 hours	40	60	

1. DIGITAL IMAGE PROCESSING

UNIT-I

Introduction and Fundamentals: Motivation and Perspective, Applications, Components of Image Processing System, Element of Visual Perception, A Simple Image Model, Sampling and Quantization.

Image Enhancement in Spatial Domain: Introduction; Basic Gray Level Functions – Piecewise-Linear Transformation Functions: Contrast Stretching; Histogram Specification; Histogram Equalization; Local Enhancement; Enhancement using Arithmetic/Logic Operations – Image Subtraction, Image Averaging; Basics of Spatial Filtering; Smoothing - Mean filter, Ordered Statistic Filter, Sharpening – The Laplacian.

UNIT-II

Image Enhancement in Frequency Domain: Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filters – Low-pass, High-pass, Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters – Gaussian Lowpass Filters; Sharpening Frequency Domain Filters – Gaussian Highpass Filters, Homomorphic Filtering.

Image Restoration: A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering – Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering – Bandpass Filters; Minimum Mean-square Error Restoration.

UNIT-III

Color Image Processing: Color Fundamentals, Color Models, Converting Colors to different models, Color Transformation, Smoothing and Sharpening, Color Segmentation.

Morphological Image Processing: Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms – Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening.

UNIT-IV

Registration: Introduction, Geometric Transformation – Plane to Plane transformation, Mapping, Stereo Imaging – Algorithms to Establish Correspondence, Algorithms to Recover Depth.

Segmentation: Introduction, Region Extraction, Pixel-Based Approach, Multi-level Thresholding, Local Thresholding, Region-based Approach, Edge and Line Detection: Edge Detection, Edge Operators, Pattern Fitting Approach, Edge Linking and Edge Following, Edge Elements Extraction by Thresholding, Edge Detector Performance, Line Detection, Corner Detection.

UNIT-V

Feature Extraction: Representation, Topological Attributes, Geometric Attributes.

Description: Boundary-based Description, Region-based Description, Relationship.

Object Recognition: Deterministic Methods, Clustering, Statistical Classification, Syntactic Recognition, Tree Search, Graph Matching.

SUGGESTED BOOKS & REFERENCE:-

1. Digital Image Processing 2nd Edition, Rafael C. Gonzalvez and Richard E. Woods, Pearson Education.
2. Digital Image Processing and Computer Vision, R.J. Schalkoff, John Wiley and Sons, NY.
3. Fundamentals of Digital Image Processing, A.K. Jain, Prentice Hall, Upper Saddle River, NJ.

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2. CRYPTOGRAPHY & NETWORK SECURITY

UNIT I

Introduction to security attacks, Services, Mechanism, encryption, Classical encryption techniques Substitution and transposition techniques. Simplified DES, Block cipher principles. The data encryption standards, Cryptanalysis, Differential and linear Cryptanalysis, Block cipher design principles, Block cipher modes of operation, evaluation criteria for AES, The AES cipher, Triple DES, blowfish.

UNIT II

Principle of public key cryptosystem, Public key cryptosystems, Application for public key cryptosystem, requirement for public key cryptography, public key crypto analysis, The RSA algorithm, computational aspects. The security of RSA, Key managements, Distribution of public key, public key distribution of secret keys, security requirements for signature scheme.

UNIT III

Elliptic curves cryptography message, authentication and hash function, authentication requirement, authentication functions, message authentication code security of hash function. Hash and Mac algorithm. MD5 message digest algorithm, secure hash algorithm(SHA-1)

UNIT IV

Authentication applications – Kerberos – X.509 authentication service – Electronic mail security – PGP – S/MIME – IP security – Web security.

UNIT V

Intruders:-Intrusion techniques, Intrusion detection, Honey pots, firewall design principles, firewall characteristics, Type of firewall, fire wall configurations.
Web security:-Web security threats, web traffic security approaches, SSL architecture, SSL record protocol, change cipher spec protocol, Alert protocol, Handshake Protocol, Cryptographic Computations, Transport layer security, Secure Electronic Transaction.

SUGGESTED BOOKS & REFERENCE:

1. Cryptography and Network Security, Principles and Practice, William Stallings, PHI
2. Cryptography Theory and Practice, Douglas R. Stinso, Champan & hall/CRC
3. Applied Cryptography, Bruce Schiener, John Wiley & Sons.
4. Network Security & Cryptography, Bernard Menezes, Cengage Learning
5. Introduction to Cryptography, Johannes A Buchmann, Springer-Verlag.
6. Network Security: Private Communication in public world, Charlie Kaufman, R Perlman, M Speciner, Prentice Hall.

3. RADAR ENGINEERING

UNIT-I

The Radar Equation: Introduction, Radar block diagram and operation, radar frequencies. The simple form of radar equation. Prediction of range performances, minimum detectable signals, receiver noise, Integration of radar pulses, Pulse repetition frequency, Antenna parameters

UNIT-2

CW and frequency modulated Radar: The Doppler effect, CW Radar, Frequency modulated CW radar, Air bone Doppler Navigation, Multiple Frequency CW Radar.

UNIT-3

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MTI and PULSE DOPPLER RADAR: Introduction to Delay and Doppler, Range ambiguity Pure MTI Tradeoffs. Range gated Doppler filter, MTI Delay line, Non coherent MTI, Pulse Doppler Radar. MTI from a moving platform. Radar display.

UNIT 4

TRACKING RADAR: Tracking with radar, Sequential lobbing, Conical Scan, Mono pulse Tracking radar, Target reflection characteristics with angular Accuracy, tracking in range. Acquisition. Comparison of trackers, tracking with surveillance radar

UNIT – 5

Radar Cross Section: Cross section for small targets, scattering cross section. Effect of polarization on Cross section, Examples of Target cross section, sphere, flat rectangular plate, flate circular plate, circular cylinder, straight wire, complex target shapes, Rayleigh model, Erlang model, Chi square model, weibull model, long normal model.

SUGGESTED BOOKS & REFERENCE:-

1: Radar Principles by Peyton Z. Peebles, Jr. John Wiley &Sons, INC.
2: Introduction to radar System Merrill I. Skolnik Mc- Graw Hill

4. MOBILE COMPUTING

UNIT – 1

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

SUGGESTED BOOKS & REFERENCE:-

1. J. Schiller, Mobile Communications, Addison Wesley.
2. A. Mehrotra, GSM System Engineering.
3. M. V. D Heijden, M. Taylor, Understanding WAP, Artech House.
4. Charles Perkins, Mobile IP, Addison Wesley.
5. Charles Perkins, Ad hoc Networks, Addison Wesley.

5. NANOTECHNOLOGY

UNIT-I

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UNIT-1   5. NANO TECHNOLOGY

Introduction to Nanotechnology, Essence of Nanotechnology, Nano in daily life, Brief account of nano clusters, Semiconductor nano particles, Properties of nano materials, Properties of nano materials, Nano in daily life, Metal nano

UNIT-2

Nano Material, Metal and Semiconductor Nanomaterials, Quantum dots, Work function, 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-gel 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

6. VACUUM TECHNOLOGY

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.

SUGGESTED BOOKS & REFERENCE:-

1. Vacuum Science and Technology, V V Rao, T B Ghosh, K L Chopra
2. Vacuum Journal, Science direct, Elsevier Publication

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OPTIMIZATION TECHNIQUES

UNIT-I

Linear programming - Central Problem of linear Programming various definitions included statements of the problem, and also their properties, simplex methods, primal and dual simplex method, transport problem, its solution. Assignment problem and its solution. Graphical Method Formulation, Linear Programming Problem

UNIT-II

Queuing Theory - Characteristics of queuing system, Classification of Queuing Model Single Channel Queuing Theory, Generalization of steady state M/M/1 queuing models(Model-I, Model-II).

UNIT-III

Replacement Theory - Replacement of item that deteriorates replacement of items that fail. Group replacement and individual replacement

UNIT-IV

Inventory Theory - Cost involved in inventory problem- single item deterministic model economics long size model without shortage and with shorter having production rate infinite and finite.

UNIT-V

Job Sequencing - Introduction, solution of sequencing problem Johnson's algorithm for n jobs through 2 machines

SUGGESTED BOOKS & REFERENCE:-

1. Gillet B.E. "Introduction to Operation Research"
2. Taha H.A "Operation Research - an introduction"
3. Kanti Swarup "Operation Research"
4. S.D.Sharma "Operation Research"
5. Hira & Gupta "Operation Research"

8. STOCHASTIC PROCESS

UNIT-I

Probability Theory Refresher: Axiomatic construction of probability spaces, random variables and vectors, probability distributions, functions of random variables; mathematical expectations, transforms and generating functions, modes of convergence of sequences of random variables, laws of large numbers, central limit theorem.

UNIT-II

Introduction to Stochastic Processes (SPs): Definition and examples of SPs, classification of random processes according to state space and parameter space, types of SPs, elementary problems.

UNIT-III

Discrete-time Markov Chains (MCs): Definition and examples of MCs, transition probability matrix. Chapman-Kolmogorov equations; calculation of n-step transition probabilities, limiting probabilities, classification of states, ergodicity, stationary distribution, transient MC; random walk and gambler's ruin problem, applications. Continuous-time Markov Chains (MCs): Kolmogorov-Feller differential equations, infinitesimal generator, Poisson process, birth-death process, Applications to queuing theory, inventory analysis, communication networks, finance and biology.
Brownian Motion: Wiener process as a limit of random walk; first -passage time and other problems, application to finance.

UNIT-IV

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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.

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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

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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.,

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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

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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: