# DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
## SCHEME OF TEACHING

### VII Semester:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Code</th>
<th>Subjects</th>
<th>Theory/ Tuto./ Prac./ Self Study</th>
<th>Total Hrs./Week</th>
<th>C.I.E</th>
<th>S.E.E</th>
<th>Credits</th>
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<tr>
<td>1.</td>
<td>12EC701</td>
<td>Computer Communication Networks</td>
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#### Elective-IV
- 12EC711 Biomedical Instrumentation
- 12EC712 Spread Spectrum Communication
- 12EC713 Image Processing
- 12EC714 Cryptography
- 12EC715 Reliability Engineering

#### Elective-V
- 12EC721 RF Circuit Design
- 12EC722 Satellite Communications Systems
- 12EC723 Pattern Recognition
- 12EC724 Data Structures using C++
- 12EC725 Artificial Intelligence

### VIII Semester:

<table>
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<th>Code</th>
<th>Subjects</th>
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#### Elective-VI
- 12EC811 Analog and Mixed Mode VLSI Design
- 12EC812 Multimedia Communications
- 12EC813 Speech Processing
- 12EC814 Real Time Operating Systems

#### Elective-VII
- 12EC821 High Performance Communication Networks
- 12EC822 Biomedical Signal Processing
- 12EC823 Optical Computing
- 12EC824 H. R. Management

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**COMPUTER COMMUNICATION NETWORKS**
Subject Code: 12EC701
Credits: 04
Hrs/Week: 4
Total Hours: 52

Course Outcomes:

After studying this course, the student will be able to:

1. Appreciate the use of computer networking in various walks of life.
2. Describe the hierarchical model for networking, types of networks and network configurations.
3. Write the reference models for networking.
4. Explain responsibilities of different layers, their implementation and associated protocols, algorithms/pseudo codes.
5. List the IEEE specifications for different layers in the network model.
6. Identify the types of networking devices/equipments.

UNIT- I


12 Hrs

UNIT -II

Data Link Layer: Framing, Error Control, Flow Control, Error-Detecting Codes.


10 Hrs

UNIT- III


Controlled Access: Reservation, Polling, Token Passing.

Channelization: FDMA, TDMA, CDMA.


10 Hrs

UNIT-IV
Connecting LANs, Backbone and Virtual LANs: Connecting devices, Back bone Networks, Virtual LANs.

Network Layer: Logical addressing, Ipv4 addresses, Ipv6 addresses, Ipv4 and Ipv6, Transition from Ipv4 to Ipv6.

UNIT -V

Network Layer: Delivery, Forwarding, Unicast Routing Protocols, Multicast Routing protocols
The Transport Layer: Process to process Delivery, User Datagram Protocol (UDP), TCP, Congestion control, QoS.
Application layer: Domain name space, Distribution of name space, Resolution.

TEXT BOOK:

REFERENCE BOOKS:
R2. William Stallings, “Data and Computer Communication”, Pearson Education Asia, 6E,
EMBEDDED SYSTEMS

Subject Code : 12EC702  
Credit : 04
Hrs/Week : 4  
Total Hours : 52

Course Outcomes:

After studying this subject, the student should be able to:

1. Design an embedded system, recognize design challenges. And to describe different IC and Processor technologies.
2. Optimize the RT level design. And to design a General purpose processor and appreciate the use of peripherals.
3. Explain different memory types. And to discuss advanced memories.
4. Explain shared data problem, Interrupt latency, and different software architecture.
5. Explain semaphores, different operating system services, and real time scheduling, understand power and memory saving techniques.

UNIT-I
Introduction: Overview of embedded systems, embedded system design challenges, common design metrics and optimizing them. Survey of different embedded system design technologies, trade-offs. Custom Single-Purpose Processors, Design of custom single purpose processors.

10 Hrs

UNIT-II

10 Hrs

UNIT-III
Memory: Introduction, memory write ability and storage performance, common memory types, composing memory, memory hierarchy, Memory management unit, advanced memories.

10 Hrs

UNIT-IV

10 Hrs

UNIT-V
Introduction to RTOS: Tasks - states - Data - Semaphores and shared data - operating systems services - Message Queues - Mail Boxes -Timers – Events - Memory Management – Interrupts. Basic design using RTOS - Overview Encapsulating Semaphores & Queues, Hard real time Scheduling, Saving memory, Power.

12 Hrs
TEXT BOOKS:

REFERENCE BOOKS:

POWER ELECTRONICS

Subject Code : 12EC703
Credits : 04
Hrs/Week : 4
Total Hours: 52

Course Outcomes:
After studying this subject, the student should be able to:
1. Identify Applications of Power Electronics and know devices used
2. Select and design drive circuits for devices
3. Understand ON/OFF conditions of S.C.R.
4. Design gate drive circuits and protection of S.C.R
5. Explain operation of different types of S.C.R converters, derive expressions for important parameters and state device specifications.
6. Understand methods of commutation for SCR and discuss design aspects.
7. Design different types of A.C Voltage regulators.
8. Know the principles of DC choppers (dc to dc) and understand a DC chopper using S.C.R’s.
9. Explain operation of inverters (dc to ac) and methods for output voltage control
10. Discuss operation of a current source Inverter and applications.

UNIT-I
Introduction, Applications of power electronics, Power semiconductor devices, Control characteristics, Types of power electronics circuits, Peripheral effects. Power BJT’s, switching characteristics, Switching limits, Base derive control, Power MOSFET’s, Switching characteristics, Gate drive, IGBT’s, Isolation of gate and base drives. 12 Hrs

UNIT -II
Introduction to Thyristors: Principle of operation states anode-cathode characteristics, Two transistor model. Turn-on Methods, Dynamic Turn-on and turn-off characteristics, Gate characteristics, Gate trigger circuits, di/dt and dv/dt protection, Thyristor firing circuits. Controlled Rectifiers: Introduction, Principles of phase controlled converter operation, 1φ fully controlled converters, Dual converters, 1 φ semi converters (all converters with R & RL load). 12 Hrs
UNIT - III

Thyristor turn off methods: Natural and forced commutation, self commutation, class A and class B types, Complementary commutation, auxiliary commutation, external pulse commutation, AC line commutation, numerical problems. 8 Hrs

UNIT - IV

DC Choppers: Introduction, Principles of step down and step up choppers, Step down chopper with RL loads, Chopper classification, Analysis of impulse commutated Thyristor chopper (only qualitative analysis). 12 Hrs

UNIT - V

Inverters: Introduction, Principles of operation, Performance parameters, 1φ bridge inverter, voltage control of 1φ inverters, current source inverters, variable DC link inverter. TEXT BOOKS:


REFERENCE BOOKS:

BIOMEDICAL INSTRUMENTATION

Subject Code: 12EC711
Hrs/Week: 3
Credits: 03
Total Hours: 39

Course Outcomes:

After studying this course, the student will be able to:

1. Differentiate General Instrumentation and Biomedical Instrumentation system.
2. Identify biometrics and measurement of them using transducers.
3. Describe the constraints of measurement of biomedical signals.
4. Identify the electrodes for different bioelectric signals viz., ECG, EMG, EEG.
5. Explain physiological transducers.
6. Explain various biomedical recording systems for ECG, EMG, EEG and others.
7. Describe principle and working of Imaging systems like X-ray machine, Tomography, MRI scanning systems and ultrasonic imaging system.
UNIT - I

Fundamentals of medical instrumentation: Anatomy and Physiology, Physiological Systems of the body, Sources of Biomedical Signals, Basic medical instrumentation system, Intelligent medical instrumentation system, General constraints in design of medical instrumentation system.

Bioelectric signals and electrodes: Origin of Bioelectric Signals, Recording Electrodes, Ag-AgCl Electrodes, Electrodes for ECG, Electrodes for EEG, Electrodes for EMG, Electrical conductivity of Electrode Jellies and Creams, Microelectrodes. 15 Hrs

UNIT - II

Physiological transducers and recording systems: Classification of transducers, Pressure Transducers, Transducers for body temperature measurement, Preamplifiers, Signal processing techniques, Recording system.

Biomedical recorders: ECG, VCG, PCG, EEG, EMG, Other biomedical recorders. 15 Hrs

UNIT - III

Modern imaging systems: X-ray Machine and Digital Radiography, X-ray Computed Tomography, MRI System, Ultrasonic Imaging System. 9 Hrs

TEXT BOOK:

REFERENCE BOOKS:
SPREAD SPECTRUM COMMUNICATION

Subject Code: 12EC712  Credits: 03
Hrs/Week: 3  Total Hours: 39

UNIT – I

Introduction to Spread Spectrum Systems: Two communication problems, direct sequence spread spectrum, BPSK, QPSK, MSK direct sequence spread spectrum Frequency –Hop spread spectrum, hybrid direct sequence/ frequency –Hop spread spectrum, complex envelope representation of Spread – spectrum systems.

Binary Shift Register sequences for Spread – spectrum Systems: Introduction, Definitions, Mathematical background and sequence generator fundamentals, maximal length sequences, Gold Codes, Non linear code generators.  16 Hrs

UNIT – II

Code tracking Loops: Introduction, optimum tracking of Wide band signals, base band Delay lock tracking loop, Non-coherent Delay lock tracking loop, Tau-Dither non-coherent tracking loop, Double Dither non coherent tracking loop, Non coherent Delay lock tracking loop with arbitrary data and spreading modulation, code tracking loops for frequency – Hop systems.

Initial synchronization of the receiver spreading code: Introduction, Problem definition and the optimum synchronizer, serial search synchronization techniques, generalized analysis of average synchronization time, synchronization using a matched filter, synchronization by estimating the received spreading code, tracking loop pull in.  17 Hrs

UNIT – III

Code Division Multiple Access: Introduction, cellular radio concept, fundamentals of cellular radio system, co-channel interference protection prediction, and cellular concept revisited, CDMA digital cellular systems, Detection of spread spectrum signal.  6 Hrs

TEXT BOOKS:
T1. Peterson, Ziemer and Borth, “Introduction to Spread Spectrum Communication”, Pearson Education Publication

REFERENCE BOOK:
IMAGE PROCESSING

Subject Code : 12EC713
Hrs/Week : 3
Credits : 03
Total Hours : 39

Course Outcomes:

After studying this Course, the student should be able to:

1. Recall the mathematical & signal principles, forming the basis for methods for image processing.
2. Understand image representation, enhancement, filtering, restoration, analysis & reconstruction.
3. Know the processing techniques including various image transformations, image reconstruction, segmentation & recognition.
4. Design & conduct imaging experiments using MATLAB.
5. To convert image from RGB to gray, black & white, remove blurring effects, noise reduction, edge detection, compression and segmentation.

UNIT - I

Digital Image Fundamentals: Elements of visual perception, a simple image model, Sampling and Quantization, some basic relationships between pixels, image geometry.

Image Transforms: Introduction, 2D orthogonal and Unitary transforms, Properties of unitary transforms, DFT, DCT.

Image Enhancement: Point operations, Histogram modeling, Spatial operations, Transform operations, Multi-spectral image enhancement, false color and pseudo color, Color image enhancement.

UNIT - II

Image Filtering and Restoration: Image observation models, Inverse and wiener filtering, Fourier domain filters, Smoothing splines and interpolation, Least squares filters

Image Analysis & Computer Vision: Spatial feature extraction, Transform features, Edge detection, Boundary extraction, Boundary representation, Moment representation, Structure, Shape features, Texture, Scene matching & detection, Image segmentation, Classification techniques.

UNIT- III


Image data Compression: Introduction, Pixel coding, Predictive techniques, Transform coding

TEXT BOOKS:


CRYPTOGRAPHY

Subject Code : 12EC714
Credits : 03
Hrs/Week : 03
Total Hours : 39

UNIT- I
Overview: Services, Mechanisms and attacks, OSI security architecture, Model for network security
Introduction to finite fields: Groups, Rings and Fields, modular arithmetic, Euclid algorithm, Finite fields of the form $GF(p)$, polynomial arithmetic, Finite fields of the form $GF(2^n)$.
Introduction to number theory: Prime numbers, Fermat's and Euler's theorem, Chinese Remainder Theorem, Discrete logarithm
Classical encryption techniques: Symmetric cipher model, Substitution techniques, Transposition techniques, Rotor machine, Steganography

UNIT- II
Block ciphers and DES: Fiestel ciphers, Simplified DES, Block cipher principles, DES, Strength of DES, Block cipher design principles, Block cipher modes of operation, Problems , IDEA , Double DES, Triple DES, Blow–Fish, RC4, RC5
Public Key Cryptography and RSA: Principles of Public Key Cryptosystems, RSA algorithm, Problems, Knapsack problem, ElGamal cryptosystem
Other public key cryptosystems and key management: Key management, Diffie Hellman key exchange, Man in the middle attack, Elliptic curve arithmetic, Elliptic curve cryptography, Problems. Analog of Diffie-Hellman on ECC, Analog of ElGamal on ECC

UNIT- III
Message authentication and hash functions: Authentication requirements, Authentication functions, Message authentication codes, Hash functions, Security of Hash functions, and MAC, SHA-1 and MD5
Introduction to quantum cryptography

TEXT BOOK:

REFERENCE BOOKS:
RELIABILITY ENGINEERING

Subject Code: 12EC715
Credits: 03
Hrs/Week: 3
Total Hours: 39

UNIT- I

UNIT- II

UNIT-III

TEXT BOOK:

REFERENCE BOOKS:
RF CIRCUIT DESIGN

Subject Code: 12EC721
Credits: 03
Hrs/Week: 3
Total Hours: 39

UNIT-I


Passive Circuit Design: Smith Chart, Applications of smith chart in distributed and lumped element circuit applications, Design of matching networks. 16 Hrs

UNIT-II

Basic considerations in Active networks: Stability consideration in active networks, Gain considerations in Amplifiers.

Active Networks: Linear and Nonlinear Design: RF/MW Amplifiers small signal design, large signal design, RF/MW oscillator design. 16 Hrs

UNIT-III

RF/MW frequency converters, rectifier and detector design, Mixer design, RF/MW control circuit design. 7 Hrs

REFERENCE BOOKS:
SATELLITE COMMUNICATION SYSTEMS

Subject Code: 12EC722  Credits: 03
Hrs/Week: 3  Total Hours: 39

Course Outcomes:

After studying this subject, the student should be able to:

General: appreciate the journey from Arthur C Clarke’s dreams to latest advancements
Detailed:
1. Understand the general laws governing satellite orbits and its parameters.
2. Appreciate various considerations in the overall design of satellites.
3. Will have knowledge of various controls and their implementations.
4. Calculate the uplink / downlink subsystem characteristics.
5. Get to know the effects on the EM waves in propagation through space.
6. Know the different communication systems used for access.
7. Will have knowledge of some commonly known applications of satellites.

UNIT-I
Orbits: Introduction, Kepler’s laws, definitions, orbital element, apogee and perigee heights, orbit perturbations, inclined orbits, calendars, universal time, sidereal time, orbital plane, local mean time and sun synchronous orbits.
Propagation impairments: Introduction, atmospheric loss, ionospheric effects, rain attenuation, other impairments.
Space link: Introduction, EIRP, transmission losses, link power budget, system noise, CNR, uplink, down link, effects of rain, combined CNR

UNIT -II
Space Segment: Introduction, power supply units, attitude control, station keeping, thermal control, TT&C, transponders, antenna subsystem.
Earth Segment: Introduction, receive only home TV system, out-door unit, indoor unit, MATV, CATV, Tx.–Rx. earth station.
Interference: Introduction, types of interference between satellite circuits, remedies.
Satellite access: single access, pre-assigned FDMA, SCPC (spade system), TDMA, pre-assigned TDMA, demand assigned TDMA. Down link analysis, comparison of uplink power requirements for TDMA & FDMA, on board signal processing, satellite switched TDMA.

UNIT - III
DBS: Introduction, orbital spacing, power rating and number of transponders, frequency and polarization, transponder capacity, bit rates for digital TV.
Other Satellite services: Satellite mobile; VSAT, ‘Radarsat’, ‘Inmarsat’, GPS.
**TEXT BOOK:**

T2. Chartrand M R, *Satellite Communications*, Cengage learning

**REFERENCE BOOKS:**


**PATTERN RECOGNITION**

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**UNIT -I**

**Introduction:** Applications of Pattern recognition, statistical decision theory, Image processing and analysis.

**Probability:** Introduction, Probability of events, Random variables, Joint distributions and densities, Moments of random variables, estimation of parameters from samples, minimum risk estimators.

**Statistical Decision Making:** Introduction, Bayes theorem, Multiple features, conditionally independent features, Decision boundaries, Unequal costs of error, Estimation of error rates, The leaving-One-Out technique, Characteristic curves, Estimating the composition of populations.

15 Hrs

**UNIT -II**

**Non Parametric Decision Making:** Introduction, Histograms, Kernel and Window estimators, Nearest neighbor classification techniques, Adaptive decision boundaries, Adaptive discriminant functions, Minimum squared error discriminant functions, choosing a decision making technique.

**Clustering:** Introduction, Hierarchical clustering, partitional clustering

**Artificial Neural Networks:** Introduction, Nets without hidden layers, Nets with hidden layers, the back-Propagation algorithm, Hopfield nets; an application.

15 Hrs

**UNIT -III**

**Processing of waveforms and Images:** Introduction, Gray level scaling transformations, equalization, Geometric Image Scaling and Interpolation, Smoothing Transformations, Edge detection, Laplacian and Sharpening operators, Line detection and Template matching, Logarithmic Gray Level Scaling, The statistical significance of image features.

9 Hrs
TEXT BOOK:

REFERENCE BOOKS:
R1. Duda and Hart, “Pattern Recognition”, (Pattern recognition a scene analysis)
DATA STRUCTURES USING C++

Subject Code: 12EC724  
Credits: 03  
Hrs/Week: 3  
Total Hours: 39

Course Outcomes:

After studying this Course, the student should be able to:

1. Understand the basic concepts of data structures.
2. Implement data structure concepts in C++.
3. Relate the data structure concepts to its real world applications.
4. Develop applications using basic data structures in C++.

UNIT-I

Arrays And Matrices: Arrays, Matrices, Special matrices sparse matrices.  
15 Hrs

UNIT-II

Stacks: The abstract data types, Derived classes and inheritance, Formula-based Representation, Linked representation, Applications. 
Queues: The abstract data types, Derived classes and inheritance, Formula-based representation, Linked representation, Applications. 
Skip Lists and Hashing: Dictionaries, Linear representation, Skip list representation, Hash table representation.  
15 Hrs

UNIT-III

Binary And Other Trees: Trees, Binary trees, Properties and representation of binary trees, Common binary tree operations, Binary tree traversal the ADT binary tree, ADT and class extensions. 
Search Trees: Binary search trees, B-trees, Applications.  
09 Hrs

TEXT BOOK:

REFERENCE BOOKS:
ARTIFICIAL INTELLIGENCE

Subject Code : 12EC725  
Credits : 03  
Hrs/Week : 3  
Total Hours : 39

UNIT- I

Introduction, the propositional calculus, predicate calculus using inference rules to produce predicate calculus expressions.  
Introduction to graph theory, strategies for state space, using state space to represent reasoning with the predicate calculus.  
Introduction to Heuristic approach, an algorithm for heuristic approach, admissibility, monotonicity and informedness, using heuristics in games, complexity issues.  
Introduction to control and implementation of state space search, production systems  
16 Hrs

UNIT- II

Issues in knowledge representation, a brief history of AI representational systems, conceptual graphs-a network language, alternatives to explicit representation, agent based and distributed problem solving.  
Introduction to weak methods theorem proving, the general problem and difference tables, resolution theorem proving, prolog and automated reasoning.  
16 Hrs

UNIT- III

Role of knowledge in language understanding, deconstructing language- a symbolic analysis, syntax 559, syntax and knowledge with A TN parsers.  
07 Hrs

TEXT BOOKS:


REFERENCE BOOK:

Course Outcomes:

After studying this lab course, the student will be able to:

1. Understand the salient features of a Verilog code.
2. Understand the different modeling styles in Verilog.
3. Perform Verilog simulation using available EDA tools (e.g. Cadence/Synopsys).
4. Develop and simulate Verilog codes for basic logic gates, universal logic gates, combinational circuits and sequential elements.
5. Make use of available Verilog codes suitable for developing codes for functional blocks such as adders of varying word widths and counters (binary/decimal, synchronous/asynchronous, MOD-N counter).
6. Develop and simulate Verilog code for any given Boolean function / stated system behavior which are elementary in the field of digital logic design.
7. Design CMOS circuit for an inverter for the given midpoint voltage, switching speed and perform simulation for AC and DC analysis.
8. Design Common Source (CS) amplifier and Common Drain Amplifier for the given gain and perform schematic simulation.
9. Perform layout simulation for inverter, CS amplifier, CD amplifier and any given Boolean expression.

PART – A: DIGITAL DESIGN

1. Write Verilog Code for the following circuits and their Test Bench for verification, observe the waveform and synthesize the code with technological library with given Constraints*. Do the initial timing verification with gate level simulation.
   i. An inverter
   ii. A Buffer
   iii. Transmission Gate
   iv. Basic/universal gates
   v. Flip flop - RS, D, JK, MS, T
   vi. Serial & Parallel adder
   vii. 4-bit counter [Synchronous and Asynchronous counter]

*An appropriate constraint should be given

PART - B: ANALOG DESIGN

1. Design an Inverter with given specifications*, completing the design flow mentioned below:
   a. Draw the schematic and verify the following
      i) DC Analysis
      ii) Transient Analysis
   b. Draw the Layout and verify the DRC, ERC
   c. Check for LVS
   d. Extract RC and back annotate the same and verify the Design
   e. Verify & Optimize for Time, Power and Area to the given constraint***
2. Design the following circuits with given specifications*, completing the design flow mentioned below:
   a. Draw the schematic and verify the following
      i) DC Analysis
      ii) AC Analysis
      iii) Transient Analysis
   b. Draw the Layout and verify the DRC, ERC
   c. Check for LVS
   d. Extract RC and back annotate the same and verify the Design.
      i) A Single Stage differential amplifier
      ii) Common source and Common Drain amplifier

3. Design an op-amp with given specifications* using given differential Amplifier, Common source and Common Drain amplifier in library** and Complete the design flow mentioned below:
   a. Draw the schematic and verify the following
      i) DC Analysis
      ii) AC Analysis
      iii) Transient Analysis
   b. Draw the Layout and verify the DRC, ERC
   c. Check for LVS
   d. Extract RC and back annotate the same and verify the Design.

4. Design a 4 bit R-2R based DAC for the given specification and complete the design flow mentioned using given op-amp in the library**.
   a. Draw the schematic and verify the following
      i) DC Analysis
      ii) AC Analysis
      iii) Transient Analysis
   b. Draw the Layout and verify the DRC, ERC
   c. Check for LVS
   d. Extract RC and back annotate the same and verify the Design.

* Appropriate specification should be given.
** Applicable Library should be added & information should be given to the designer.
*** An appropriate constraint should be given
SEMINAR

Sub code : 12EC705  
Credits : 01  
Hours/Week : 3

Student will present his conclusions on any subject of his choice in the field of Electronics for about 20 minutes in front of the professors to be evaluated for the marks so specified. He will also prepare and submit a detailed report on the subject in a proper format before the presentation.

PROJECT

Sub code : 12EC706  
Credits : 01  
Hours/Week : 3

Student will carry out a project using the knowledge he had gathered from the courses he has successfully cleared to arrive at some useful conclusions using any of the methods listed below:

i) Designing and testing a circuit for a new concept
ii) Conceptual development of a new idea in the field of electronics
iii) Literature survey of any topic of importance in electronics
WIRELESS COMMUNICATION

Subject Code : 12EC801
Credits : 04
Hrs/Week : 4
Total Hours : 52

Course Outcomes:

After the end of course, the student should be able to:

1. Know about the history and evolution of wireless communication, advantages of wireless communication
2. Differentiate between the wired and wireless telephones
3. Grasp the Basics of cellular system – cellular geometry, frequency reuse, handoff etc
4. Suggest Channel assignment strategies, Improving the capacity of a cellular system
5. Calculate Mobile radio propagation, path loss models and its use, concept of fading.
6. Take into account multipath channel parameters which are essential in quantifying the channel.
7. Enumerate the diversity of techniques, its advantages and application to MIMO systems.
8. Apply fundamentals of Channel coding
9. Appreciate multiple access techniques.
10. Visualize the fundamentals and development of wireless networking, traffic routing, and different data services.

UNIT - I

Introduction to wireless communication: History and evolution, Difference between wireless and fixed telephone networks.
Cellular concept – System design fundamentals: Introduction, Frequency reuse, Cellular geometry, Channel assignment strategies, Handoff strategies, Interference and System capacity, Trunking and GOS, Improving coverage and capacity in cellular systems.

UNIT - II

Mobile Radio Propagation: Introduction to Radio Wave propagation, Free space propagation model, Relating power to Electric Field, Basic propagation mechanism – Reflection, Diffraction and Scattering (suitable models to be covered), Practical Link budget design using path loss models, Outdoor and Indoor propagation.
Small-Scale multipath propagation, Impulse response model of multipath propagation, Parameters of mobile multipath channels, Types of Small-Scale Fading.
UNIT -III

**Diversity Techniques and Coding:** Concepts of Diversity, Diversity Combining and Switching methods, Selection Diversity, Feedback Diversity, Maximal Ratio Diversity, Equal Gain Combining, Polarization Diversity, Frequency Diversity, Time Diversity. Fundamentals of Channel Coding, Block Codes and Finite Fields, Convolution Codes, TCM.  

12 Hrs

UNIT -IV

**Multiple Access Techniques for Wireless Communication:** Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum Multiple Access, SDMA, Packet radio, CSMA, Capacity of Cellular Systems.  

10 Hrs

UNIT - V

**Wireless Networking:** Introduction and Development of Wireless Networks, Traffic Routing in Wireless Networks, Wireless data Services, ISDN, SS7, GSM Architecture  

10 Hrs

**TEXT BOOK:**


**REFERENCE BOOKS:**


**POWER ELECTRONICS LAB**

Subject Code : 12EC802  
Credits: 02  
Hrs/Week : 3

**Course outcomes**

**At the end of the course student should be able to**

1. Given a power device, to know how to identify various terminals
2. To know how to obtain, analyze and plot the static characteristics of various power devices
3. To know how to design and characterize various types of firing circuits
4. To know how to build and analyze various types of power converters
5. To know how converters behave in presence of inductance in the load
6. To know how to make a lamp dimmer
7. To know how to use basic features of laboratory equipment like power supplies, power scopes etc.
LIST OF EXPERIMENTS

1. Static characteristics of SCR and DIAC.
2. Static characteristics of MOSFET and IGBT.
3. Controlled HWR and FWR using RC triggering circuit
4. SCR turn off using i) LC circuit ii) Auxiliary Commutation
5. UJT firing circuit for HWR and FWR circuits.
7. AC voltage controller using triac – diac combination.
9. Voltage (Impulse) commutated chopper both constant frequency and variable frequency operations.
10. Speed control of a separately exited DC motor.
11. Speed control of universal motor.
12. Speed control of stepper motor.
13. Parallel / series inverter.

Note: Experiments to be conducted with isolation transformer and low voltage

PROJECT

Subject Code : 12EC803 
Credits : 09
Hrs/Week : 0+0+9

Course Outcomes:

On the completion of the project student will have the ability to

1. Get experience of applying previous knowledge.
2. Learn skillful use of various hard and soft tools.
3. Take up a relevant project, analyze its requirement and plan for its execution.
4. Work efficiently and constructively in a team environment.
5. Integrate smaller tasks into a larger task and to disintegrate a larger task to smaller ones.
6. Record and Document the work done.

Students will carry out a detailed project in Electronics either singly or in small groups to show case the extent of knowledge gained during the regular classes in the relevant and useful applications on the subject of electronic circuits, systems, using either or both hardware and software.
ANALOG AND MIXED MODE VLSI DESIGN

Subject Code : 12EC811
Credits : 03
Hrs/Week : 3
Total Hours : 39

UNIT- I
Review of MOS device physics, MOS device models.
Single stage amplifiers: Basic concepts, common source, source follower, common gate stage, cascode stage amplifiers
Current mirrors (basics), Differential amplifiers: Single-ended and differential operation, basic differential pair (qualitative analysis only), common mode response, differential pair with MOS loads, Gilbert cell. 14 Hrs

UNIT- II
Op-Amp design: General considerations, One-stage Op-Amp, Two Stage Op-Amp
Data Converter Architectures: DAC Architectures: Resistors String, R-2R Ladder Networks, Current Steering, Charge Scaling DAC, Cyclic DAC, Pipeline DAC, ADC Architectures: Flash, 2-step Flash ADC, Pipeline ADC, Integrating ADC, Successive Approximation ADC. 17 Hrs

UNIT- 3
Sub-Micron CMOS circuit design: Process flow, capacitors and resistors, MOSFET Switch, Delay and Adder elements, Analog Circuits MOSFET Biasing. 8 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
MULTIMEDIA COMMUNICATIONS

Subject Code :  12EC812  
Hrs/Week :  3  
Credits :  03  
Total Hours :  39

UNIT- I

Multimedia Communications: Introduction, multimedia information representation, multimedia networks, multimedia applications, media types, communication modes, network types, multipoint conferencing, network QoS application QoS.


UNIT -II

Audio and Video Compression: Introduction, audio compression, DPCM, ADPCM, APC, LPC, video compression, video compression principles, H.261, H.263, MPEG, MPEG-1, MPEG-2, and MPEG-4.

Multimedia Information Networks: Introduction, network performance parameters, throughput, networking delay, delay variance, error rate, quality of service. QoS perspectives, QoS Processing, multimedia transmission, requirements, transmission over WANs, Multimedia Transmission over LANs, ATM Networks, Wireless LANs.  

UNIT-III

Multimedia transport and management protocols
Multimedia transport: RTP and RTCP
Multimedia management protocols: H.323, SIP, SDP, SAP.  

8 Hrs

TEXT BOOKS:

SPEECH PROCESSING

Subject Code : 12EC813
Credits : 03
Hrs/Week : 3
Total Hours : 39

UNIT- I

Time-domain methods for speech processing: time dependent processing of speech, short time energy and average magnitude, short-time average zero crossing rates. 16 Hrs

UNIT- II

Analysis and Synthesis: Brief Applications of temporal processing of speech signals in synthesis, enhancement, hearing applications and clear speech.
Frequency domain methods for speech processing: introduction, definitions and properties: Fourier transforms interpretation and linear filter interpretation, sampling rates in time and frequency. 15 Hrs

UNIT-III

Filter bank summation and overlap add methods: for short-time synthesis of speech, sinusoidal and harmonic plus noise method of analysis/synthesis.
Homomorphic speech processing: Introduction, homomorphic system for convolution, the complex cestrum of speech, homomorphic vocader. 8 Hrs

TEXT BOOK:

REFERENCE BOOKS:
REAL-TIME OPERATING SYSTEMS

Subject Code: 12EC814  
Credits: 03  
Hrs/Week: 3  
Total Hours: 39

Course Outcomes:

After studying this subject, the student should be able to:

- Understand the concept of real time systems with an example, types of real time systems, various task classes.
- Understand the structure of real time systems, time constraints, Performability, Examples of performabilty, Source code analysis, Pipelining.
- Understand the scheduling algorithms such as RM algorithm, EDF algorithm, IRIS algorithms, Utilization balancing algorithm etc.
- Understand the real time protocols such as VT-CSMA algorithm, Timed token protocol, Window protocol and Token ring protocol.
- Understand RTOS services, Kernel services, Scheduling algorithms, Synchronization issues, OS security issues.
- Understand the features of MUCOS and Vx-Works along with its applications such as ACVS, Sending application layer bytes on a TCP/IP protocol.

UNIT-I

Task Assignment & Scheduling: Classical Uniprocessor scheduling algorithms: Rate Monotonic and Earliest Deadline First; Multiprocessor scheduling: Utilization-Balancing Algorithm, Next-Fit Algorithm, Bin-Packing Assignment; Fault tolerant scheduling.  
16 Hrs

UNIT-II

Real Time Communication: Network topologies, Network architecture issues; Protocols: Contention-based protocol (VTCSMA only) and Token-based protocols.  
16 Hrs

UNIT-III

RTOS Tools with case studies: Use of MUCOS/OS-II, Use of Vx Works, Case studies of Vending machines, Coding for sending application layer bytes of TCP/IP stream.  
7 Hrs

TEXT BOOKS:
HIGH PERFORMANCE COMMUNICATION NETWORKS

Subject Code : 12EC821

Credits : 03

Hrs/Week : 3

Total Hours : 39

UNIT- I


Internet and TCP/IP Networks: IPV4 Reliable multicast, Multicast IP, Mobile IP, TCP and UDP, Applications, FTP, SMTP. Internet success and limitations, Performance of TCP/IP Networks, Performance of circuit switched Networks.

UNIT - II

ATM And Wireless Network
ATM: Main features of ATM, Addressing, signaling and Routing, ATM header structure, ATM AAL, Internetworking with ATM

Network controls
Control of networks, Objectives and methods of control, Circuit switched networks, datagram Networks, Network economics, Derived demand for network services, ISPs, subscriber demand model.

UNIT - III

Optical Networks: Optical Links, WDM systems, Optical cross connects, Optical LANs, Optical paths and Networks. SONET, DWDM, FTH, DSL, Intelligent networks CATV.

TEXT BOOKS:
BIOMEDICAL SIGNAL PROCESSING

Subject Code: 12EC822  Credits: 03
Hrs/Week: 3  Total Hours: 39

Course Outcomes:

After studying this subject, the student should be able to:

- Understand the general characteristics of medical data.
- Identify different techniques to record ECG.
- Analyze digital & integer filters in biomedical applications.
- Learn application of adaptive filters in biomedical signal processing.
- Learn importance of signal averaging in signal processing.
- Understand different data reduction techniques.
- Analyze an ECG signal using different techniques.

UNIT- I

Overview of Biomedical Signals: Sources and nature of biomedical signals, Types of biomedical signals: deterministic, stochastic, fractal and chaotic. Characteristics of medical data, Objectives of biomedical signal analysis. Introduction to ECG, EEG, EMG, PCG and their signal characteristics.

Digital and Integer Filters: Digital filters pole-zero plot, Integer filters: Basic design concept, Low-pass, High-pass, Band-pass and Band-reject integer filters. 9 Hrs

UNIT-II

Artifacts in Biomedical Signals: Baseline wander, Power-line noise and High frequency noise sources.

Adaptive Filters and Signal Averaging: Principal noise canceller model, 60-Hz adaptive canceling using a sine wave model, Applications of adaptive filtering, Basics of signal averaging.

Data Reduction Techniques: Overview of data reduction techniques, Turning point algorithm, Huffman coding.

Advanced Biomedical Signal Analysis techniques: Power spectrum estimation, Discrete cosine transform and Short-time Fourier transform, Wavelet transform 10 Hrs

UNIT-III

ECG QRS Detection: Differentiation techniques, Template matching techniques, Pan-Tompkins QRS detection algorithm.

Computer-Aided ECG (EEG, EMG, PCG) Interpretation: Overview of computer-aided diagnosis, ECG interpretation, Computer-assisted classification, Portable arrhythmia monitor. 9 Hrs

Number of LAB Hours: to be with MATLAB tool during Lab sessions 11 Hrs
TEXTBOOK:

REFERENCE BOOKS:

OPTICAL COMPUTING

Subject Code : 12EC823 Credits : 03
Hrs/Week : 3 Total Hours : 39

UNIT -I
Linear Optical Processing: Introduction, photographic film, spatial filtering using binary filters, holography, inverse filtering, de-blurring
Optical Arithmetic: Introduction, Half-tone processing, non-linear optical processing, arithmetic operation
Recognition using analog optical systems: Introduction, matched filter, joint transform correlation, phase only filter, AM recognition filters, generalized correlation filter, Mellin transform based correlation
Devices: Non-linear devices, integrated objects, threshold devices

  16 Hrs

UNIT -II
Shadow casting and symbolic substitution: Shadow casting system and design algorithm, POSC logic operation, POSC multiprocessor, parallel ALU using POSC, sequential ALU using POSC, symbolic substitution
Optical matrix processing: Multiplication, Multiplication using convolution, matrix operations, cellular logic architecture.

  15 Hrs

UNIT -III
Artificial Intelligence Computations: Neural networks, associative memory, optical implementations, interconnections.

  08 Hrs

TEXT BOOK:
HUMAN RESOURCE MANAGEMENT

Subject Code: 12EC824  
Credits: 03  
Hrs/Week: 3  
Total Hours: 39

Course Outcomes:

1. Focus on understanding human resource management in organizations and its significance.
2. Explains about the stages of employing people such as Human Resource Planning, Deciding on HR policies and principles, Job – analysis, recruitment and selection, employee training and development, performance appraisal and employee compensation practices and procedures in organizations.
3. To develop an insight into the aspects of provisions and privileges of employees, safety and health provisions. Industrial relations and trade union activities and related rules, ability to deal with ethical issues of human resources management and effectiveness.
4. Developing awareness about current and contemporary issues relating to employee management in organization.

UNIT-I


UNIT-II


UNIT-III

Managing Ethical Issues in HRM, Evaluating HRM Effectiveness, Contemporary issues in HRM, International issues in HRM. Case studies to be included in all chapters.

TEXT BOOK:


REFERENCE BOOK:

Open Electives Offered in VIII Semester for the year 2015-16

MA8X 01 Graph Theory
MA8X 02 Linear Algebra
HU8X 03 Intellectual Property Rights
PH8X 04 Advanced Materials Technology
BT8X 05 Nano Technology
BT8X 06 Instrumental methods of Analysis
CV8X 07 Environmental Impact Assessment
ME8X 08 Industrial Pollution Control
ME8X 09 Management and Entrepreneurship
EE8X 10 Non-Conventional Energy Systems
EE8X 11 Linear Systems Theory
EC8X 12 Information and Electronic Communication Technology
EC8X 13 Robotics
CS8X 14 Object Oriented Prog. with C++
CS8X 15 Essentials of Information Technology
EC8X 18 Consumer Electronics
PH8X 19 Optoelectronic devices
HU8X 20 Value Education
CH8X 21 Natural Products Chemistry for Bio-Tech
CS8X 22 Essentials of IT Service Industry
MA8X 23 Statistical design and analysis of experiments
HU8X 24 Professional & Cognitive Communique
MA8X 25 Introduction to Topology
GRAPH THEORY

Subject code : MA8X01
Hours/Week : 3

Credits : 03
Total Hours : 39

UNIT - I
Introduction to graphs, digraphs, sub graphs-spanning and induced graphs, paths, cycles, connectivity, cut points, bridges, blocks. 8 Hrs

UNIT – II
Trees, Eularian graphs, characterizations, Hamiltonian graphs. 7 Hrs

UNIT – III
Planar graphs, outer planar graphs, Euler’s polyhedron formula, Colorability: chromatic number, Five colour theorem, four colour conjecture, Chromatic polynomial. 8 Hrs

UNIT – IV
Representations of graphs: The adjacency matrix and incidence matrix. Circuit matrix, cutest matrix. Shortest paths in weighted graphs, Dijkstra’s algorithm to find shortest paths. 8 Hrs

UNIT – V
Spanning trees: Algorithms to find a spanning tree A minimal spanning tree – Kruskal’s & Prims algorithm.
Connectivity test: Warshall’s algorithm, algorithm to locate an Euler Circuit from Incidence matrix. Algorithm to locate an Euler Circuit from the adjacency matrix for an undirected graph. 8 Hrs.

TEXT BOOK:
2. Narsing Deo, “Graph Theory with Applications to Engg. and Comp. Sciences”- PHI.

REFERENCE BOOKS:
2. D.B.West, “Introduction to Graph Theory”, PHI.
LINEAR ALGEBRA

Subject code : MA8X02
Hours/Week : 3
Credits: 03
Total Hours: 39

UNIT-I
Linear equations: System of linear equations and its solution sets; elementary row operations and echelon forms; matrix operations; invertible matrices, LU-factorization.

UNIT-II
Vector spaces: Vector spaces; subspaces; bases and dimension; coordinates; summary of row-equivalence; computations concerning subspaces.

UNIT-III
Linear Transformations: Linear transformations; algebra of linear transformations; isomorphism; representation of transformations by matrices; linear functions; transpose of a linear transformation. Determinants and elementary properties.

UNIT-IV
Canonical Forms: Characteristic values; similarity of matrices, Cayley Hamilton theorem, annihilating polynomials; invariant subspaces; direct –sum decompositions; invariant direct sums; diagonalization of symmetric matrices, iterative estimates of characteristic values.

UNIT-V
Inner Product Spaces: Inner products; inner product spaces; orthogonal sets and projections; Gram-Schmidt process; QR-factorization; least-squares problems; symmetric and unitary operators.

TEXT BOOKS:
INTELLECTUAL PROPERTY RIGHTS (IPR)

Subject Code : HU8X03
Credits : 03
Hours/week : 3 Hrs
Total hours: 39

UNIT I

Introduction to Intellectual Property
Invention and Creativity - Intellectual Property (IP) – Importance, Jurisprudential definition and concept of property, rights, duties and their correlation; History and evaluation of IPR – like Patents, Trademarks, Copyright & Related Rights, Industrial Design, Traditional Knowledge, Geographical Indications 08 Hrs

UNIT II

Agreements and Treaties

UNIT III

Basics of Patents and Concept of Prior Art
Introduction to Patents; Types of patent applications: Ordinary, PCT, Conventional, Divisional and Patent of Addition; Specifications: Provisional and complete; Forms and fees, Invention in context of “prior art”; Patent databases; Searching International Databases; Country-wise patent searches (USPTO, EPO, WIPO, IPO, etc.) 08 Hrs

UNIT IV

Patent filing procedures
National & PCT filing procedure; Time frame and cost; Status of the patent applications filed; Structure of Patent document, Precautions while patenting – disclosure/non-disclosure; Financial assistance for patenting – introduction to existing schemes, Patent licensing and Agreement, Patent infringement- meaning, scope, litigation. 08 Hrs

UNIT V

Case Studies on Patents (Basumati rice, turmeric, Neem, etc.) non-biological cases may be included– Copyright and related rights – Trade Marks – Trade secrets - Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition Technology transfer and license agreement. 07 Hrs

REFERENCES:
5. Intellectual Property Today: Volume 8, No. 5, May 2001,

Important Links:
http://www.w3.org/IPR/
http://www.wipo.int/portal/index.html.en
http://www.ipr.co.uk/IP_conventions/patent_cooperation_treaty.html
www.patentoffice.nic.in
www.iprlawindia.org/- 31k - Cached - Similar page

ADVANCED MATERIALS TECHNOLOGY

Subject Code: PH8X04
Credits: 03
Hours/Week: 3 Hrs
Total Hours: 39

The objectives of the course:
1. To provide our students adequate education in materials technology to have a basis for a complete understanding of current and future scientific and technological developments
2. To provide our students, adequate education regarding the material properties to handle the design problem involving materials, effectively.
3. To select a right material for a specified application from the thousands of available materials available.
4. To select a cost effective material to reduce the cost of finished product.

UNIT I

Structures and Properties of Ceramics- Introduction, Ceramic structures: Crystal structures, Silicate Ceramics, Carbon, Imperfection in ceramics, ceramic phase diagram, Mechanical properties: Brittle Fracture of Ceramics, Stress- Strain Behavior, mechanisms of plastic deformation, Miscellaneous mechanical Considerations.

Types, processing and Applications of Ceramics - Glasses and Glass Ceramics, clay Products, Refractories, Abrasives, Cements, Advanced Ceramics, Fabrication and processing of Ceramics and applications, Fabrication and processing of Glasses and applications, Fabrication and processing of Clay Products, Powder Pressing, Tape casting.

UNIT II

Structure and Properties of Polymer - Introduction, Hydrocarbon Molecules, Polymer Molecules, Types of polymers-Thermoplastic and Thermosetting Polymers, Copolymers, Polymer Crystallinity, Polymer Crystals, Defects in Polymers, Diffusion in Polymeric Materials, Polymer types - Plastics, Elastomers, Fibers,
Mechanical Behavior of Polymers: Stress-Strain Behavior, Mechanism of Deformation and Strengthening of Polymers, Deformation of semi-crystalline Polymers, Deformation of Elastomers, Advanced Polymeric Materials

**Polymer Synthesis and Processing** - Polymerization, polymer additives, Forming Techniques for Plastics, Fabrication of fibers and Films and applications

08 hrs

**UNIT III**


08 hrs

**UNIT IV**

Shape memory alloys and Metallic glasses:
Introduction to shape memory alloys, Fundamental characteristics, shape memory effect (pseudoeelasticity), Advantages and disadvantages of SMA, Methods of processing, Commercial shape memory alloys and applications.
Introduction to metallic glasses, principle, properties, processing, applications - bulk metallic glass in nanotechnology, metallic glasses for air craft structure.

07 hrs

**UNIT V**

Introduction to Nano materials: Properties of individual nanoparticles, Semiconducting nanoparticles: optical properties, photofragmentation, coulombic explosion, Carbon clusters: small carbon clusters, \( \text{C}_{60} \) crystals, alkali doped \( \text{C}_{60} \), larger and smaller fullerenes, other bucky balls, nanostructured crystals: natural nanocrystals, photonic crystals, nanostructured ferromagnetism: Dynamics of nanomagnets, nanopore containment of magnetic particles, ferrofluids.

08 hrs

**TEXT BOOKS:**


**REFERENCE BOOKS:**

1. Van Vlack L.H. “Elements of Material Science”, Addison-Wesley Publishers

**Scheme:**

1) SEE to be conducted out of 100 marks and will be reduced to 50 marks
2) Two Questions are to be set from each unit, carrying 20 marks each.
3) Students have to answer any one full question from each Unit.
NANOTECHNOLOGY

Subject Code : BT8X05  
Credits : 03

Hours/Week : 3 Hrs  
Total Hours : 39

OBJECTIVE
The objectives of this course includes introduction to nanotechnology, detailed study of MEMS, applications of nanotechnology. 
Beneficiary Branches of Engineering: EC, Mechanical, Civil.

UNIT I
INTRODUCTION

UNIT II
NANOMATERIAL AND NANO TOOLS
Buckyballs (Fullerenes), Nanotubes, nanowire, Dendrimers, Nanoshells, magnetic nanoparticle, Quantum Dot (Nanocrystals), self assembled monolayers, Scanning probe microscopy (Scanning tunneling microscopy, Atomic force microscopy).

UNIT III
NANOTECHNOLOGY FOR DRUG DISCOVERY & DRUG DELIVERY

UNIT IV
MICROFLUIDICS
Microflows (Laminar flow), Hagen-Pouiselle equation, micromixing, microvalves & micropumps, Need for the microfluidics, Fabrication of Soft Materials ,application of microfluidics

UNIT V
MEMS & APPLICATIONS
Introduction and Overview, Design of MEMS, Sensors, Electromagnetic Transducers, Mechanical Transducers, Chemical Transducers, Optical Transducers - Applications of optical and chemical transducers. Recent Developments in MEMS and Nano chips. DNA based MEMS, application of MEMS

TEXT BOOKS:
T3.G.Schmid, “Nanotechnology Assessment and Perspectives”.
T5. Jean Berthier, Pascal Silberzan, “Micro fluidics for biotechnology”.

INSTRUMENTAL METHODS OF ANALYSIS

Subject Code : BT8X06
Credits : 03
Hours / Week: 3
Total Hours : 39

Beneficiary Branches of Engineering: Mechanical, Civil.

UNIT-I

INTRODUCTION
Types of analytical instrumental methods and their selection, role of computers in analytical methods, performance requirements of analytical instruments, and instrument calibration techniques. Principle of microscopy, light field microscopy, scanning electron microscopy, tunneling electron microscopy and applications 7 Hrs

UNIT-II

SPECTROSCOPIC TECHNIQUES
Basic principles and applications of UV-Visible spectrometry, infrared spectrometry, nuclear magnetic resonance spectrometry, molecular mass spectrometry. Surface spectroscopic techniques: electron spectroscopy and ion spectroscopy; atomic absorption spectroscopy. 9 Hrs

UNIT-III

CHROMATOGRAPHIC TECHNIQUES
Introduction to chromatographic separations. Basic principles and theory. Gas chromatography and HPLC: principle, instrumentation, column, detector, mobile phase, sample preparation. Application of chromatographic techniques. 9 Hrs

UNIT-IV

THERMAL AND ELECTROCHEMICAL TECHNIQUES
Principles and applications of thermo-gravimetric analysis (TGA), differential thermal analysis (DTA), differential scanning calorimetry (DSC). Electrochemical methods for analysis, electrochemical cells, types of electrodes, electrode potentials. 8 Hrs

UNIT-V

ENVIRONMENTAL APPLICATIONS
Types and concentration of various gas pollutants, instrumental techniques and measurement range for carbon dioxide, sulfur dioxide, nitrogen oxides, hydrocarbons and ozone. Types of water pollutants and detection techniques. 6 Hrs

TEXT BOOK:

REFERENCES BOOKS:

ENVIRONMENTAL IMPACT ASSESSMENT

Sub Code : CV 8X07
Hrs/ Week : 03
Credits : 03
Total Hours : 39

Objective: To equip the students with the various key elements of EIA.
Pre-requisites of the course: CV 113

UNIT I
Developmental activity and ecological factors; EIA, EIS, FONSI. Need for EIA studies, Baseline information, Procedure for conducting EIA, Limitation of EIA; Environmental Acts/policies. 8 Hrs

UNIT II
Frame work of impact assessment in developmental projects; Environmental setting, EIA-Objective, content, methodologies, techniques, Rapid and comprehensive EIA. 9 Hrs

UNIT III
Assessment and prediction of attributes: Air, Water, Noise, Land, Ecology, Soil, Socio-economic environment. 7 Hrs

UNIT IV
Public participation in environment decision making, practical consideration in preparing EIA and EIS, salient features of the project activity, Environmental parameter – activity relationship matrices. 8 Hrs

UNIT V
EIA for construction project, power projects, mining projects. 7 Hrs

TEXT BOOKS

REFERENCE BOOKS
1. Guidelines for EIA of developmental projects, Ministry of Environment and Forest, GOI.
INDUSTRIAL POLLUTION CONTROL

Subject Code : ME 8X08
Hrs/ Week : 03
Credits : 03
Total Hours : 39

UNIT I
1. Introduction to Pollution
Man and the environment, environmental degradation due to energy generation, consequences of pollution, sustainable industrial growth, air water and soil pollution, carbon audit. Ill effects of pollutants, Photochemical Smog, permissible concentrations. 8 Hrs

UNIT II
2. Meteorology
Meteorology, Wind rose, plume dispersion studies & Numerical problems 8 Hrs

UNIT III
3. Separation techniques
Particulates and fly ash separation techniques. Sources of Particulates Matter, fly ash properties, theory of settling processes- (problems), Single & parallel plate ESP- (problems), Bag House, Cyclone separator, Spray Tower, Scrubbers & Venturi Scrubber, merits and demerits of each. 8 Hrs

UNIT IV
4. Smoke and gaseous pollutants
Smoke and gaseous pollutants: formation, measurement and control techniques T.T.T.O principle- (Ringlemann Chart, Smokescope, Bosch smoke meter), Coal firing- Under feed and overfeed stocker, Domestic and Industrial Incinerators, Pollutant gaseous (So2, Co, UBHC & NOx) Their sources, measurement and control. So2-Colorimetric, scrubbing & lime stone injection method. CO- Colorimetric, IR CO analyzer & control by oxidation. UBHC- Gas chromatography, Control by after burning & floating tanks. NOx- Iso-kinetic sampling, colorimetric method, control methods in brief for Low peak combustion temperature. 7 Hrs

UNIT V
Water, soil, noise, plastic and odor pollution, their control methods.
Pollution control Acts, Legal aspects of pollution control. 8 Hrs

REFERENCE BOOKS:
2. W. L. Faith, John Wiley “Air Pollution Control”.
3. “Environmental Pollution Control Engineering”, Wiley Eastern Ltd.,

Scheme Examination:
TWO questions to be set from each UNIT and Students shall answer FIVE full questions choosing at least ONE question from each UNIT.
MANAGEMENT & ENTREPRENEURSHIP

Sub Code : ME 8X09
Credits : 03
Hrs/ Week : 03
Total Hours : 39

UNIT I
PLANNING: Nature, importance and purpose of planning process - Objectives - Types of plans (Meaning Only), Steps in planning & planning premises, Hierarchy of plans.

UNIT II
DIRECTING & CONTROLLING: Meaning and nature of directing - Leadership styles Classification and meaning only), Motivation Theories (Meaning of motivation and Classification of theories; content, process and contemporary), Communication - Meaning and importance. Coordination - meaning, importance and Techniques of Coordination. Meaning and steps in controlling - Essentials of a sound control system - Methods of establishing control (in brief)

UNIT III
ENTREPRENEURSHIP: Concept of Entrepreneurship, Evolution of Entrepreneurship, Stages in entrepreneurial process; Role of entrepreneurs in Economic Development; Entrepreneurship in India; Entrepreneurship - its Barriers. Meaning of Entrepreneur; Functions of an Entrepreneur, Types of Entrepreneurs, Entrepreneur - an emerging Class.
Identification of business opportunities: Market Feasibility Study; Technical Feasibility Study; Financial Feasibility Study & Social Feasibility Study.

UNIT IV
SMALL SCALE INDUSTRIES: Definition; Characteristics; Need and rationale; Objectives; Scope; role of SSI in Economic Development. Advantages of SSI, Steps to start and SSI, Government policy towards SSI; Different Policies of SSI, Impact of Liberalization, Privatization, Globalization on SSI. Effect of WTO/GATT on SSI, Supporting Agencies of Government for SSI, Ancillary Industry and Tiny Industry (Definition Only)
INSTITUTIONAL SUPPORT: Different Schemes; TECKSOK; KIADB; KSSIDC; KSIMC; DIC Single Window Agency; SISI; NSIC; SIDBI; KSFC

UNIT V
PREPARATION OF PROJECT: Meaning of Project; Project Identification; Project Selection; Project Report; Need and Significance of Report; Contents; Formulation; Guidelines by Planning Commission for Project report; Errors of Project Report; Project Appraisal, Network Analysis (Simple numerical problems to find early and late, start and finish times, critical path and total project duration).

8 Hrs
TEXT BOOKS:

REFERENCE BOOKS:

NON CONVENTIONAL ENERGY SYSTEMS

Subject Code : EE8X10
Hrs / Week : 3-0-0
Credits : 3
Total Hours : 39

UNIT – I
Energy Sources: Introduction, Importance of Energy Consumption as Measure of Prosperity, Per Capita Energy Consumption, Classification of Energy Resources; Conventional Energy Resources - Availability and their limitations; Non-Conventional Energy Resources – Classification, Advantages, Limitations; Comparison of Conventional and Non-Conventional Energy Resources; World Energy Scenario; Indian Energy Scenario. 3 Hrs


Solar Thermal Systems: Principle of Conversion of Solar Radiation into Heat, Solar Water Heaters (Flat Plate Collectors), Solar Cookers – Box type, concentrating dish type, Solar driers, Solar Still, Solar Furnaces, Solar Green Houses 4 Hrs

Solar PV Systems – stand-alone and grid connected; Applications – Street lighting, Domestic lighting and Solar Water pumping systems. 4 Hrs

UNIT – II
Energy Storage: Introduction, Necessity of Energy Storage, and Methods of Energy Storage (classification and brief description using block diagram representation only) 3 Hrs


UNIT – III
Energy from Ocean: Tidal Energy – Principle of Tidal Power, Components of Tidal Power Plant (TPP), Classification of Tidal Power Plants, Estimation of Energy – Single basin and Double basin type TPP (no derivations. Simple numerical problems), Advantages and Limitation of TPP. Ocean Thermal Energy Conversion (OTEC): Principle of OTEC system, Methods of OTEC power generation – Open Cycle (Claude cycle), Closed Cycle (Anderson cycle) and Hybrid cycle (block diagram description of OTEC); Site-selection criteria, Biofouling, Advantages & Limitation of OTEC.

TEXT BOOKS:

REFERENCE BOOKS:

LINEAR SYSTEMS THEORY

Subject Code : EE8X11  
Credits : 03
Hrs / Week : 3-0-0  
Total hours : 39

UNIT-I
State variable analysis & design: Introduction, concept of state, state variables & state model, state model of linear systems, linearization of state equations. 3 Hrs
State space representation using physical variables, phase variables & canonical variables. 6 Hrs
Derivation of transfer function from state model, diagonalisation, eigen values, Eigen vectors, generalized Eigen vectors. 6 Hrs

UNIT-II
Solution of state equation, state transition matrix & its properties, computation using Laplace transformation, power series method, Cayley-Hamilton method, 8 Hrs
Concept of controllability & observability, methods of determining the same. 6 Hrs

UNIT- III
Pole placement techniques: stability improvements by state feedback, necessary & sufficient conditions for arbitrary pole placement
Liapunov stability criteria, Liapunov functions, direct method of Liapunov & the linear system, Hurwitz criterion & Liapunov’s direct method 5 Hrs

TEXT BOOKS:

REFERENCE BOOKS:

INFORMATION AND ELECTRONIC COMMUNICATION TECHNOLOGY

Subject Code : EC 8X12
Credits : 03
Hours/Week : 03
Total Hrs : 39

Common elective from Electronics and Communication department - for the students of Other branches

UNIT I
Introduction: measure of information, information content, symbols, entropy, communication channel, noise and channel capacity, discrete channels, error control, codes.
Noise & signal processing, AM/FM/PM..., sampling, PAM, TDM, PCM., Concept of spread spectrum, multiple access, cells, mobility, inter-cell handshake.       15 Hrs

UNIT II
Microwaves: microwave devices, microwave systems and antennas, propagations, reflections and refractions terrestrial communications, ground and space components, SNR, FDMA, TDMA Etc, satellite systems and services.
Optical fiber: optical devices, transmission networks, multiplexing, WDM, OTDM, n/w management, lasers.  16 Hrs

UNIT III
Computers communications: OSI, TCP/IP, languages, adhoc networks, security, multimedia, audio/video compression, 3G/4G N/Ws, latest trends.  8 Hrs

REFERENCE BOOKS:
R3. Faraouzan, “Data Communication”, TMH.
ROBOTICS

Subject Code:  EC 8X13  
Hrs/ Week  :  03  
Credits  :  03  
Total Hrs :  39

Common elective from Electronics and Communication department - for Students from other branches

UNIT I

**Introduction:** Historical developments, arm kinematics and dynamics, manipulated trajectory, planning and control, sensing, robot languages, machine intelligence.

**Robot arm kinematics:** Direct kinematics problem and inverse kinematics solution.

**Robot arm dynamics:** Lagrange-Euler formulation, Newton -Euler formulation equation of motion.

**Planning trajectories:** General considerations, joint interpolated trajectories, planning Cartesian path trajectories.  
**16 Hrs**

UNIT II

**Sensing:** Range, proximity, touch, force and torque sensing.

**Low level vision:** Image acquisition, illumination, geometry preprocessing.

**High level vision:** Segmentation, description, 3D structure recognition, interpretation.

**Robot programming languages:** Characteristics of robot languages, task languages.  
**16 Hrs**

UNIT III

**Robot intelligence:** State space search, predicate logic, means-ends analysis, robot learning, task planning expert systems.  
**7 Hrs**

TEXT BOOK:

REFERENCE BOOKS:
R2. Groover MP et al., “Industrial Robotics”, TMH.
OBJECT ORIENTED PROGRAMMING with C++

Subject Code : CS 8X14
Credits : 03
Hrs/ Week : 03
Total Hours : 39

UNIT I
Principles of object-oriented programming:
A look at Procedure Oriented Programming, object Oriented Programming Paradigm, Basic Concepts of OOP, Benefits of OOP, Object oriented languages, Applications of OOP.

Beginning with c++:
What is c++, Applications of C++, Structure of C++ program, Basic Data types, derived data types, user defined data types, variables in c++, dynamic initialization of variables, reference variables, operators in c++, scope resolution operator, memory management operators, type cast operators, manipulators, namespace.

UNIT II
Functions in C++:
Function prototyping, Inline Functions, Default Arguments, Function Overloading

Classes and objects:
Introduction, C Structure Revisited, Specifying a Class, Defining Member Functions, Static Data Members, and Static Member Functions. Arrays of Objects, Objects as Functions Arguments, this pointer, Friend Functions, Returning Objects, Constant Member Functions.

UNIT III
Constructors and Destructors
Introduction, Constructors, Parameterised Constructors, Multiple Constructors in a Class. Constructors with Default Arguments, Copy Constructors, Dynamic Constructors, Constant Objects, Destructors.

Operator Overloading and Type Conversions
Introduction, Defining Operator Overloading, Overloading the Various Operators, Overloading the Increment and the Decrement Operators (Prefix and Postfix), Overloading the Unary Minus and the Unary Plus Operator, Overloading the Arithmetic Operators. Overloading the Relational Operators, Overloading the Assignment Operator, Overloading the Insertion and Extraction Operators, Rules for overloading operators. Type Conversions.

UNIT IV
Inheritance
Introduction, Defining Derived Classes, Single Inheritance, Protected Access Specifier, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Constructors in Derived Classes, Nesting of Classes.

Pointers, Virtual Functions and Polymorphism
Introduction, Pointers, Pointers to Objects, Pointers to Derived Classes, Virtual Functions, Pure Virtual Functions.
UNIT V

Templates and Exception Handling

Working with files
Classes for Files Stream Operations, Opening and Closing a File, Error Handling during File Operations. 8 Hrs

TEXT BOOKS:
1. E. Balagurusamy, “Object - Oriented Programming with C++”, Third Edition, Tata McGraw Hill. (Chapters 1.3 to 1.8, 2.1, 2.2, 2.6, 3.5 to 3.7, 3.10 to 3.18, 4.3, 4.6 to 4.9, 5, 6, 7, 8, 9, 11, and 12).

REFERENCE:
3. K.R. Venugopal, “Mastering C++”.

ESSENTIALS OF INFORMATION TECHNOLOGY

Subject Code : CS 8X15  
Credits : 03  
Hrs / Week : 03  
Total Hours : 39

Introduction to Computer Systems (Self-Study)
Introduction to Computer Systems - Basics of computer systems - Various hardware components - Data storage and various Memory units - Central Processing Unit - Execution cycle - Introduce to software and its classifications.

UNIT-I

Operating Systems
Introduction - Memory management - Process management - Interprocess Communication - Deadlocks - File management - Device management. 6 Hrs

UNIT-II

Problem Solving Techniques
Introduction to problem solving - Computational problem and it's classification - Logic and its types - Introduction to algorithms - Implementation of algorithms using flowchart - Flowcharts implementation through RAPTOR tool - Searching and sorting algorithms - Introduction and classification to Data Structures - Basic Data Structures - Advanced Data Structures. 7 Hrs

UNIT-III

Programming & Testing
Structured Programming - Functions - Structures - File Handling - Introduction to Software Development Life Cycle - Industry Coding Standards and Best Practices - Testing and Debugging - Code Review. 8 Hrs

UNIT-IV


UNIT-V

RDBMS
- RDBMS - data processing - the database technology - data models
- ER modeling concept -notations - Extended ER features
- Logical database design - normalization
- SQL - DDL statements - DML statements - DCL statements
- Joins - Sub queries - Views
- Database design Issues 9 Hrs

Integrated Project:
Project based on C/C++/JAVA & RDBMS.

REFERENCES:

Note:
1. Courseware for the subject (power point and the notes) is provided by the teacher. List of references is only for additional reading.
2. Project is a team work with 3 or 4 students in a team. Project need to be carried out offline (outside the lecture hours).
3. Project work includes implementation of some information system using the concepts of programming, testing and RDBMS. Following activities are involved in the project:
   - Preparation of High level design and Detailed design document.
   - Unit Test Plan and Integrated Test Plan.
   - Coding and Unit Testing, Integration Testing.

   Students can use the following to implement the Project:
   - Programs using C/C++/JAVA Language
   - Embedded SQL can be used to connect the Front-End with the backend Database systems
   - Visual studio .NET 2005 (or Visual studio 6), RAPTOR tool and oracle 9i/10g to be used for the project.

4. CIE carries 50 Marks which includes Theory Assessment (40 Marks) and Project Work (10 marks). Theory Assessments will be conducted based on CAMP methodology. Project evaluation will be done using Rubrics methodology.

5. Number of hours listed for each unit are only for the class room teaching. Students are expected to give much more time to study each of the topics outside the class hours.

**CONSUMER ELECTRONICS**

**Subject Code**: EC 8X18  
**Credits**: 03  
**Hrs/ Week**: 03  
**Total Hours**: 39

Common elective from Electronics and Communication department - for the students of other branches

**Course Outcomes:**

**After studying this subject, the student should be able to:**

**General**: Have a reasonable understanding of the operation of modern gadgets, a common man normally uses.
   - Have a wider choice of the professions he can plan for.
   - Identify and pursue new opportunities.

**Detailed**: Advance himself in a unique mix of skills required for emerging careers
   - Take up higher studies in entertainment / white-goods industry
   - Have a better grasp of the sound recording and marketing industry
   - Appreciate the breadth of video industry and their markets
   - Have broader view of telecommunication choices available
   - Get an impetus to search and yearn for a deeper knowledge on general issues.

**UNIT I**

**SOUND**: Properties of sound and its propagation, Transducers (Micro Phone, Loud Speakers), enclosures, mono-stereo, Amplifiers, Multiplexers, mixers, Synthesizers.

**VISION**: B/W TV, CTV concepts, B/W & Color Cameras, Displays.

15 Hrs

**UNIT II**

**RECORDING AND PLAYBACK**: Discs, Magnetic tapes and discs, Optical discs; recording and playback, audio and video systems, Theatre Sound, Studios, Editing.
COMMUNICATIONS AND BROADCASTING: Switching Systems, Land lines, Modulation, Carrier, Fiber optics, Radio and TV broad casting

UNIT III
UTILITIES: Fax, Xerox, Calculators, Microwave ovens, Washing Machines, A/C & refrigeration, Dishwashers, ATMS, Set -Top boxes, Auto Electronics, Industrial Electronics, Robotics, Electronics in health / Medicine, nano- technologies.

TEXT BOOK:

REFERENCES:

OPTO ELECTRONIC DEVICES

Subject Code : PH 8X19 Credits : 03
Hrs/ Week : 03 Total Hours : 39

The objectives of the course:
* To know the basics of solid state Physics and understand the nature and characteristics of light
* To understand different methods of luminescence, display devices and laser types and applications
* To learn the principle of optical detection, mechanisms in different detection devices
* To understand different light modulation techniques and the concepts and applications optical switching
* To study the integration process and application of optoelectronic integrated circuits in transmitters and receivers.

PART-A
UNIT – I

Display Devices
Introduction- Fluorescence, Phosphorescence, Photo Luminescence, Cathode Luminescence, Electro Luminescence, LED, plasma displays, Liquid Crystal displays, Numeric displays. 7 Hrs

UNIT – II

Lasers & Fibre Optics
Optical fibre - Principle construction & working, Propagation of light, signal distortion and Attenuation 8 Hrs

PART-B
UNIT - III

Optical Detectors
Photo detector- thermal detectors, thermoelectric detectors-types, Photon Devices-types, Photoconductive detectors, Junction detectors- Photo diodes (PIN and APD), Photo Transistors, Detector Performance – characteristics, frequency response, noise aspect and sensitivity

UNIT - IV

Optoelectronic Modulators
Introduction, Polarization, Birefringence, Optical activity, Electro-optic effect, Kerr modulators, scanning & switching, Magneto-optic devices, Acousto-optic effect

8 Hrs

UNIT - V

Optoelectronic Waveguides
Hybrid and Monolithic Integration, Applications of Optoelectronic wave guide devices, Construction and working of integrated transmitters and receivers-Front end photo receiver, PIN-HBT Photo receiver & OEIC transmitters

8 Hrs

TEXT BOOK:

REFERENCES:

Scheme:
1) SEE to be conducted out of 100 marks and will be reduced to 50marks

2) Two questions carrying 20 marks each will be set from each unit and students have to answer any one.

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VALUE EDUCATION

Subject Code:  HU 8X20
Credits : 03
Hrs/ Week : 03
Total Hours : 39

The Objectives of the course:
1. To make the students realize the significance of values in self-development.
2. To train the students in techniques of mind control, time management and stress management.
3. To make students use the fundamentals learnt in the course in solving
   a) The problems in their own lives like intoxication, gambling, extra marital relations, generation gap, ragging, peer pressure, addiction to social networking sites.
   b) The problems pertaining to the society in general like corruption, irresponsible media, distractions among youth, gender discrimination, westernization, child abuse & animal cruelty.
4. To make students understand value of sustainable civilization, simple living and high thinking.

UNIT I
Three components of human personality (IQ, EQ and SQ), separating men from animals, real problems of life, how to acquire knowledge.
Why sense gratification is opium of the masses, three kind of people and their symptoms, ethical degradation of the society today, how mind gets out of control, anger management, different levels of consciousness (bodily platform, sensual platform, mental and intellectual), regulative principles of freedom, difference between moderation and abstinence. 15 Hrs

UNIT II
Intoxication, harmful effect of alcohol on liver, central nervous system, blood, gastro intestinal tract, muscles, etc. myths and facts regarding alcohol. Harmful effect of smoking on respiratory health, strokes and heart diseases, cognitive dysfunction, passive smoking myths and facts about smoking. Drug addiction, common neurological effects of drug addiction, physical effects. Negative impacts of gambling, gambling vs. substance abuse, Forms of illicit sex, forms of animals cruelty, alternatives for animal experimentation.
Knowledge, attitudes and skills needed to achieve a sustainable value based global culture. 15 Hrs

UNIT III
Generation gap, ragging, peer pressure, addiction to social networking sites, corruption, irresponsible media, distractions among youth, gender discrimination, westernization, child abuse, euthanasia, capital punishment, female feticide, terrorism. 9 Hrs

Scheme:
1) SEE to be conducted out of 100 marks and will be reduced to 50 marks.
2) Three questions from units 1&2 each and two questions from unit 3 shall be set, carrying 20 marks each.
3) Students have to answer 5 full questions, selecting at least two questions from units 1&2 each and one from unit 3.
4) Break Up of CIE (50 marks):
   - First Mid Semester Exam - 10 marks
   - Second Mid Semester Exam - 10 marks
   - Class Quiz - 05 marks
   - Students' solution of problems discussed in the form of video skits - 25 marks
NATURAL PRODUCTS CHEMISTRY

Subject Code : CH8X21
Credits : 03
Hrs/Week : 03
Total Hours : 39

UNIT I


UNIT II

Steroids: Introduction and nomenclature of steroids, Blanc’s rule, Barbier-Wielman degradation, Oppenauer oxidation, Dile’s hydrogenation. Chemistry of estrogen, Vitamin D and bile acids.
Sex hormones: Chemistry of estrogen, progesterone, androsterone and testosterone. Structure and synthesis of cortisone and aldosterone.

UNIT III

Prostaglandins: Introduction, nomenclature, classification and biological role of prostaglandins. Structure elucidation and stereochemistry of PGE1, PGE2 and PGE3. Total synthesis of PGE1 (Corey’s method).

UNIT IV

Chemistry of Porphyrins: Introduction to porphyrins, structure and degradation products of haemoglobin and chlorophyll.

UNIT V

Alkaloids: Definition, Classification and isolation of alkaloids. General methods of structural determination of alkaloids. Detailed study of structure elucidation, rearrangement, synthesis and biogenesis of the following alkaloids- papaverine, cinchonine, and morphine.

REFERENCES:

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ESSENTIALS OF IT SERVICE INDUSTRY (SPAN TECHNOLOGIES)

Subject Code : CS8X22
Credits : 03
Hrs/week : 03
Total Hours : 39

UNIT I
Fundamentals of Software Industry
3 Hrs
to SDLC Process; Life cycle models; Requirement Gathering Techniques; Functional, Non Functional, Statutory and Regulatory Requirements; Configuration Mgmt; Workshop on Requirement Analysis.

UNIT II
Relational Database
6 Hrs
Fundamentals of Relational Databases; Primary key, Unique Key, Foreign keys and Indexes; Logical & Physical Databases; Simple Queries.

UNIT III
Basics of DOTNET & coding techniques
9 Hrs
Introduction to .NET framework 3.5 with additional features of .NET 4.0; Language construct C#; Visual Studio Developer environment IDE; Coding Standards and General Coding guidelines.

UNIT IV
ASP.NET
12 Hrs
Page life cycle; Web.config; types of apps, control structure; HTML controls; Server controls; Custom controls; User controls; Form validation; Master Pages, Themes, Skins, CSS, Passing data between forms, Session object, view state, Request / Response; ADO.Net.

UNIT V
Code Enabler
9 Hrs
Error/Exception handling; XML – Overview; Creating XML; XML validation; XPATH; XML schema, attributes, XML in SQL; Usage of Code Analysis Tools – Face, Style Cop; Jquery;IIS.

Note:
1. Courseware for the subject (Power Point Presentation) will be provided by the teacher. List of references is only for additional reading.
2. Assignment will be provided for each theory sessions. These assignments need to be carried out by each student (outside the lecture hours) independently and must be submitted within the timeframe specified by the instructor.
3. Tests will be conducted on each topics separately and test assignment score will be used for final evaluation.
4. Test score will carry a weightage of 20%, assignment 30% and rest 50% weightage would be given to the final examination.
STATISTICAL DESIGN AND ANALYSIS OF EXPERIMENTS

Subject code : MA8X23  
Credits : 03  
Hrs/Week : 3  
Total Hours : 39

UNIT – I

Curve fitting and Regression: Least square principle, curve fitting of linear, quadratic and exponential. Correlation and properties, correlation coefficients, regression analysis. 8 Hrs

UNIT – II

Probability Theory: Review of pdf’s, expectation, variance, moment generating function and properties, Moment generating functions and their properties, random samples, sampling distributions, central limit theorem and applications 10 Hrs

UNIT-III

Estimation and Testing of hypothesis: Consistency and unbiased statistics, point and interval estimation, mean and variance, tests of hypothesis concerning mean and variances. 8 Hrs

UNIT-IV

Functions of random variables, t, F and chi-square distributions 7 Hrs

UNIT-V

Analysis of variance of one-way, two-way classified data, experimental designs: CRD, RBD, LSD, factorial experiments. 6 Hrs

TEXT BOOKS:
1. Irwin Miller, John E. Frund, “Probability and Statistics for Engineers” 3rd edition

REFERENCE BOOKS:
PROFESSIONAL & COGNITIVE COMMUNIQUÉ

Subject Code : HU8X24          CIE Marks : 50
Hours/Week : 03              Total Hours : 39

UNIT I
Common sense: Understand the term ‘common sense’ & commonsensical consensus, unsettling commonsensical consensus. (Role of language in the growth of an individual)
Emotional Intelligence: Nature, function and types of intelligence; emotion, intelligence and creativity; Growth and development of emotional intelligence  8 Hrs

UNIT-II
Manners and Etiquettes - work place etiquettes, Significance of Cross Cultural understanding; Cultural Sensitivity, Impact of social Media Self-Presentation Skills.
Workplace: Physical and Psychological working conditions; Workplace Readiness Skills.  8 Hrs

UNIT-III
Writing: Creative Writing, Formal writings/Informal writing, Plagiarism.
Reading and Interpretation: Styles of reading, scanning, skimming, detailed reading.  8 Hrs

UNIT-IV
Presentation Skills: Event planners coordinate and manage conferences meetings and parties.  8 Hrs

UNIT-V
Diaspora: exile, migration, old and new diasporas, the heterogeneity of diasporas, groups, especially by gender, class, sexuality, caste, religion, the role of language and other cultural practices in migratory experiences; Films and Indian Diaspora.  7 Hrs

REFERENCES:
Ray French: Cross Culture Management, Universities Press
Urmila Rai : Business Communication, Himalaya Publishing House
Neil Fiore; The Now Habit at Work: Perform Optimally, Maintain Focus, and Ignite Motivation in Yourself and Others ,Publisher: Wiley ISBN: 9780470593462
V. Geetha; Gender http://writingexercises.co.uk/index.php
http://www.studyskills.soton.ac.uk/studytips/reading_skills.htm
http://pages.minot.k12.nd.us/votech/File/workplace.htm
INTRODUCTION TO TOPOLOGY

Subject code : MA8X25 .......................................................... Credits : 3
Hrs/Week : 03 .......................................................... Total Hours : 39

UNIT –I
Basics of set theory and logic: Functions, relations, arbitrary cartesian products, principle of recursive definition, countable and uncountable sets, infinite sets and axiom of choice, well ordered set and maximum principle. 8 Hrs

UNIT-II
Topological spaces, basis for a topology, order topology, product topology on \( X \times Y \), The subspace topology, closed sets and limit points, continuous functions. 8 Hrs

UNIT-III
Product topology, Metric topology, Examples. 8 Hrs

UNIT-IV
Connectedness and compactness: Connected spaces, connected sets in the real line, compact spaces, compact sets in the real line. 8 Hrs

UNIT-V
Countability and separation axioms. T_1,T_2,T_3,T_4 Spaces. 7 Hrs

REFERENCE BOOKS: