

DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL (SONEPAT)
SCHEME OF STUDIES AND EXAMINATION
B. TECH. IV YEAR (ELECTRONICS & COMMUNICATION ENGINEERING)
SEMESTER VIII
Credit Based Scheme w.e.f. 2015-2016

Sr. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Exam. Marks		Total Marks	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	ECE402B	WIRELESS COMMUNICATION SYSTEMS	3	1	-	25	75	-	100	4	3
2	ECE404B	DATA COMMUNICATION AND NETWORK(ECE,EEE)	3	1	-	25	75	-	100	4	3
3		DEPT. ELECTIVE I	4	-	-	25	75	-	100	4	3
4		DEPT. ELECTIVE II	4	-	-	25	75	-	100	4	3
5	ECE424B	DATA COMMUNICATION AND NETWORK LAB	-	-	2	20	-	30	50	1	3
6	ECE431B	PROJECT	-	-	8	75	-	125	200	8	3
7	ECE438B	SEMINAR	-	-	2	50	-	-	50	2	-
8	GPEC402B	GENERAL FITNESS FOR THE PROFESSION	-	-	-	-	-	100	100	4	3
Total			14	2	12	245	300	255	800	31	

DEPT. ELECTIVE-I			DEPT. ELECTIVE-II		
S.NO	CODE	TITLE	S.NO	CODE	TITLE
1	ECE406B	NEURAL NETWORK & FUZZY LOGIC	1	ECE416B	DIGITAL IMAGE PROCESSING
2	ECE408B	ELECTRONIC MATERIALS AND NANO TECHNOLOGY	2	ECE418B	RELIABILITY ENGINEERING
3	ECE410B	BIOMEDICAL ELECTRONICS	3	ECE420B	TELECOMMUNICATION SWITCHING SYSTEMS
4	ECE412B	OPTICAL COMMUNICATION	4	ECE426B	EMBEDDED SYSTEM DESIGN
5	ECE414B	RADAR AND SONAR ENGINEERING	5	ECE428B	POWER SYSTEM STABILITY AND FACTS

Note:

- Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Sports is given in General Proficiency Syllabus.
- The students will be allowed to use non-Programmable Scientific Calculator. However, sharing/exchange of calculator is prohibited in the examination.
- Electronic Gadgets including Cellular Phones are not allowed in the examination.
- Project coordinator will be assigned the project (ECE436B) load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her. Project involving design, fabrication, testing, computer simulation, case studies etc., which has been commenced by students in VII semester will be completed in VIII semester.
- For the course ECE438B (Seminar), a student will select a topic from emerging areas of Engineering & Technology and study it independently. Student will give a seminar / talk on the topic.
- The evaluation of the student for his / her General Fitness for Profession shall be carried out by a team consisting of Dean Faculty of Engineering. & Technology, Chairperson of concerned department and external examiner appointed by University.
- The minimum strength of the students should be 20 to run an elective course.

ECE402B

WIRELESS COMMUNICATION SYSTEMS

B. Tech Semester –VIII

L T P Credits
3 1 - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks

Duration of Exam. : 3 Hrs.

UNIT I

Introduction to Wireless Communication Systems:

Evolution of Mobile Radio Communications : Introduction, First Generation (1G), Second Generation (2G), Generation (2.5G) , Third Generation (3G), Evolution from 2G To 3G, Fourth Generation (4G), Examples of Wireless Communication Systems , Difference Between Fixed Telephone Network and Wireless Telephone Network, Wireless Local Loop [WLL], Wireless Local Area Networks (WLAN) , Personal Area Network(PAN), Bluetooth.

The Cellular Concept-System Design Fundamentals

Introduction, Frequency Reuse, Channel Assignment Strategies, Hand-Off Strategies, Interference and System Capacity, Trunking and Grade of Service, Improving Coverage and Capacity in Cellular Systems.

UNIT II

Mobile Radio Propagation: Large Scale Path Loss :

Introduction to Radio Wave Propagation, Free Space Propagation Model, Practical Link Budget Design Using Path Loss Models, Outdoor Propagation Models, Indoor Propagation Models, Signal Penetration into Buildings.

Mobile Radio Propagation: Small Scale Fading and Multipath:

Small Scale Multipath Propagation, Impulse Response Model of a Multipath Channel, Small Scale Multipath Measurements, Parameters of Mobile Multipath Channels ,Types of Small Scale Fading, Rayleigh and Ricean Distributions.

UNIT III

Equalization and Diversity :

Fundamentals of Equalization, Equalizer in a Communication Receiver, Linear Equalizer, Non Linear Equalization, Diversity Techniques, Rake Receiver, Interleaving

Multiple Access Techniques for Wireless Communication :

Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Spread Spectrum Multiple Access, Space Division Multiple Access (SDMA), Capacity of Cellular System.

UNIT IV

Wireless Networking :

Introduction to Wireless Networks, Development of Wireless Networks, Traffic Routing in Wireless Networks, Wireless Data Services, Common Channel Signaling, Integrated Services Digital Network (ISDN), Signalling System No.7(SS 7),Personal Communication Services/Networks. (PCS/PCN)

Wireless Systems and Standards:

Global System for Mobile (GSM),Cdma Digital Cellular Standard(IS-95),GPRS,EDGE,W-Cdma,Cdma2000

Text Books :

1. T.S. Rappaport, "Wireless Communication, Principles & Practice," PHI .
2. Rajeshwar Dass, "Wireless Communication Systems," I.K International Pvt. Ltd
3. Jochen Schiller, "Mobile Communication," Pearson Education

Reference Books:

1. William, C Y Lee, "Mobile Cellular Telecommunications," Mc Graw Hill
2. Dr. Kamilo Feher "Wireless and Digital Communication," PHI

NOTE:

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In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

ECE404B

DATA COMMUNICATION AND NETWORK

B. Tech Semester –VIII (ECE, EEE)

L T P Credits
3 1 - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks

Duration of Exam. : 3 Hrs.

UNIT I

Data Communication and Networks:

Components, Data Representation, Data Flow, Guided and Unguided Media, Distributed Processing, Network Criteria, Physical Structure, Network Models, Category of Networks

Data and Signals:

Analog and Digital Data, Analog and Digital Signals, Periodic and Non Periodic Signals, Transmission Impairments- Attenuation, Distortion, Noise, Performance bandwidth, Throughput, Latency, Bandwidth-Delay Product, Jitter

UNIT II

Digital Transmission:

Digital to digital Conversion-Line Coding, Line Coding Schemes, Block Coding, Scrambling, Transmission modes-Parallel Transmission and Serial Transmission

Multiplexing

Frequency Division Multiplexing, Wavelength division Multiplexing, Synchronous Time division multiplexing, Statistical Time Division multiplexing

UNIT III

Switching:

Circuit Switched Networks-Three Phases, Efficiency Delay, Datagram Networks-Routing table, Efficiency delay, Virtual Circuit Networks- Addressing, Three Phases, Efficiency, Delay in Virtual Circuit Networks

Data Link Control

Framing-Fixed Size Framing, Variable Sized framing, Flow and Error Control-Flow Control, error control, Protocols; Noiseless Channels-Simplest protocol, stop and Wait Protocol, Noisy Channels-Stop and Wait Automatic Repeat Request, Go Back n Automatic Repeat request, Selective Repeat Automatic Repeat request, PiggyBacking

UNIT IV

Network Models:

Layered Tasks-Sender, receiver and Carrier, The OSI Model-Layered Architecture, Peer to peer processes, Encapsulation, Layers in the OSI Model-Physical Layer, data Link layer, Network layer, transport layer, Session layer, Presentation layer, application layer, Summary of layers, Introduction to TCP-IP and Internetworking

Wired Lans-Ethernet:

IEEE Standards-Data Link Layer, Physical layer, Standard Ethernet-Mac Sublayer, Physical layer, Changes in the standard bridged Ethernet, Switched Ethernet, full duplex Ethernet, fast Ethernet-Mac sublayer, Physical layer

Text Books :

1. Data Communication and Networking by Behrouz.A.Forouzan(TMh Publication)

Reference Books:

1. Computer Networks by William Stallings

NOTE:

Approved by UG BOS & FET

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

ECE424B

DATA COMMUNICATION AND NETWORK LAB

B. Tech Semester –VIII

L T P Credits
- - 2 1

Class Work : 20 Marks
Practical : 30 Marks
Total : 50 Marks

Duration of Exam. : 3 Hrs.

LIST OF EXPERIMENTS:

1. To study different types of transmission media
2. To study Quadrature Phase Shift Keying Modulation.
3. To study Quadrature Amplitude Modulation.
4. To Study 16 Quadrature Amplitude Multiplexing.
5. To Study Serial Interface RS-232 and its applications.
6. To study the Parallel Interface Centronics and its applications.
7. To configure the modem of a computer.
8. To make inter-connections in cables for data communication in LAN.
9. To install LAN using Tree topology.
10. To install LAN using STAR topology.
11. To install LAN using Bus topology.
12. To install LAN using Token-Ring topology
13. To install WIN NT
14. To cofigure a HUB/Switch.

Note:-

- 1 Total ten experiments are to be performed in the semester

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- 2 At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.

ECE431B

PROJECT
B. Tech Semester –VIII

L T P Credits
- - 8 8

Class Work : 75 Marks
Practical : 125 Marks
Total : 200 Marks

Duration of Exam. : 3 Hrs.

The project started in VII Semester will be completed in VIII Semester and will be evaluated through a panel of examiners consisting of the following:

Head/ Chairperson of Department : Chairperson
Project coordinator : Member
External examiner : To be appointed by the University

The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).

Project coordinator will be assigned the project load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.

The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

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ECE438B

SEMINAR
B. Tech Semester –VIII

L T P Credits
- - 2 2

Class Work : 50 Marks
Practical : -
Total : 50 Marks

The objectives of the course remains

- To learn how to carry out literature search
- To learn the art of technical report writing
- To learn the art of verbal communication with the help of modern presentation techniques

A student will select a topic in emerging areas of Engineering & Technology and will carry out the task under the observation of a teacher assigned by the department.

He/ She will give a seminar talk on the same before a committee constituted by the chairperson the department. The committee should comprise of three faculty members from different specializations. The teacher associated in the committee will be assigned 2 hours teaching load per week.

However, guiding students' seminar will not be considered towards teaching load.

The format of the cover page and the organization of the body of the seminar report for all the undergraduate programs will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

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GPEC402B

GENERAL FITNESS FOR THE PROFESSION

B. Tech Semester –VIII

L T P Credits
- - - 4

Examination : -
Practical : 100 Marks
Total : 100 Marks

Duration of Exam. : 3 Hrs.

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.

The evaluation will be made by the committee of examiners constituted as under:

- | | | | |
|----|--|---|-----------------------------|
| 1. | Dean, Faculty of Engineering & Technology/ Director /Principal of affiliated college | : | Chairperson |
| 2. | Chairperson of the department | : | Member |
| 3. | External expert | : | Appointed by the university |

A. The student will present a written report before the committee with following in view:

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:

- | | | |
|-----|--|-------------------|
| I. | Academic Performance | ----- |
| II. | Extra Curricular Activities / Community Service, Hostel Activities | (12 Marks) |
| III | Technical Activities / Industrial, Educational tour | (12 Marks) |
| IV | Sports/games | (16Marks) |

Note: Report submitted by the students should be typed on both sides of the paper.

- B.** A student will support his/her achievement and verbal & communicative skill through presentation before the examiners.
(40 Marks)

- C.** Faculty Counselor Assignment **(20 Marks)**

It will be the duty of the student to get evaluated by respective faculty counselor and to submit the counselor assessment marks in a sealed envelope to the committee.

A counselor will assess the student which reflects his/her learning graph including followings:

1. Discipline throughout the year
2. Sincerity towards study
3. How quickly the student assimilates professional value system etc.
4. Moral values & Ethics- Syllabus (one lecture/week on the topics of Human values/Ethics is to be delivered)

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ECE406B

NEURAL NETWORK AND FUZZY LOGIC

B. Tech Semester –VIII (Elective I)

L T P Credits
4 - - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks

Duration of Exam. : 3 Hrs.

UNIT I

NEURO-FUZZY TECHNIQUES:

Neuro-fuzzy techniques, need of neuro-fuzzy techniques, Neural and fuzzy intelligence, fuzziness vs Multivalence: the dynamical systems to machine intelligence.

NEURAL NETWORKS:

Neural networks characteristics, difference between biological neuron & A.N.N, History of development in neural networks principles, Artificial neural net terminology, Model of a neuron, Topology

UNIT II

NEURAL NETWORKS MODELS & RULES:

Feed forward network, feedback network, Supervised, Unsupervised, Re-enforcement learning. Knowledge, representation and acquisition. Basic Hop field model, Types of learning, Hebbian learning, Perception learning, Delta learning, Window–Hoff Learning correlation Learning, Winner-Take–all learning rule

ARTIFICIAL NEURAL NETWORKS & APPLICATIONS:

Radial basis function neural networks, Basic learning laws in RBF nets, Recurrent back propagation, Introduction to counter propagation networks, ART networks, Associative Memories, Applications such as pattern recognition, speech and decision-making.

UNIT III

FUZZY LOGIC:

Basic concepts of fuzzy logic, Fuzzy vs. Crisp set, Linguistic variables, Membership functions, Fuzzy sets & Operations of fuzzy sets, Fuzzy IF-THEN rules.

FUZZY SYSTEM:

Fuzzy system, Fuzzy Inference System, De-Fuzzification.

UNIT IV

APPLICATIONS OF FUZZY LOGIC:

Application of Fuzzy logic: Industrial automation, energy saving AC control, washing machines, automatic target tracking, ABS system, Traffic light controller.

NEURO-FUZZY SYSTEM:

Introduction, combining fuzzy system with neural network, properties of Neuro-Fuzzy system, Neuro-Fuzzy architecture, applications.

Reference Books:

1. B. Yegnanarayana, " Artificial Neural Networks"PHI
2. J.M. Zurada, "Introduction to artificial neural systems", Jaico Pub.
3. ROSS J.T , "Fuzzy logic with engineering application", TMH
4. Simon Haykin, "Neural Networks", PHI
5. Ahmad M.Ibrahim, "Introduction to applied Fuzzy Electronics", (PHI)
6. P.D. wasserman, "Neural computing theory & practice", (ANZA PUB).

NOTE:

Approved by UG BOS & FET

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

ECE408B

ELECTRONIC MATERIALS AND NANOTECHNOLOGY

B. Tech Semester –VIII (Elective I)

L T P Credits
4 - - 4

Class Work : 25Marks
Theory : 75Marks
Total : 100Marks

Duration of Exam. : 3 Hrs.

UNIT I

INTRODUCTION TO ELECTRONIC MATERIALS:

Thermodynamics of Materials; Mechanical Properties of Materials; Bonding, Structure and Crystallography; Advanced Fluid-Solid Reaction Engineering; Microstructural and Microchemical Characterization of Materials.

MATERIAL BASICS:

Ohms Law and Materials Properties; The Hall Effect; Conductors – Metals, Alloys, Non-metallic Conductors; Contacts, Resistors and Heating; Thermionic Emission, Tunneling, Thermoelectric Effects; Ionic conductors: Debye Length, Nernst Equation.

UNIT II

INTRODUCTION TO DIELECTRICS:

Dielectrics – Mechanisms of Polarization; Frequency dependence of Dielectric constants; Dielectric Losses; Mechanisms of Electrical Breakdown; Piezo-electricity; Ferro-electricity; Dielectrics and Optics.

BASICS OF MAGNETICS:

Magnetics – Origin of Magnetic dipoles; Types of Magnetisms: Diamagnetism, Para-magnetism and Ferro-magnetism; Magnetic data storage.

UNIT III

ADVANCED MATERIALS:

MEMS; NEMS; CNTS; Novel semiconductors; Photovoltaic materials.

MATERIALS FOR IC FABRICATION:

Materials and Processes for Silicon Technology; Si Oxide, LOCOS Process; Chemical Vapor Deposition: Silicon Epitaxy, Oxide CVD, CVD for Poly-Silicon, Silicon Nitride and Miscellaneous Materials; Etching Techniques: Chemical Etching, Plasma Etching; Lithography: Basic Lithography Techniques, Resist and Steppers; Electrochemistry of Silicon.

UNIT IV

ELECTRONIC DEVICES:

Electronic Device Components: Wires & Cables, Semiconductors, Capacitors, PCBs, MEMS, Battery, CD-R, EMI/RFI, ITO, Electro-wetting, LCD & LED; CDs and DVDs.

NANOTECHNOLOGY IN ELECTRONICS:

Nanotechnology in Electronics: Magnetoresistive Random Access Memory (MRAM); Self-assembled nanostructures; Nano-photonics; Nano-ionics; Molecular electronics; Nanomaterials electronics; Nanofabrication.

Reference Books:

1. Materials Science and Engineering, by W.D. Callister, 7th edition, J. Wiley and Sons 2007, ISBN-10: 0-471-73696-1.
2. NANOTECHNOLOGY FOR MICROELECTRONICS AND OPTOELECTRONICS, J.M. Martínez-Duart, R.J. Martín-Palma and F. Agulló-Rueda, Eds, Elsevier 2006, ISBN-10: 0080 445535.
3. Anatoli Korkin & Federico Rosei, Eds, Nanoelectronics and Photonics, Springer 2008, ISBN: 978-0-387-76498-6.
4. Edward L. Wolf, Nanophysics and Nanotechnology: An Introduction to Modern Concepts in Nanoscience, Wiley-VCH, 2006, ISBN-10: 3-527-40651-4.
5. Faiz Rahman, Ed, NANOSTRUCTURES IN ELECTRONICS AND PHOTONICS, Pan Stanford Publishing 2008, ISBN-10 981-4241-10-5.
6. ADVANCED MAGNETIC NANOSTRUCTURES, Eds David Sellmyer & Ralph Skomski, Springer 2006, ISBN 10: 0-387-23309-1.
7. Silicon nanoelectronics, edited by Shunri Oda and David Ferry, Taylor and Francis 2006, ISBN 0-8247-2633-2.
8. Opto electronics & Photonics By Kasap (Pearson).

NOTE:

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

ECE410B**BIOMEDICAL ELECTRONICS**

B. Tech Semester –VIII (Elective I)

L T P Credits
4 - - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks

Duration of Exam. : 3 Hrs.

UNIT I**Electrodes, Sensors and Transducers:**

Signal Acquisition, Transduction, Active v/s Passive sensors, Sensor error sources, sensor terminology, signal processing, electrodes for biophysical sensing, medical surface electrodes, microelectrodes, different types of transducers.

Electrocardiography:

Generation of electric currents in heart, ECG waveform, standard lead system, ECG preamplifier, ECG readout devices, ECG machines, ECG machine maintenance, faults and troubleshooting.

UNIT II**Cardio vascular measurements and Devices:**

Physiological pressure measurements, B.P. measurements, Oscillometric and Ultrasonic non-invasive pressure measurements, pressure transducers, pressure amplifiers, calibrations methods, detector circuits, dilution methods, blood flow measurements. Introduction to plethysmography, phonocardiograph, defibrillators, pacemakers, heart lung machine.

Respiratory system measurements and Devices:

Human respiratory system, gas laws, internal respiration, external respiration, mechanics of breathing, parameters and regulations of respiration, respiratory transducers, medical gases, introduction to spirometer and artificial ventilators.

UNIT III**Nervous system measurements and Devices:**

Organization of Human nervous system, cerebral angiography, cranial X-rays, brain scans, system preamplifier and specifications of EEG, EEG electrodes, EEG telemetry system, typical EEG system artifacts, faults, trouble shooting and maintenance.

ICUs, CCUs and Operating Rooms (Ors):

ICU/CCU equipments, Bedside monitors, central monitoring consoles, ECG and physiological telemetry, types of surgery, OR personal, sterilization, OR equipments.

UNIT IV**Medical Laboratory Instrumentation:**

Blood tests, Colorimeter, flame photometer, spectrophotometer, blood cell counters, pH and blood gas analyzers, auto analyzer, dialysis machine, Electrical safety precautions, typical faults.

Medical Imaging Equipments:

Basic Principles and working of various medical imaging modality: X-ray, CT Scan, MRI, PET Scan, Ultrasonography, color Doppler, Echocardiography, nuclear medical imaging.

Reference Books:

1. Introduction to Biomedical Equipments Technology by Carr & Brown, Pearson Education.
2. Biomedical Instrumentation and measurements by Cromwell et al, Pearson Education.
3. Handbook of Biomedical Instrumentation by Khandpur, Tata McGraw Hill.

NOTE:

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

ECE412B**OPTICAL COMMUNICATION****B. Tech Semester –VIII (Elective I)**

L T P Credits
4 - - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks

Duration of Exam. : 3 Hrs.

UNIT I**Introduction to Optical communication System:**

Electromagnetic Spectrum used for optical communication,Block Diagram of optical Communication System,Basics of transmission of light rays,Advantages of optical fiber communication

Structure of Optical Fibers:

Step Index Fibers,Graded index Fibers,Single mode fibers(Cut off wavelength,Mode field Diameter,Effective Refractive index),MultiMode fibers

UNIT II**Attenuation:**

Material losses in Silica Glass Fibers(Intrinsic and Extrinsic),Linear Scattering losses(Rayleigh Scattering,Mie scattering),Non Linear scattering losses(SBS,SRS),Fiber Bend loss

Dispersion:

Chromatic Dispersion(Material Dispersion,Waveguide Dispersion),InterModal Dispersion(Multimode Step index fiber,MultiMode Graded Index fiber),Dispersion Modified single mode fibers(Dispersion Shifted and Dispersion Flattened Fibers)

UNIT III**Optical Fiber Connections:**

Fiber alignment and joint loss(Multimode,Single mode),Fiber Splices(Fusion),fiber Couplers(Three and Four port Couplers)

Optical Sources(LED):

Introduction to absorption and Emission Of radiation,Characteristics of Optical sources,LED power and Efficiency,LED Structures(Surface and Edge Emitting),LED Characteristics(Optical O/P power,O/P Spectrum,Modulation Bandwidth)

UNIT IV**Optical Sources(LASER):**

Einstein Relation,Population Inversion,Optical Feedback,Laser Oscillation,Threshold condition for laser oscillation,Comparison of LED and Laser as an Optical Source.

Optical Detectors:

Introduction,Quantum Efficiency,Responsivity,Long wavelength cut off,P-I-N photodiode,Avalanche Photodiode,Benefits and drawbacks of Avalanche photodiodes,Multiplication Factor

Text Books:

1. Fiber Communication By JOHN.M. SENIOR (Pearson Education).

Reference Books:

1. Optical Communication By G. Keiser(Tata Mc Graw Hill)
2. Essentials of Modern optical Fiber Communication By REINHOLD NOE(Springer)
3. Fiber Optic Communication By Palais(Pearson)

NOTE:

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

ECE414B**RADAR AND SONAR ENGINEERING**

B. Tech Semester –VIII (Elective I)

L	T	P	Credits	Class Work	:	25 Marks
4	-	-	4	Theory	:	75 Marks
				Total	:	100 Marks
Duration of Exam.			:	3 Hrs.		

UNIT I**INTRODUCTION TO RADAR:**

Radar Block Diagram & operation, Radar Frequencies, Radar development, Application of Radar.

RADAR EQUATION:

Simple form of Radar Equation, Prediction of Range performance, Minimum detectable signal, Receiver noise, Signal to Noise ratio, Transmitter Power, Pulse repetition frequency & range ambiguities, System losses, Propagation effects.

UNIT II**CW & FREQUENCY MODULATED RADAR:**

The Doppler effect, CW Radar, Frequency-modulated CW Radar, Multiple Frequency CW Radar.

MTI & PULSE DOPPLER RADAR:

Introduction, Delay Line Cancellors, Multiple or staggered, Pulse repetition frequencies, range-Gated Doppler Filters, Digital Signal Processing, Other MTI delay line, Limitation of MTI performance, Noncoherent MTI, Pulse Doppler Radar, MTI from a moving platform.

UNIT III**TRACKING RADAR:**

Tracking with Radar, Sequential Lobbing, Conical Scan, Monopulse Tracking Radar, Tracking in range, Acquisition.

RECEIVERS, DISPLAYS & DUPLEXERS:

Radar Receivers, Noise Figure, Mixer, Low-noise Front ends, Displays, Duplexer, Receiver protectors.

UNIT IV**INTRODUCTION TO SONAR:**

History of sonar, underwater propagation: sound velocity profile, propagation mode, multipaths; Types of sonar system: active, generic active and passive.

SONAR PARAMETERS:

Basic Types of noise in sonar system, Detection of acoustic energy using sonar: detection criterion, sonar system performance, figure of merit; Sonar transducers.

Text Books:

1. Introduction to Radar Systems: Merrill I. Skolnik, ; MGH

Reference Books:

1. Electronic Communication Systems : Kennedy; TMH
2. Fundamental of DADAR, SONAR and Navigation Engineering: K.K. Sharma; Katson Books

NOTE:

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

ECE416B**DIGITAL IMAGE PROCESSING**

B. Tech Semester –VIII (Elective II)

L T P Credits
4 - - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks

Duration of Exam. : 3 Hrs.

UNIT I**Introduction to Digital Image processing :**

Development of Digital Image processing, Components of an Image Processing System, Fundamental steps in Image Processing, Different Levels of Processing, Lower Level Processing Techniques, Applications of Image Processing

Introduction to Image Acquisition:

Capturing Devices, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition: Image Acquisition using a single sensor, Image Acquisition using sensor strips, Image Acquisition using sensor arrays, A simple Image formation model.

UNIT II**Elements of Visual Perception:**

Structure of the Human Eye, Image Formation in Eye, Brightness Adaptation and Discrimination.

Image Digitization and Pixels:

Basic Concepts in sampling and quantization, Representing Digital Images, Spatial and Intensity Resolution, Image Interpolation, Some Basic Relationships between pixels: Neighbours of a Pixel, Adjacency, Connectivity, Regions, and Boundaries, Distance Measures.

UNIT III**Image processing tools:**

Array versus Matrix Operations, Linear vs Nonlinear Operations, Arithmetic Operations, Set & Logical Operations, Spatial Operations, Vector and Matrix Operations, Probabilistic methods.

Image Transforms & Image Registration:

Unitary Transforms: Separable Unitary Transforms, Basis Images, Orthogonal Transforms, Basic Information Theory; Fourier Transform, Discrete Fourier Transform, Properties of Fourier Transform, Convolution & Correlation, Convolution in Frequency domain.

Geometrical Transformations: Basic Transformations, Applications of Geometrical Transformations; Image mapping: Determining a set of Landmarks, Image Transformation Matrices, Computing Transformation Coefficients; Problems of Transforming Digital Images: Direct mapping, Reverse mapping, Grey Level Interpolation.

UNIT IV**Image Enhancement in Spatial Domain:**

Pixel Grey Level Transformation: Linear & Nonlinear Transformations, Grey Level Slicing, Bit-Plane Slicing, Image Averaging; Mask Based Processing: Smoothing Linear filter, Geometric Mean Filter, Harmonic Mean Filter, Median Filter, Max & Min Filters, Sharpening Filters, Image blurring and deblurring; Histogram Processing: Histogram Equalization, Contrast Stretching.

Image Enhancement in Frequency Domain:

Basics of Filtering in the frequency domain: Frequency domain filtering fundamentals, Steps for frequency domain filtering, correspondence between filtering in the spatial and frequency domains, Image smoothing: Ideal Low pass filter, Butterworth Low pass Filter, Gaussian filter; Image sharpening: Ideal High Pass Filter, Butterworth High Pass Filter, Gaussian high pass filter.

Text Books:

1. Rafael C. Gonzalez and Richard E. Woods, "Digital Image Processing", Pearson
2. M. K. Pakhira, "Digital Image Processing and Pattern Recognition", PHI

Reference Books:

1. Anil K Jain, "Fundamentals of Digital Image Processing", PHI Edition 1997.
2. Keenneth R Castleman, " Digital Image Processing", Pearson
3. Chanda & Majumder, "Digital Image Processing & Analysis", PHI

NOTE:

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

ECE418B**RELIABILITY ENGINEERING**

B. Tech Semester -VIII (Elective II)

L T P Credits
4 - - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks

Duration of Exam. : 3 Hrs.

UNIT I**Introduction:**

Definition for Reliability, Need for reliability engineering, Causes of failures, catastrophic failures and degradation failures. Characteristic types of failures, useful life of components, Exponential case of chance failures, Reliability measures, Derivation for exponential distribution function, other kinds of distributions, Binomial, Poisson uniform, Rayleigh, Weibull, Gamma distributions, Markov chains, failures data analysis.

Reliability in Systems:

Reliability Block Diagrams, series systems, parallel systems, K-out of - M systems, Open and short circuit failures, standby systems. Reliability Analysis of Non-series Parallel system, Boolean Algebra Method, Cut-set approach, delta star method, logical signal relation method, Bayes Theorem Method

UNIT II**Reliability Prediction:**

Objective of reliability Prediction, Classification, information sources for failure rate data, prediction methodologies, general requirement, role and limitations of reliability prediction.

Reliability Allocation:

Subsystems reliability improvement, Apportionment for new units, criticality.

UNIT III**Redundancy Techniques for reliability:**

Forms of maintenance, measures of maintainability and availability, maintainability function, availability function, two unit parallel system with repair, Markov model for two unit systems, preventive maintenance, provisioning of spares.

Reliability Testing:

Kinds of testing, component reliability measurements parametric methods, confidence limits, accelerate testing, equipment acceptance testing.

UNIT IV**Economics of Reliability Engineering:**

Reliability cost, effect of reliability on cost. Reliability achievement cost models, reliability utility cost models, replacement policies.

Integrated performance measures for communication systems:

Integration of reliability and capacity, Delay related reliability.

Text Books:

1. KK Aggarwal, "Reliability Engineering", Kluwer Academic Netherlands.
2. B Singh, "Quality Control and Reliability Analysis", Khanna Publishers.

Reference Books:

1. KB Mishra: Reliability Prediction & Analysis: A Methodology oriented treatment ,Elseveir,Netherlands
2. Ebeling, "Introduction to Reliability & Maintainability", TMH

NOTE:

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ECE420B**TELECOMMUNICATION SWITCHING SYSTEM**

B. Tech Semester –VIII (Elective II)

L T P Credits
4 - - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks

Duration of Exam. : 3 Hrs.

UNIT I**EVOLUTION OF SWITCHING SYSTEM:**

What is Switching, Types of Switching, Block Diagram of Telecommunication Network, Switching System Fundamentals, Classification of Switching System, Elements of a Switching System, Basic Function of Switching System, Basic Telephone Communication, Function of a Manual Switching System, Magneto or Local Battery Switchboard, Common Battery Switchboard, Limitations of Manual Switching System, Introduction to strowger switching system.

CROSSBAR SWITCHING SYSTEM:

Introduction, Principle of Common Control, Touch Tone Dial Telephone, Crossbar Switch Mechanism, Principle of Crossbar Switching, Crossbar Switch Configurations, Organisation of a Crossbar Telephone Switch, A General Trunking, Electronic Switching, Classification Crosspoint Technology

UNIT II**SPACE DIVISION SWITCHING:**

Stored Program control, Centralised SPC, Distributed SPC, Software Architecture, Application software, Enhanced Services, Two Stage Networks, n-Stage Networks.

TIME DIVISION SWITCHING:

Introduction, Analog Time Division Switching, Digital Time Division Switching, A Digital Memory Switch, Time Stages in General, Two-Dimensional Switching, Multiple Stage Time and Space Switching

UNIT III**PACKET SWITCHING:**

Statistical Multiplexing, Local area & wide area networks, Large Scale Networks, Broadband Networks

TELETRAFFIC ENGINEERING:

Introduction, Network Traffic Load, CCITT Recommended Busy Hours, Traffic Terminology, The Unit of Traffic, Congestion, Grade of Service, Blocking Probability, Traffic Measurements, Modelling Switching System, Markov processes representing traffic. Calculation of blocking probability, stationary probability measures for Ergodic Markov processes. Combinatorial interpretation, calculation of blocking probability.

UNIT IV**CONTROL OF SWITCHING SYSTEMS:**

Call Processing functions, common control, Reliability, Availability & Security.

SIGNALLING:

Customer Line Signalling, Audio frequency junctions & trunk circuits, FDM carrier Systems, PCM signalling, Inter – register signalling, Common channel Signalling Principles.

Text Books:

1. Thiagarajan Viswanathan, "Telecommunication Switching Systems and Networks", PHI
2. Syed Riffat Ali, "Digital switching Systems, system reliability and analysis", Tata MC Graw, 2002.

Reference Books:

1. Keshav S, "An Engineering Approach to Computer Network Networking", Addison Wesley, 1998.
2. Martin, "Telecommunication & Computer 3e", PHI

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ECE426B**EMBEDDED SYSTEMS DESIGN**

B. Tech Semester –VIII (Elective II)

L T P Credits
4 - - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks

Duration of Exam. : 3 Hrs.

UNIT I**INTRODUCTION OF EMBEDDED SYSTEMS DESIGN:**

Embedded Systems Design: Definition, Issues, Challenges and Trends, Current events and emerging technologies.

AVR MICROCONTROLLER:

Introduction to AVR microcontroller, features of AVR family microcontrollers, different types of AVR microcontroller, architecture, memory access and instruction execution, pipelining, program memory considerations, addressing modes, CPU registers, Instruction set, and simple operations.

UNIT II**FEATURES OF AVR MICROCONTROLLER:**

Timer: Control Word, mode of timers, simple programming, generation of square wave, Interrupts: Introduction, Control word Simple Programming, generation of waveforms using interrupt, serial interface using interrupt.

SPECIAL FEATURES OF AVR MICROCONTROLLER:

Watch-dog timer, Power-down modes of AVR microcontroller, UART, SRAM.

UNIT III**APPLICATIONS BASED ON AVR MICROCONTROLLER:**

Applications based on RF Card, Graphical LCD, Color LCD, Zigbee, DTMF, GSM, GPS, Smart Card, RF ID, Touch Screen, Bluetooth.

COMMUNICATION INTERFACE WITH AVR MICROCONTROLLER:

RS-232, RS-485, SPI, IIC, ISA, CAN.

UNIT IV**SOFTWARE REQUIREMENTS FOR EMBEDDED SYSTEMS DESIGN:**

Assemblers, Compilers, Linkers, Loaders, Debuggers, Profilers and Test Coverage Tools Utilities like make, ranlib, obj copy and obj dump, Configuring and Building GNU Cross-Tool chain Building RTOS / EOS Image for Target Hardware.

OPERATING SYSTEM FOR EMBEDDED SYSTEM:

Embedded Operating Systems, Real Time Operating System (RTOS), Writing Time and Space Sensitive Programs, Writing Device Drivers, Interrupt Handling in C, Combining C with Assembly.

Text Books :

1. Programming & Customizing the AVR Microcontroller, Dhananjay V. Gadre, Tata McGraw-Hill Pub. Co. Ltd., New Delhi.

NOTE:

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ECE428B**POWER SYSTEM STABILITY AND FACTS**

B. Tech Semester –VIII (Elective II)

L	T	P	Credits
4	-	-	4

Class Work	:	25 Marks
Theory	:	75 Marks
Total	:	100 Marks

Duration of Exam. : 3 Hrs.

UNIT I**POWER SYSTEM STABILITY PROBLEM:**

Rotor angle stability, voltage stability, short term and long term stabilities, swing equation and its solution techniques.

SYNCHRONOUS MACHINES AND ITS MODELLING:

Power transformation, flux linkage equations, voltage equation, formulation using state-space equations, normalizing voltage and torque eqns., equivalent circuit of synchronous m/c, the flux linkage state-space model. Linearization of the flux linkage model, Simplified linear model block diagram, state-space representation of simplified model.

UNIT II**DYNAMIC STABILITY:**

State-space representation, stability of a dynamic system, analysis of stability, Eigen properties of the state matrix, Small signal stability of a single m/c infinite bus system, Effect of excitation systems, power system stabilizer, system state matrix with armature winding.

TRANSIENT STABILITY:

An elementary view of transient stability, numerical integration methods, simulation of power system dynamic response.

UNIT III**VOLTAGE STABILITY:**

Basic concept related to voltage stability, voltage collapse, voltage stability analysis, prevention of voltage collapse.

FLEXIBLE AC TRANSMISSION SYSTEM:

FACTS definitions, review of FACTS devices, series compensation in transmission systems, cascade connection of components-shunt and series compensation.

UNIT IV**SUB-SYNCHRONOUS OSCILLATORS:**

Turbine generator torsional characteristics, characteristics of series capacitor compensated transmission system, Self excitation, torsional interaction, counter measure to SSR problems, ferro resonance.

FACTS DEVICES:

Series connected controllers- inter line power flow controller(IPFC), thyristor controlled series capacitor(TSSC), thyristor controlled series reactor(TCSR), thyristor switch series reactor(TSSR). Shunt connected controllers- static synchronous compensator(STATCOM), static synchronous generator(SSG), battery energy storage system(BESS), super conducting magnetic energy storage(SMES), static VAR compensator(SVC), thyristor controlled reactor(TCR), thyristor switched reactor(TSR), thyristor switched capacitor(TSC), static VAR generator or absorber, static VAR system(SVS), thyristor controlled braking resistor(TCBR), Combined series-shunt connected controllers- unified power flow controllers(UPFC), thyristor controlled phase shifting transformer(TCPST), interphase power controller(IPC), Combined series-series controllers.

Text Books:

1. Power System Stability and Control by Prabha Kumar: MGH
2. Power System Control and Stability by Anderson and Fouad: Galgotia Publications

Reference Books:

1. Extra high voltage AC Transmission Engg. By Rokosh Das Begamudre
2. Electrical energy theory: An Introduction by O.I. Elgerd: TMH

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