Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)

Department of Electronics & Communication Engineering

SCHEME OF STUDIES & EXAMINATIONSB.Tech.

IVth YEAR (SEMESTER –VII)

Choice Based Credit Scheme w.e.f. 2021-22

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1		Program Elective-3	3	0	0	25	75	-	100	3	3
2		Program Elective-4	3	0	0	25	75	-	100	3	3
3		Program Elective-5	3	0	0	25	75	-	100	3	3
4	ECE401C	Fiber Optic Systems & Networks	3	0	0	25	75	-	100	3	3
5	ECE481C	Fiber Optic Systems & Networks Lab	0	0	2	25	-	75	100	1	3
6	ECE483C	Project Stage-I	0	0	8	25	-	75	100	4	3
7	ECE485C	Professional Training (Level-3)	0	0	2	100	-	-	100	2	-
8		Open Elective-II	3	0	0	25	75	-	100	3	3
Total			**15**	**0**	**12**	**275**	**375**	**150**	**800**	**22**	

Note:

1. Assessment of Professional Training (Level-3)(ECE487C), undergone at the end of semester-VI, will be based on seminar, viva-voce, report and certificate of professional training obtained by the student from the industry / institute / research lab / training centre etc.
2. (i) Project coordinator and other assisting co-coordinators will be assigned the Project Stage-I **(ECE485C)** load of, maximum of 02 hrs. per week including their 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.
   (ii)*Project involving design, fabrication, testing, computer simulation, case studies etc., will be commenced by students in semester-VII and will be completed in semester-VIII **(*applicable for those students only who will not opt for internship in VIII Semester)**.
3. Students will be permitted to opt for any three elective courses from the list given below. The minimum strength of the students should be 20 to run an elective course.

S.No.	Program Elective-3		Program Elective-4		Program Elective-5	
	Course No.	Course Title	Course No.	Course Title	Course No.	Course Title
1	ECE421C	Adaptive Signal Processing	ECE429C	Wavelets	ECE437C	Fundamentals of Image Processing
2	ECE423C	Mobile Communication & Networks	ECE431C	Wireless Sensor Networks	ECE439C	Satellite Communication
3	ECE425C	Cryptography	ECE433C	Pattern Recognition	ECE441C	Artificial Neural Networks & Fuzzy Logic
4	ECE427C	High Speed Electronics	ECE435C	Biomedical Signal Processing	ECE443C	ASICs and FPGAs

1. Students will be permitted to opt for any one **Open Elective-II** course run by other department, from group of subjects given in table below. However, the department shall offer those elective for which they have expertise. The choice of the students for any elective shall not be binding for the department to offer, if the department does not have expertise. The minimum strength of the students should be 20 to run an elective course.

PURAN
MURTI
CAMPUS

ECE401C Fiber Optic Systems & Networks

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1 (9 Lectures)

Introduction to Optical Communication System: Electromagnetic Spectrum used for optical communication, block diagram of optical communication system. Introduction to vector nature of light, propagation of light, propagation of light in a cylindrical dielectric rod, Ray model, wave model, Advantages of optical fiber Communication.

Unit 2 (12 Lectures)

Structure of Optical Fibers: Different types of optical fibers (Step Index Fibers, Graded index Fibers, Single mode fibers, Multi Mode fibers) Modal analysis of a step index fiber. Signal degradation on optical fiber due to dispersion and attenuation. Fabrication of fibers and measurement techniques like OTDR.

Unit 3 (12 Lectures)

Optical sources :LEDs and Lasers, Photo-detectors - pin-diodes, APDs, detector responsivity, noise, optical receivers. Optical link design - BER calculation, quantum limit, power penalties. Optical switches - coupled mode analysis of directional couplers, electro-optic switches.

Optical amplifiers :EDFA, Raman amplifier.

Unit 4 (9 Lectures)

WDM and DWDM systems: Principles of WDM networks. Nonlinear effects in fiber optic links. Concept of self-phase modulation, group velocity dispersion and soliton based communication.

Text/Reference Books:

1. John. M Senior,Optical Fiber Communication, 3rd Edition, Pearson Education.
2. G. Keiser, Fiber Optic communication, McGraw-Hill
3. T. Tamir, Integrated optics, Springer-Verlag.
4. G. Agrawal, Nonlinear fiber optics, Academic Press. G. Agrawal, Fiber optic Communication Systems, John Wiley and sons

Course Outcomes: At the end of the course, students will demonstrate the ability to:

1. Understanding principles of fiber optic communication, comparing it to contemporary means of communication. Also understand spectrum utilization sensitizing them towards natural resources.
2. Comparing and selecting the right fiber for a specific application by measuring losses in the fiber. They learn to use instruments for quick restoration of a fiber network in case of failure.
3. Significance of available sources of light and detectors for efficient usage and protection of environment is understood.
4. Enhancing data rate by multiplexing techniques taking our system towards next level generation.

Note:

1. In Semester Examinations, the paper setter will set two questions from each unit (total 8 questions in all), covering the entire syllabus. Students will be required to attempt only five questions, selecting atleast one question from each unit.

2. The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.

3. For students admitted in B.Tech. 1st Year (C-Scheme) in 2019 & onwards and all trailing students:

Examinations and evaluations of students shall be conducted, covering the entire syllabus, as per guidelines "AICTEExamination Reforms". Students shall be informed about these reforms.

ECE481C Fiber Optic Systems & Networks Lab

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits
0	0	3	1.5

Class Work	: 25
Examination	: 75
Total	: 100
Duration of Exam	: 3 Hours

List of Experiments:

1 To calculate the attenuation losses in optical fiber.

2 To calculate the bending losses in optical fiber.

3 To study various type of dispersion and calculating dispersion in optical fiber.

4 To enhance the system capacity using WDM and analyze results using BER and Eye Pattern.

5 To study the characteristics of fiber Brag Grating.

6 To simulate dispersion analysis in different types of fibers.

7 To simulate the non-linear effect in optical fiber.

8 To study and simulate the characteristics of LEDs.

9 To study and simulate the characteristics of LASER diode.

10 To study and simulate characteristics of PIN photodiode.

Text/Reference Books:

1 John. M Senior, Optical fiber Communication: Principal and Practice, 3rd Edition, Pearson Education.
2 G. Keiser, Fiber Optic communication, McGraw-Hill
3 T. Tamir, Integrated optics, Springer-Verlag
4 G. Agrawal, Nonlinear fiber optics, Academic Press
5 G. Agrawal, Fiber optic Communication Systems, John Wiley and sons

Course Outcomes: At the end of the course, students will demonstrate the ability to:

1. To be able to work on hardware kits of fiber optics, understanding fragile structure of fiber hence learning proper measuresfor deployment.
2. Students learn different instruments used for establishing an optical link without degrading environment.
3. A simulation environment is setup for thorough analysis and evaluation of a link so that new techniques in the field couldbe developed.
4. Different sources and detectors could be simulated with different parameters so that their characterization could bedone.This may bring about change in technology.

Note:

1. Each laboratory class/section shall not be more than about 20 students.
2. To allow fair opportunity of practical hands on experience to each student, each experiment may be either done by each student individually or in group of not more than 3-4 students. Larger groups be strictly discouraged/disallowed.
3. Ten experiments are to be performed out of which at least seven experiments should be performed from the above list.

Remaining three experiments should be performed from the above list or designed and set by the concerned department asper the scope of the syllabus.

ECE421C Adaptive Signal Processing

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1 (11 Lectures)

Adaptive Systems: Definition, Characteristics, Areas of Application, General Properties, Open and Closed- Loop Adaptation, Applications of Closed-Loop Adaptation, Example of an Adaptive System.

The Adaptive Linear Combiner: General Description, Input Signal and Weight Vectors, Desired Response and Error, The Performance Function, Gradient and minimum mean-square Error, Example of a performance surface, Alternative Expression of the Gradient, Decorrelation of error and input Components.

Unit 2 (10 Lectures)

Theory of Adaptation with Stationary Signals: Review of probability, random variables and stationary random processes, Correlation structures, Normal Form of input Correlation matrix, Eigen values and Eigenvectors of the input Correlation matrix, an example with two weights, Geometrical significance of Eigen values and Eigen vectors.

Unit 3 (12 Lectures)

Searching the performance surface: Methods of searching the performance surface, basic ideas of Gradient search methods, simple Gradient search algorithm and its solution, Stability and Rate of Convergence, The learning curve, Gradient search by Newton's method, Newton's method in multidimensional space, Gradient search by the Steepest Descent, Comparison of learning curves.

Unit 4 (12 Lectures)

Adaptive Algorithms: LMS Algorithm, derivation of the LMS algorithm, Convergence of the weight vector, example of convergence; Z-Transform in adaptive signal processing: Z-Transform, Right and Left handed sequences, Transfer functions, Frequency response, impulse response and stability, inverse Z-transform, Correlation Functions and Power Spectra.

Text/Reference Books:

1. S. Haykin, Adaptive filter theory, 4th Edition, Pearson Education
2. B.Widrow and S.D. Stearns, Adaptive Signal Processing, Pearson Education.

Course Outcomes: At the end of the course, students will demonstrate the ability to:

1. Understand open & Closed loop Control systems and their practical applications.
2. Use non-linear control and concepts of need & significance of changing the control parameters w.r.t. real-time situation.
3. Mathematically represent the 'adaptability requirement' and use in practical applications,
4. Understand the mathematical treatment for Adaptive Algorithms and Adaptive signal processing.

Note:

1. In Semester Examinations, the paper setter will set two questions from each unit (total 8 questions in all), covering the entire syllabus. Students will be required to attempt only five questions, selecting atleast one question from each unit.

2. The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.

3. For students admitted in B.Tech. 1st Year (C-Scheme) in 2019 & onwards and all trailing students:

Examinations and evaluations of students shall be conducted, covering the entire syllabus, as per guidelines "AICTE Examination Reforms". Students shall be informed about these reforms.

ECE423C Mobile Communication & Networks

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1(12 Lectures)

Mobile Radio System: A reference model, frequencies for radio transmission, Signals, antennas, signal propagation, multiplexing.

Characteristics Of Radio Waves: Multipath characteristics of radio waves signal fading, time dispersion, Doppler spread, coherence time, LCR, fading statistics, diversity techniques

Unit 2(12 Lectures)

Mobile Radio Propagation: Mechanism, free space path loss, long distance path loss model, Okumara model, Hata model, PCS model, wideband PCS, microcell model, indoor propagation model, Jake's channel model.

Wireless Systems: Standards – GSM, signaling & call control, mobility management, location racking wireless data services IS-95, GPRS and CDMA.

Unit 3(10 Lectures)

Modulation Technology: System application, FM for mobile radio, digital modulation, constant envelop modulation, nonconstant envelop modulation, OFDM modem, spread spectrums ystems.

Wireless Data Networking: IEEE standards, models different layers, wireless LAN, Hypes LAN, Bluetooth performance analysis of link & transport layer protocols over wireless channels.

Unit 4(10 Lectures)

Mobile Network Layer: Mobile IP: Goals, assumptions & requirements, IP packet delivery, agent discovery, registration, tunneling and encapsulation, optimization, reverse tunneling, IP-V6, mobile ad-hoc networks.

Mobile Transport Layer: Tradition TCP, classical TCP improvement, TCP over 2.5G/3G wireless networks performance enhancing proxies.

Text/ Reference Books:

1. Mobile Communication: Jochen Schiller Pearson Education.

2. Rajeshwar Dass, "Wireless Communication Systems," I.K International Pvt. Ltd
3. William C.Y.Lee, "Mobile Cellular Telecommunications Analog and Digital Systems", 2nd edition, TMH, 1995.
4. Asha Mehrotra, "A GSM system Engineering" Artech House Publishers Bosten, London,1997.
5. T.S.Rappaport, "Wireless Communications Principles and Practice", 2nd edition, PHI,2002.

Course Outcomes: At the end of the course, students will demonstrate the ability to:

1. Understand basics of mobile communication and propagation mechanism of wave which will help the students to understandpropagation model of wireless communication systems
2. Understand various terms/parameters which should be kept in mind while designing the mobile communication model which in turn helps in capacity enhancement of wireless communication systems.
3. Differentiate between working of analog and digital modulation techniques to solve the problem of quality of service prevailing in society.
4. Understand various standards of mobile communication systems i.e. GSM, SDMA,IS-95 etc. which automatically improve the selection of mobile communication standards in day to day life. Students will also be able to understand the concept of network and transport layer used in mobile communication standards.

ECE425C Cryptography

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3Hours

Unit 1 (10 Lectures)

Basic Concepts of Number Theory and Finite Fields: Divisibility and the divisibility algorithm, Euclidean algorithm, Modular arithmetic, Groups, Rings and Fields, Finite fields of the form GF(p), Polynomial arithmetic, Finite fields of the form GF(2n)

Unit 2 (11 Lectures)

Classical Encryption Techniques and Symmetric Ciphers : Symmetric cipher model, Substitution techniques, Transposition techniques, Steganography **:** Traditional Block Cipher structure, Data Encryption Standard, The AES Cipher

Unit 3 (11 Lectures)

Pseudo-Random-Sequence Generators and Stream Ciphers: Linear Congruential Generators, Linear Feedback Shift Registers, Design and analysis of stream ciphers, Stream ciphers using LFSRs

Unit 4 (12 Lectures)

Public-Key Encryption and Hash Functions: Prime Numbers, Fermat's and Euler's theorem, Primality testing, Chinese Remainder theorem, discrete logarithm. The RSA algorithm, Diffie -Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.Background, Snefru, N-Hash, MD4, MD5,Secure Hash Algorithm [SHA],One way hash functions using symmetric block algorithms, Using public key algorithms, Choosing a one-way hash functions, Message Authentication Codes. Digital Signature Algorithm, Discrete Logarithm Signature Scheme

Text/Reference Books:

1. William Stallings , "Cryptography and Network Security Principles and Practice",Pearson Education Inc., 6th Edition, 2014, ISBN: 978-93-325-1877-3
2. Bruce Schneier, "Applied Cryptography Protocols, Algorithms, and Source code in C", Wiley Publications, 2nd Edition, ISBN: 9971-51-348-X
3. Cryptography and Network Security, Behrouz A. Forouzan, TMH, 2007.
4. Cryptography and Network Security, Atul Kahate, TMH, 2003.

Course Outcomes: At the end of the course, students will demonstrate the ability to:

1. Use basic cryptographic algorithms to encrypt the data.
2. Generate some pseudorandom numbers required for cryptographic applications.
3. Provide authentication and protection for encrypted data.
4. Understand various authentication algorithms.

ECE427C High Speed Electronics

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1 (11 Lectures)

Transmission line theory (basics) crosstalk and non-ideal effects; signal integrity: impact of packages, vias, traces, connectors; non-ideal return current paths, high frequency power delivery, methodologies for design of high speed buses; radiated emissions and minimizing system noise.

Unit 2 (10 Lectures)

Noise Analysis: Sources, Noise Figure, Gain compression, Harmonic distortion, Inter-modulation, Cross-modulation, Dynamic range Devices: Passive and active, Lumped passive devices (models), Active (models, low vs high frequency)

Unit 3(12 Lectures)

RF Amplifier Design, Stability, Low Noise Amplifiers, Broadband Amplifiers (and Distributed) Power Amplifiers, Class A, B, AB and C, D E Integrated circuit realizations, Cross-over distortion Efficiency RF power output stages Mixers –Up-conversion, Down-conversion, Conversion gain and spurious response. Oscillators Principles.

Unit 4 (11 Lectures)

PLL Transceiver architectures. Printed Circuit Board Anatomy, CAD tools for PCB design, Standard fabrication, Microvia Boards.
Board Assembly: Surface Mount Technology, Through Hole Technology, Process Control and Design challenges.

Text/Reference Books:

1. Stephen H. Hall, Garrett W. Hall, James A. McCall “High-Speed Digital System Design: A Handbook of Interconnect Theory and Design Practices”, August 2000, Wiley-IEEE Press
2. Thomas H. Lee, “The Design of CMOS Radio-Frequency Integrated Circuits”, CambridgeUniversity Press, 2004, ISBN 0521835399.
3. Behzad Razavi, “RF Microelectronics”, Prentice-Hall 1998, ISBN 0-13-887571-5. 4. Guillermo Gonzalez, “Microwave Transistor Amplifiers”, 2nd Edition, Prentice Hall.
4. Kai Chang, “RF and Microwave Wireless systems”, Wiley.
5. R.G. Kaduskar and V.B.Baru, Electronic Product design, Wiley India, 2011N.H.E.

Course Outcomes: At the end of the course the students will be able to:

1. Understand significance and the areas of application of high-speed electronics circuits.
2. Understand the properties of various components such as Noise figure, gain compression, inter-modulation, extramodulation etc. used in high speed electronics circuit design

3. Design High-speed electronic components : RF power amplifier, RF mixer and Oscillators.
4. Study High speed PLL system and tool used to design these high speed components & PLL system.

ECE429C Wavelets

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1(10 Lectures)

Continuous Wavelet Transform: Introduction, definition, CWT as a correlation, CWT as an operator, Inverse CWT, Introduction to discrete wavelet transform, Orthogonal wavelet decomposition.

Unit 2(12 Lectures)

MRA, Orthogonal Wavelets, Construction of general Orthonormal MRN, Wavelet basis of MRN, Digital filtering interpretation, Interpreting Orthonormal MRA's for Discrete – time signals, Issues related to PRQMF Filter banks, , Generating scaling function and Wavelets from Filter Banks.

Unit 3(12 Lectures)

Wavelet Transform and Data Compression, Introduction, Transform Coding, DTWT for image compression, Image compression using DTWT and Run length coding, Embedded tree image coding, comparison with JPEG, Audio compression, Audio masking, Wavelet based audio coding.

Unit 4(10 Lectures)

Applications of Wavelet Transforms: Introduction, Wavelet Denoising, Speckle Removal, Edge Detection and Object isolation, Image Fusion, Object detection by Wavelet Transforms of Projections, Communication Applications-Scaling Functions as signaling Pulses, Discrete Wavelet Multitone Modulation.

Text/Reference Books:

1. Raghuveer M. Rao, Ajit S. Bopardikar, "Wavelet Transforms: Introduction to Theory and Applications", Pearson Education.
2. Y.T. Chan, Wavelet Basics, Kluwer Publishers, Boston, 1993.
3. Daubechies, Ten Lectures on Wavelets, Society for Industrial and Applied Mathematics, Philadelphia, PA, 1992.
4. C. K. Chui, An Introduction to Wavelets, Academic Press Inc., New York, 1992.
5. Gerald Kaiser, A Friendly Guide to Wavelets, Birkhauser, New York, 1995.
6. P. P. Vaidyanathan, Multirate Systems and Filter Banks, Prentice Hall, New Jersey, 1993.
7. A.N. Akansu and R.A. Haddad, Multiresolution signal Decomposition: Transforms, Subbands and Wavelets, Academic Press, Oranld, Florida, 1992.

8. B.Boashash, Time-Frequency signal analysis, In S.Haykin, (editor), Advanced Spectral Analysis, pages 418--517. Prentice Hall, New Jersey, 1991.

Course Outcomes: At the end of the course, students will demonstrate the ability to:

1. Understand time-frequency nature of the signals and using wavelet transform as an alternative and more useful transform.
2. Understand multi resolution analysis and apply the concepts of wavelets to practical problems like compression.
3. Mathematically analyze the systems or process the signals using appropriate wavelet functions.
4. Using and selecting appropriate resolution for practical problems; preprocessing like noise removal from images.

ECE431C Wireless Sensor Networks

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1(9 Lectures)

Introduction to Sensor Networks, Unique constraints and Challenges in sensor networking, Advantage of Sensor Networks, Applications of Sensor Networks, Types of wireless sensor networks.

Unit 2(12 Lectures)

Mobile Ad-hoc Networks (MANETs), Vehicular Ad-hoc Networks (VANETs) and Wireless Sensor Networks,Single-hop and multi-hop wireless communication, Enabling technologies for Wireless Sensor Networks. Issues and challenges in wireless sensor networks. Routing protocols, MAC protocols: Classification of MAC Protocols, S-MAC Protocol, B-MAC protocol, IEEE 802.15.4 standard and ZigBee,

Unit 3(9 Lectures)

Dissemination protocol for large sensor network. Data dissemination, data gathering, and data fusion; Quality of a sensor network; Real-time traffic support and security protocols.

Unit 4(10 Lectures)

Design Principles for WSNs, Gateway Concepts, Need for gateway, WSN to Internet Communication and Internet to WSN Communication. single-node architecture, hardware components & design constraints, operating systems and execution environments, introduction to Tiny OS.

Text/Reference Books:

1. WaltenegusDargie , Christian Poellabauer, “Fundamentals Of Wireless Sensor Networks Theory And Practice”, By John Wiley & Sons Publications ,2011.
2. SabrieSoloman, “Sensors Handbook" by McGraw Hill publication. 2009.
3. Feng Zhao, Leonidas Guibas, “Wireless Sensor Networks”, Elsevier Publications,2004 .
4. Kazem Sohrby, Daniel Minoli, “Wireless Sensor Networks”: Technology, Protocols and Applications, Wiley-Inter science.
5. Philip Levis, And David Gay "TinyOS Programming” by Cambridge University Press 2009.

Course Outcomes: At the end of the course, students will demonstrate the ability to:

1. Design wireless sensor networks for a given application.
2. Understand emerging research areas in the field of sensor networks.
3. Understand MAC protocols used for different communication standards used in WSN.
4. Explore new protocols for WSN.

ECE433C Pattern Recognition

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1 (9 Lectures)

Feature Extraction and Representation: Image Features-Image Histogram, Image Transformation, Edge detection, Image segmentation, Hough Transforms; Feature representation-Chain code representation, polygonal Approximation, Boundary Segments, Approximation Curve, Different Measurements, shape descriptors; Measuring moments, Principal Components, Boundary thinning, Measuring Textures: using statistical moments, structural approach, spectral approach; Biometric Features- Fingerprint Recognition; Handwritten Script.

Unit 2 (10 Lectures)

Pattern Recognition: Recognition and Learning-Human Learning, Machine Learning; Recognition by Machines; Overview of Pattern Recognition-Acquisition and Representation of Patterns, Feature Selection, Pattern Classification; Applications of Pattern Recognition; Pattern Recognition Strategies-Statistical Pattern Recognition, Syntactic Pattern Recognition; Optimization Methods used for Pattern Recognition: Overview of Simulated Annealing, Overview of Evolutionary Algorithms, Genetic Algorithms, Evolutionary programming, Annealing Evolution.

Unit 3 (10 Lectures)

Classification & Decision Making: Decision Making-Linear Functions, Non Linear Separability, Generation of Decision Functions, Generalized Decision Functions, Distance based Classifier

Statistical Decision Making: Bayes Theorem for Decision Making, Simple Bayes Classification, Probability and Expected Values, Likelihood Estimation, Decision Regions and Decision Boundaries, Multivariate Decision making, Estimation of Error Rates, Minimizing Risk Factor.

Unit 4 (12 Lectures)

Nearest Neighbour Classifier: Distance based Classification, The Nearest Neighbour classifier, Nearest Neighbour Error Rate, Performance of Nearest Neighbour Classifier, NN Learning in Discrete and Continuous Domains, Important Features of NN Algorithm, Modification for Non-Numeric Attributes

Decision Tree Learning: Tree and decision Tree with example, Decision Tree Construction and Learning, Performance of Decision Tree Learning, Determining the best Splitting Attribute, Sme common Decision Tree Algorithms.

Text Books:

1. Malay K. Pakhira, Digital Image Processing and Pattern Recognition, PHI Learning, 2011
2. R.O.Duda, P.E.Hart and D.G.Stork, *Pattern Classification*, John Wiley, 2001

References:

1. K. R. Castleman, *Digital Image Processing* , Prentice Hall of India, 1996.
2. S.Theodoridis and K.Koutroumbas, *Pattern Recognition*, **4/e**, Academic Press, 2009.
3. C.M.Bishop, *Pattern Recognition and Machine Learning*, Springer, 2006.
4. W.Chou B.H. Juang (Eds.),*Pattern Recognition in Speech and Language Processing* , CRC Press, 2003.
5. J.I.Tou & R.C.Gonzalez, *Pattern Recognition Priciples*, Addition –Wesley.
6. R.Schalkoff, *Pattern Recognition –Statistical, Structural and Neural Approach.*

Course Outcomes: At the end of the course, students will demonstrate the ability to:

1. Understand and recognize image features, different transforms, biometric features and their use for various applications.
2. Recognize patterns and understand machine learning. They will know about evolutionary algorithms and their programming.
3. Classify and decision making using different algorithms and functions including statistical methods.
4. Understand and apply different types of classifiers such as nearest neighbor, distance based, and Neural Networks etc. theywill also know about decision tree learning, algorithms and performances.

ECE435C Biomedical Signal Processing

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1 (9 Lectures)

Introduction to Biomedical Signals: Nature of Biomedical signals, Examples of Biomedical signals-Action Potential, The Electroneurogram (ENG), The Electromyogram (EMG), The electrocardiogram (ECG), The Electroencephalogram (EEG), Event-related potentials (ERP), The electrogastrogram (EGG), the Phonocardiogram (PCG), Carotid pulse, Signals from catheter tip sensors, speech signal,Objectives of Biomedical signal analysis, Difficulties in Biomedical signal analysis, Computer –aided diagnosis.

Unit 2 (10 Lectures)

Filtering for removing Artifacts: Random Noise, structured noise, and physiological interference; Stationary versus nonstationary processes,Noise in Event-related potentials, High –frequency noise in the ECG, Motion artifact in the ECG, Power-line interference in ECG signals, maternal interference in fetal ECG.

Time Domain Filters: Synchronized averaging, Moving –average filters, Derivative –based operators to remove low-frequency artifacts.

Unit 3 (11 Lectures)

Frequency –domain filters: Removal of high –frequency noise: Butterworth Lowpass filters, Removal of Low –frequency noise: Butterworth highpass filters, Removal of periodic artifacts: Notch and Comb filters; Optimal Filtering: The Wiener Filter **Adaptive Filters for removal of Interference:** Adaptive noise canceller, Least-mean squares adaptive filter, recursive least –squares adaptive filter, selecting an appropriate filter, Application-Removal of artifacts in the ECG, Maternal-Fetal ECG.

Unit 4 (11 Lectures)

Event Detection: The P, Q,R,S, and T waves in the ECG, The first and second heart sounds, EEG Rhythms, waves and transients; Derivative based methods for QRS detection

Correlation Analysis of EEG channels: Detection of EEG rhythms, Template matching for EEG spike –and-wave detection; Cross-spectral techniques-coherence analysis of EEG channels, Detection of P wave, Homomorphic filtering-Generalized linear filtering, homomorphic deconvolution.

Text/Reference Books:

1. Rangaraj M. Rangayyan, "Biomedical Signal Analysis", John Wiley & Sons.
2. Willis J. Tompkins, "Biomedical Digital Signal Processing: C Language Examples and Laboratory Experiments for theIBM PC", Prentice Hall India.

3. Eugene N. Bruce, "Biomedical Signal Processing and Signal Modeling", John Wiley & Sons.
4. John L. Semmlow, "Biosignal and Biomedical Image Processing : MATLAB-Based Applications", CRC press.
5. S. Cerutti and C. Marchesi , "Advanced Methods of Biomedical Signal Processing", John Wiley & Sons.

Course Outcomes: At the end of the course, students will demonstrate the ability to:

1. Understand and analyze different types of biomedical signals like ENG, EMG, ECG, EEG etc which are useful for various disease diagnoses.
2. Identify artifacts in biomedical signals and using different types of filters to remove these.
3. Remove noise using suitable frequency domain filters like butterworth, optimum filter, and adaptive filters.
4. Detect different types of useful events in biomedical signals; analyze EEG channels, and use of homomorphic filtering.

ECE437C Fundamentals of Image Processing

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1(12 Lectures)

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 2(12 Lectures)

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 3(12 Lectures)

Image processing tools: Array versus Matrix Operations, Linear vs Nonlinear Operations, Arithmetic Operations, Set & Logical Operations, Spatial Operations, Vector and Matrix Operations, Probablistic 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.

Unit 4(12Lectures)

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, 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.

Text Books:

1. Rafael C. Gonzalez and Richard E. Woods, "Digital Image Processing", 3rd Edition, Pearson Education, 2016.
2. M. K. Pakhira, "Digital Image Processing and Pattern Recognition", PHI.

Reference Books:

1. Anil K Jain, "Fundamentals of Digital Image Processing", Pearson Education, 2015.
2. Keenneth R Castleman, " Digital Image Processing", Pearson Education.

Course Outcomes: At the end of the course, students will demonstrate the ability to:

1. Understand, represent, and analyse analog & digital images mathematically.
2. Interpret image quality, image acquisition, image resolution, and human visual perception.
3. Represent and analyse the images using various transforms to be used for different applications and image registration.
4. Choose processing techniques as per application in spatial and frequency domain and interpret the results; applying theimage processing concepts practically.

ECE439C Satellite Communication

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1 (9 Lectures)

Introduction: Introduction to Satellite Communication: Principles and architecture of satellite Communication, Brief history of Satellite systems, advantages, disadvantages, applications and frequency bands used for satellite communication. Applications of satellite communication. Future trends in satellite communications.

Satellite link budget: Flux density and received signal power equations, Calculation of System noise temperature for satellite receiver, noise power calculation, earth station parameters.

Unit 2 (10 Lectures)

Orbital Mechanics: Orbital equations, Kepler's laws, Apogee and Perigee for an elliptical orbit, evaluation of velocity, orbital period, angular velocity etc. of a satellite, concepts of Solar day and Sidereal day.

Satellite sub-systems: Study of Architecture and Roles of various sub-systems of a satellite system such as Telemetry, tracking, command and monitoring (TTC & M), Attitude and orbit control system (AOCS), Communication sub-system, power sub- systems etc. Typical Phenomena in Satellite Communication: Solar Eclipse on satellite, its effects, remedies for Eclipse, Sun Transit Outage phenomena, its effects and remedies, Doppler frequency shift phenomena and expression for Doppler shift.

Unit 3 (10 Lectures)

Modulation and Multiple Access Schemes: Various modulation schemes used in satellite communication, Meaning of Multiple Access, Multiple access schemes based on time, frequency, and code sharing namely TDMA, FDMA and CDMA. Hybrid Accesstechniques.

Unit 4 (12 Lectures)

Laser Satellite Communication: Link analysis, optical satellite link transmitter, optical satellite link receiver, satellite beam acquisition, tracking & positioning, deep space optical communication link.

Special Purpose Communication Satellite: Satellite for earth observation, satellite for weather forecast, satellite for scientific studies, satellite for military applications, satellite television, telephone services via satellite, data communication services, VSAT, MSAT, GPS systems.

Text/Reference Books:

1. Timothy Pratt Charles W. Bostian, Jeremy E. Allnutt: Satellite Communications: Wiley India. 2nd edition 2002
2. Tri T. Ha: Digital Satellite Communications: Tata McGraw Hill, 2009
3. Dennis Roddy: Satellite Communication: 4th Edition, McGraw Hill,2009
4. Wilbur L Pritchard, Henri G, Suyderhoud and Robert A. Nelson: Satellite Communication System Engineering, 2nd edition Pearson Education.

Course Outcomes: At the end of the course, students will demonstrate the ability to:

1. Understand the basic concepts of satellite communication and utilize their concepts in designing of various requirements and upgradation in the field of satellite communication.
2. Get acquainted with telemetry, tracking, command and monitoring models along with link designing in the field of satellite communication.
3. Acquire in-depth knowledge of earth station technology and will also review various digital modulation techniques.
4. Gain in-depths into the state-of-the-art development in specialized and purpose satellite along various multiple access techniques employed in advanced communication system which helps in predicting weather, natural disaster and will help mankind to take preventive action according.

ECE441C Artificial Neural Networks & Fuzzy Logic

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1(12 Lectures)

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 2(10 Lectures)

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 3(10 Lectures)

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 4(11 Lectures)

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.

Text/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).

Course Outcome: At the end of this course, student will demonstrate the ability to:

1. Understand Neuro-Fuzzy techniques and basics of neural network with respect to biological neural networks.
2. Understand and differentiate between various neural network architectures which will further help the students to implement real time applications i.e. pattern recognition, speech recognition etc. which in turn helps in connection of speech related human problems.
3. Understand fuzzy logics, rules and systems for solving day to day problems prevailing our society.
4. Understand fuzzification with neural networks and to understand applications of fuzzy systems i.e. ABS system, Target tracking, Washing Machines etc. which automatically improves the living standards of a common man.

ECE443C ASICs and FPGAs

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1 (9 Lectures)

Introduction of ASICs:Types of ASICs - Design flow – CAD tools used in ASIC Design – Programming ASICs:Antifuse – static RAM – EPROM and EEPROM based ASICs, Programmable Logic Devices : ROMs and EPROMs – PLA –PAL. Gate Arrays – CPLDs and FPGAs

Unit 2 (12 Lectures)

ASIC Physical design: System partition -partitioning - partitioning methods – interconnect delay models and measurement of de lay - floor planning - placement – Routing : global routing - detailed routing - special routing - circuit extraction – DRC

Unit 3 (12 Lectures)

FPGA:Field Programmable gate arrays- Logic blocks, routing architecture, Design flow technology - mapping for FPGAs, Xilinx XC4000 - ALTERA's FLEX 8000/10000, ACTEL's ACT-1,2,3 and their speed performance Case studies: Altera MAX 5000 and 7000 - Altera MAX 9000 – Spartan II and Virtex II FPGAs - Apex and Cyclone FPGAs

Unit 4 (9 Lectures)

SOCs:System-On-Chip Design - SoC Design Flow, Platform-based and IP based SoCDesigns, Basic Concepts of Bus-Based Communication Architectures, On-Chip Communication Architecture Standards, Low-Power SoC Design

Text/Reference Books:

1. M.J.S .Smith, "Application Specific Integrated Circuits, Addison -Wesley Longman Inc.,1997.
2. Wayne Wolf, FPGA-Based System Design, Prentice Hall PTR, 2004.
3. S. Trimberger, Field Programmable Gate Array Technology, Edr, Kluwer AcademicPublications, 1994.
4. John V.Oldfield, Richard C Dore, Field Programmable Gate Arrays, Wiley Publications1995.
5. P.K.Chan& S. Mourad, Digital Design Using Field Programmable Gate Array, PrenticeHall, 1994.
6. Parag.K.Lala, Digital System Design using Programmable Logic Devices , BSP, 2003.
7. S. Brown, R. Francis, J. Rose, Z. Vransic, Field Programmable Gate Array, Kluwer Pubin,1992.
8. J. Old Field, R.Dorf, Field Programmable Gate Arrays, John Wiley & Sons, Newyork,1995.
9. FarzadNekoogar and FaranakNekoogar, From ASICs to SOCs: A Practical Approach,Prentice Hall PTR, 2003.
10. R. Rajsuman, System-on-a-Chip Design and Test. Santa Clara, CA: Artech House Publishers, 2000.
11. F. Nekoogar. Timing Verification of Application-Specific Integrated Circuits (ASICs). Prentice Hall PTR, 1999.

Course Outcomes: At the end of the course, students will demonstrate the ability to:

1. Understand the design flow related to ASICs and FPGA.
2. Learn the standard tools that can be used to develop various hardware applications.
3. Learn and implement industry standard bus architectures.
4. Understand the complete architectures and their applications

ECE483C Project Stage-I

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits
0	0	8	4

Class Work	: 25
Examination	: 75
Total	: 100
Duration of Exam	: 3 Hours

The project started in VII Semester will be completed in VIII Semester **(*applicable for those students only who will not opt for internship 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 thedepartment 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 bythe Dean, Faculty of Engineering and Technology.

Course Outcomes: After completing this course, the student will have:

1. Practical exposure of Industrial Projects Skill
2. Learn various aspects of software and hardware handling of industrial work.
3. Attitude more professionally inclined.
4. Better understanding about time management.

ECE485C Professional Training (Level-3)

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
0	0	2	2	Class Work	: 100
				Total	:100
				Duration of Exam	: 3 Hours

At the end of 6th semester each student would undergo four weeks Professional Training in an Industry/ Institute/ Professional Organization/Research Laboratory etc. with the prior approval of the Training and Placement Officer of the University and submit in the department a typed report along with a certificate from the organization.

The typed report should be in a prescribed format.

The report will be evaluated in the 7th Semester by a Committee consisting of three teachers from different specialization to be constituted by the Chairperson of the department. The basis of evaluation will primarily be the knowledge and exposure of the student towards different processes and the functioning of the organization.

The student will interact with the committee through presentation to

demonstrate his/her learning. Teachers associated with evaluation work

will be assigned 2 periods per week load.

COURSE OUTCOMES: After the course is completed the student will have:

1. Additional knowledge about professional attributes.
2. The students will develop a more professional outlook.
3. The students will know how to deal with time bound tasks in a more effective way.
4. The students will have more efficient attribute of multi-tasking.

CSE 305C Computer Networks

B.Tech. 3rd YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1 (10 Lectures)

OSI Reference Model and Network Architecture: Introduction to Computer Networks, Example Networks ARPANET, Internet, Private Networks, and Network Topologies: Bus, Star, Ring, Hybrid, Tree, Complete, Irregular –Topology; Types of Networks: Local Area Networks, Metropolitan Area Networks, Wide Area Networks; layering architecture of networks, OSI model, Functions of each layer, Services and Protocols of each layer.

Unit 2 (10 Lectures)

TCP/IP: Introduction, History of TCP/IP, Layers of TCP/IP, Protocols, Internet Protocol, TransmissionControl Protocol , User Datagram Protocol, IP Addressing, IP address classes, Subnet Addressing, Internet Control Protocols, ARP, RARP, ICMP, Application Layer, Domain Name System, Email – SMTP, POP,IMAP; FTP, NNTP, HTTP, Overview of IP version 6.

Unit 3 (10 Lectures)

Local Area Networks: Introduction to LANs, Features of LANs, Components of LANs, Usage of LANs,LAN Standards, IEEE 802 standards, Channel Access Methods, Aloha, CSMA, CSMA/CD, Token Passing, Ethernet, Layer 2 & 3 switching, Fast Ethernet and Gigabit Ethernet, Token Ring, LAN interconnecting devices: Hubs, Switches, Bridges, Routers, Gateways.

Unit 4 (10 Lectures)

Wide Area Networks: Introduction of WANs, Routing, Congestion Control, WAN Technologies,Distributed Queue Dual Bus (DQDB), Synchronous Digital Hierarchy (SDH)/ Synchronous Optical Network (SONET), Asynchronous Transfer Mode (ATM), Frame Relay, Wireless Links.

Introduction to Network Management: Management, Class of Service, Quality Firewalls, VLANs, Proxy Servers.Remote Monitoring Techniques: Polling, Traps, Performance of Service, Security management, Digital signatures, SSL.

Text/Reference Books:

1. Computer Networks (3rd edition), Tanenbaum Andrew S., International edition, 1996.
2. Data Communications, Computer Networks and Open Systems (4th edition), Halsall Fred, 2000, Addison Wesley, Low Price Edition.
3. Business Data Communications, Fitzgerald Jerry, Computer Networks – A System Approach, Larry L. Peterson & Bruce S. Davie, 2nd Edition.

Course Outcomes: After completing the course, student will demonstrate the ability to:

1. To understand the organization of computer networks, factors influencing computer network development and the reasonsfor having variety of different types of networks.
2. To apply knowledge of different techniques of error detection and correction to detect and solve error bit during datatransmission.
3. To design a network routing for IP networks.
4. To demonstrate proper placement of different layers of ISO model and illuminate its function and determine proper usageof the IP address, subnet mask and default gateway in a routed network.

CSE 431C Cyber Security

B.Tech. 3rd YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1 (10 Lectures)

Introduction To Cybercrime:- Cybercrime and Information Security, Classificationsof Cybercrimes, The need for Cyber laws, The Indian IT Act Challenges to Indian Law and Cybercrime Scenario in India, Weakness in Information Technology Act and it consequences, Digital Signatures and the Indian IT Act, Cybercrime and Punishment; Technology, Students and Cyber law; Survival tactics for the Netizens, Cyber-offenses: Cybers talking, Cyber cafe and Cyber crimes, Botnets, Attack Vector, Cloud Computing.

Unit 2 (10 Lectures)

Tools And Methods Used In Cybercrime:- Proxy Servers and Anonymizers, Phishingand identity theft, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Stenography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow; Cybercrime: Mobile and Wireless Devices: Trends in Mobility, Attacks on Wireless Networks, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges, Registry Settings for Mobile Devices, Authentication Service Security Attacks on Mobile/Cell Phones.

Unit 3 (10 Lectures)

Understanding Computer Forensics:- The Need for Computer Forensics, Cyberforensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Computer Forensics and Stenography, Relevance of the OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics, Forensics Auditing, Anti forensics.

Unit 4 (10 Lectures)

Cyber security Organizational Implications:- Cost of Cybercrimes and IPR Issues,Web Threats for Organizations, Security and Privacy Implications from Cloud Computing, Social Media Marketing, Social Computing and the Associated Challenges for Organizations, Protecting People's Privacy in the Organization, Organizational Guidelines for Internet Usage, Safe Computing Guidelines and Computer Usage Policy, Incident Handling, Forensics Best Practices, Media and Asset Protection, Importance of Endpoint Security in Organizations.

Text/Reference Books:

1. "Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Nina Godbole, Sunit Belapur, Wiley India Publications, April, 2011.

Course Outcomes: After completing the course, student will demonstrate the ability to:

1. Able to demonstrate cyber crime its laws and related terms.
2. Work with SQL injection, DOS attacks etc.
3. Explain computer forensic, Network forensic cyber forensic.
4. Understand safe computing guidelines, usage policies and incident handling.

CHE457C Industrial Safety

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1 (10 Lectures)

Introduction: Concept of loss prevention, origin of process hazards, types of process hazards, acceptable risks, accident and loss statics, nature of accident process, concepts of inherent safety in plants or Factories, dose Vs response curve, toxicants entry route, thresh limit values, safety regulations.

Unit 2 (10 Lectures)

Hazards: Fire, Chemical (industrial and laboratory scale), electrical, mechanical, biohazards (natural and anthropogenic), toxic materials, their types and preventive measures, Liquid and vapor phase hazardous methods, storage and handling, containment, precautions, Personal safety precautions.

Unit 3 (10 Lectures)

Risk management principles, risk analysis techniques, risk control, hazards operability studies, hazard analysis, Fault tree analysis, Consequences analysis, human error analysis, accidental error analysis, economics of risk management, check list, reliability theory, event tree, HAZOP, safety reviews, what if analysis.

Unit 4 (10 Lectures)

Safety audit, procedure for safety auditing, audit report, safety report, safety training, emergency planning and disaster management, introduction to security risk factors tables.

Text Books:

1. Chemical Hazards and safety, 2nd Edition, DawandeDenet& Co. , 2012
2. Loss preventions in process industries, Lees Butterworth-Heinemann, 1980.
3. Industrial safety Handbook, William and Handley, McGraw Hill.

Reference Books:

1. Safety and Hazard management in Chemical Industries, Vyas, Atlantic 2013.
2. Industrial safety, health environment & Security, Basudev Panda, Laxmi publication ISBN- 97893-81159-43-9.
3. Industrial Safety and Health Management, 4th Edition, C. Ray Asfahl, Prentice Hall International Series, 1984.
4. Industrial Accident Prevention : A Safety Management Approach, Herbert William Heinrich.

Course Outcomes: After completing the course, student will demonstrate the ability to:

1. Analyze the effect of release of toxic substances.
2. Understand the industrial laws, regulations and source models.
3. Understand the methods of hazard identification and preventive measures and develop safety programs to prevent thedamage or loss.
4. Conduct safety audits and improve safety practices

CE406C Disaster Management

B.Tech. 4th YEAR (SEMESTER –VII)

Electronics & Communication Engineering

L	T	P	Credits		
3	0	0	3	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Unit 1 (10 Lectures)

Introduction to Disaster Management: Disaster, Emergency, Hazard, Mitigation, Disaster Prevention, Preparedness and Rehabilitation, Risk and Vulnerability, Classification of Disaster, Natural and Man-made Disasters, International day and Decade of Disaster Reduction.

Risk and Vulnerability to disaster mitigation and management options: Warning and Forecasting.

Unit 2 (12 Lectures)

Hydro-meteorological based disasters I: Disaster Management Act 2005, Role of NDMA, NDRF, NIDM, Tropical Cyclones, Floods, droughts, mechanism, causes, role of Indian Metrological Department, Central Water Commission, structure and their impacts, classifications, vulnerability, Early Warning System, Forecasting, Flood Warning System, Drought Indicators, recurrence and declaration, Structural and Non-structural Measures.

Hydro-meteorological based disasters II: Desertification Zones, causes and impacts of desertification, Characteristics, Vulnerability to India and Steps taken to combat desertification, Forest Fires; Causes of Forest Fires; Impact of Forest Fires, Prevention.

Unit 3 (10 Lectures)

Geological based disasters: Earthquake, Reasons, Compression, Shear, Rayleigh and Love Waves; Magnitude and Intensity Scales, Direct and Indirect Impact of Earthquake; Seismic Zones in India, Factors, Indian Standards Guidelines for RCC and Masonry Structures, Prevention and Preparedness for Earthquake, Tsunamis, Landslides and avalanches: Definition, causes and structure; past lesson learnt and measures taken; their Characteristic features, Impact and prevention, Atlas (BMTRPC); structural and non-structural measures.

Unit 4 (10 Lectures)

Manmade Disasters I: Chemical Industrial hazards; causes and factors, pre- and post-disaster measures; control; Indian Standard Guidelines and Compliance;

Traffic accidents; classification and impact, Fire hazards; Classification as per Indian Standards;

Fire risk assessment; Escape routes; fire-fighting equipment; classification of buildings, fire zones, occupancy loads; capacity andarrangements of exits,

Use of remote sensing and GIS in disaster mitigation and management.

Text Books:

1. Thomas D. Schneid , Disaster Management and Preparedness, CRC Publication, USA, 2001.
2. Patrick Leon Abbott, Natural Disasters, Amazon Publications, 2002.
3. Ben Wisner., At Risk: Natural Hazards, People vulnerability and Disaster, Amazon Publications, 2001.
4. Oosterom, Petervan, Zlatanova, Siyka, Fendel, Elfriede M., "Geo-information for Disaster Management", Springer Publications, 2005.
5. Savindra Singh and Jeetendra Singh, Disaster Management, Pravalika Publications, Allahabad.
6. Nidhi Gauba Dhawan and Ambrina Sardar Khan, Disaster Management and Preparedness, CBS Publishers & Distribution.