B. E. SYLLABUS

ELECTRONICS & COMMUNICATION ENGINEERING

VII & VIII SEMESTER

With
Scheme of Teaching
& Examination
<p>| 1. | Dr. Rajesh Shetty K. | Ph.D | Professor/HOD |
| 2. | Dr. M.K. Parasuram | Ph.D | Director |
| 3. | Prof. S. Chandrakanth Naik | M.S/MBA | Asso. Professor |
| 4. | Dr. Rekha Bhandarkar | Ph.D | Professor |
| 5. | Dr. Ratnamala Rao | Ph.D | Professor |
| 6. | Dr. Ajay Singhal | Ph. D | Professor |
| 7. | Prof. H. Manjunath Pai | M.Tech | Asst. Prof Gd III |
| 8. | Mr. Durga Prasad | M.Tech(Ph.D) | Asst. Prof Gd III |
| 9. | Mr. Mahaveera K. | M.Tech | Asst. Prof Gd III |
| 10. | Mrs. Sushma P.S. | M.Tech | Asst. Prof Gd III |
| 11. | Mrs. Sunitha Lasrado | M.Tech(Ph.D) | Asst. Prof Gd III |
| 12. | Mrs. Shrividya G. | M.Tech | Asst. Prof Gd III |
| 14. | Mrs. Vidya Kudva | M.Tech | Asst. Prof Gd III |
| 15. | Mrs. Prabha Niranjan | M.Tech(Ph.D) | Asst. Prof Gd III |
| 16. | Mr. Satheesh Rao | M.Tech | Asst. Prof Gd III |
| 17. | Mr. Suken Rao M. | M.Tech(Ph.D) | Asst. Prof Gd II |
| 18. | Mr. Ravindra K.S. | M.Tech | Asst. Prof Gd II |
| 19. | Mr. Pradyumna G.R. | M.Tech | Asst. Prof Gd II |
| 20. | Mrs. Roopa B. Hegde | M.Tech | Asst. Prof Gd II |
| 21. | Mrs. Usha Desai | M.Tech(Ph.D) | Asst. Prof Gd II |
| 22. | Mrs. Charishma | M.Tech | Asst. Prof Gd II |
| 23. | Mrs. Niju Rajan | M.Tech | Asst. Prof Gd II |
| 24. | Mrs. Shubha B. | M.Tech | Asst. Prof Gd II |
| 26. | Mr. Anil Kumar Bhat | M.Tech | Asst. Prof Gd I |
| 27. | Ms. Ranjitha Ravindran | M.Tech | Asst. Prof Gd I |
| 29. | Mr. Bomme Gowda | B.E(M.Tech) | Asst. Professor |
| 30. | Mrs. Deepa K. | M.Tech | Asst. Prof Gd I |
| 31. | Mr. Dileep Kumar M.J. | M.Tech | Asst. Prof Gd I |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Degree</th>
<th>Academic Position</th>
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<tr>
<td>32</td>
<td>Mr. Abhilash. K.</td>
<td>M.Tech</td>
<td>Asst. Prof Gd-I</td>
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<tr>
<td>33</td>
<td>Mr. Sudharshana</td>
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<td>Mr. Mahesh Kumar T.N.</td>
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<td>Mr. Shivakumar B. R.</td>
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<td>Mrs. Nagapriya Kamath K.</td>
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<td>Ms. Ramya Shetty</td>
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<td>Mrs. Anupama B.</td>
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<td>Asst. Prof Gd I</td>
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**Department of E & C Engineering, NMAMIT, Nitte**

**Vision**

Empowering people, Partnering in Community Development by achieving expertise requiring the knowledge of state of the art technology in the field of Electronics and Communication.

**Mission**

To impart specialized education in the field of Electronics & Communication that contributes to the socio-economic development of the region and to generate technical manpower with high degree of credibility, integrity and ethical standards by providing vibrant learning environment.
Program: B.E. Electronics & Communication Engineering

Program Educational Objectives (PEO’s):

PEO1: The Graduate should have a solid Foundation in Mathematical, science and Electronics Engineering Fundamentals required to solve Electronics and Communication Engineering problems and also which will help to pursue higher Studies and life-long learning needed for a successful professional career.

PEO2: To inculcate in graduates professional, effective communication skills, teamwork Skills, multidisciplinary approach, and an ability to relate engineering issues to Broader social context.

Program Outcomes (PO’s):

PO1: Students will be able to identify, analyze and solve basic Electronics Engineering Problems, in Specific areas, by applying knowledge of Mathematics, science and Engineering with modern Engineering tools.

PO2: Students will demonstrate an ability to visualize and work on Laboratory and Multidisciplinary tasks.

PO3: Students will be able to understand engineering practice in the context of global, Economic, Environmental and societal realities
### DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

### SCHEME OF TEACHING

#### VII Semester:

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>SUBJECT CODE</th>
<th>SUBJECTS</th>
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<th>HRS./WEEK</th>
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<th>SEE</th>
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#### Elective-IV

- EC711 Biomedical Instrumentation
- EC712 Spread Spectrum Communication
- EC713 Image Processing
- EC714 Cryptography
- EC715 Reliability Engineering

#### Elective-V

- EC721 RF Circuit Design
- EC722 Satellite Communications Systems
- EC723 Pattern Recognition
- EC724 Data structures using C++
- EC725 Artificial Intelligence
### DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
### SCHEME OF TEACHING

#### VIII Semester:

<table>
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<th>SL. NO</th>
<th>SUBJECT CODE</th>
<th>SUBJECTS</th>
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**Elective-VI**

- EC811  Analog and mixed mode VLSI design
- EC812  Multimedia Communications
- EC813  Speech Processing
- EC814  Real Time Operating System

**Elective-VII**

- EC821  High Performance Communication Networks
- EC822  Biomedical Signal Processing
- EC823  Optical Computing
- EC824  H. R. Management
COMPUTER COMMUNICATION
NETWORKS

Subject Code : EC701 Credits : 04
Hrs/Week : 4 Total Hours : 52

UNIT - I


UNIT - II

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


UNIT - III


Controlled Access: Reservation, Polling, Token Passing.

Channelization: FDMA, TDMA, CDMA.

UNIT - IV

Connecting LANs, Backbone and Virtual LANs: Connecting devices, Backbone Networks, Virtual LANs.

Network Layer: Logical addressing, IPv4 addresses, IPv6 addresses, IPv4 and IPv6, Transition from IPv4 to IPv6.  
**10 Hrs**

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. 
**10 Hrs**

TEXT BOOK:


REFERENCE BOOKS:


R2. William Stallings, “Data and Computer Communication”, Pearson Education Asia, 6E,

EMBEDDED SYSTEMS

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

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

Processor design: RT level design and optimizing the design. General purpose processors, General-purpose processor design. Standard Single-Purpose Peripherals: Timers/ counters, UART, PWM, LCD, Keypad controllers. 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

Interrupts: Basics - Shared Data Problem - Interrupt latency. Survey Of Software Architecture: Round Robin, Round Robin with Interrupts, Function Queue, scheduling, RTOS architecture. 10 Hrs

UNIT - V

Introduction to RTOS: Tasks - states - Data - Semaphores and shared data - operating systems services - Massage 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 : EC703
Credits : 04
Hrs/Week : 4
Total Hours : 52

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, 1φ 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

**AC Voltage Controllers:** Introduction, Principles of on and off control, Principles of phase control, Single phase controllers with resistive loads and Inductive loads, numerical problems.

**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.

8 Hrs

TEXT BOOKS:


REFERENCE BOOKS:


BIOMEDICAL INSTRUMENTATION

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

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 : EC712    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, Ziomer and Borth, “Introduction to Spread Spectrum Communication”, Pearson Education Publication

REFERENCE BOOK:
IMAGE PROCESSING

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

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.

15 Hrs

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.

15 Hrs

UNIT - III

**Image Reconstruction from projections:** Introduction, Radon transform, Back projection operator, Projection theorem, Inverse radon transform.

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

9 Hrs

TEXT BOOKS:


CRYPTOGRAPHY

Subject Code : EC714  
Credits : 03

Hrs/Week : 3  
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

16 Hrs

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

16 Hrs

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

Digital signature and authentication protocol: Digital signature and authentication protocol, Digital signature standard. Introduction to quantum cryptography

7 Hrs
TEXT BOOK:

REFERENCE BOOKS:

RELIABILITY ENGINEERING

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

UNIT - I
Probability Density Functions used to Calculate Reliability. Mixed Distribution and Combined. Effects Models, Complex Systems Design and Analysis. 15 Hrs

UNIT - II
Point an Interval Estimates for the Exponential. Bayesian Point and Interval Estimates for Exponential Binomial, Geometric and Poisson distribution. 16 Hrs
UNIT - III


8 Hrs

TEXT BOOK:


REFERENCE BOOKS:


RF CIRCUIT DESIGN

Subject Code : EC721  
Credits : 03

Hrs/Week : 3  
Total Hours : 39

UNIT - I

Wave Propagation in Networks: Introduction to RF/MW concepts and applications; RF electronic concepts Fundamental concepts in wave propagation, circuit representation of two port RF/MW 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 : EC722
Credits : 03
Hrs/Week : 3
Total Hours : 39

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 15 Hrs
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.  **16 Hrs**

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.  **8 Hrs**

**TEXT BOOK:**


**REFERENCE BOOKS:**


PATTERN RECOGNITION

Subject Code : EC723  
Credits : 03
Hrs/Week : 3  
Total Hours : 39

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.

15 Hrs

UNIT - II


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

9 Hrs

TEXT BOOK:

REFERENCE BOOKS:
R1. Duda and Hart, “Pattern Recognition”, (Pattern recognition a scene analysis)

DATA STRUCTURES USING C++
Subject Code : EC724 Credits : 03
Hrs/Week : 3 Total Hours : 39

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. 9 Hrs

TEXT BOOK:
REFERENCE BOOKS:


ARTIFICIAL INTELLIGENCE

Subject Code : EC725  
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 Al 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. 7 Hrs
TEXT BOOKS:

REFERENCE BOOK:

VLSI LAB

Subject Code : EC704       Credits: 02
Hrs/Week    : 3

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 specification* 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

Subject code : EC705  
Credits : 02
Hrs/Week : 3

WIRELESS COMMUNICATION

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

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. 10 Hrs
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


UNIT - IV


UNIT - V


TEXT BOOK:

REFERENCE BOOKS:
POWER ELECTRONICS LAB

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

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 : EC803
Hrs/Week   : 9
Credits : 09
ANALOG AND MIXED MODE VLSI DESIGN
Subject Code : EC811 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 : EC812 Credits : 03
Hrs/Week : 3 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.


15 Hrs

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.

16 Hrs

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 : EC813
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 : EC814  
Credits : 03  
Hrs/Week : 3  
Total Hours : 39

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 : EC821  
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 : EC822  Credits : 03
Hrs/Week : 3  Total Hours : 39

UNIT - I
Introduction to computers in medicine and ECG: Characteristics of medical data, Medical instrument, Iterative definition of medicine, Evolution of microprocessor-based systems, The microcomputer-based medical instrument, Basic electrocardiography, ECG lead systems, ECG signal characteristics
Digital filtering and integer filters: Digital filters, the z transform, Elements of a digital filter, Types of digital filters Transfer function of a difference equation, the z-plane pole-zero plot, The rubber membrane concept, Basic design concept, Low-pass integer filters, High-pass integer filters, Band pass and band-reject integer filters.
15 Hrs

UNIT - II
Adaptive filters and signal averaging: Principal noise canceller model, 60-Hz adaptive canceling using a sine wave model, other applications of adaptive filtering, Basics of signal averaging, Signal averaging as a digital filter, A typical averager.
Data reduction techniques: Turning point algorithm, AZTEC algorithm, Fan algorithm, Huffman coding The Fourier transform, Correlation, Convolution, Power spectrum estimation
15 Hrs

UNIT - III
ECG QRS detection: Power spectrum of the ECG, Band pass filtering techniques, Differentiation techniques, Template matching techniques, QRS detection algorithm.
9 Hrs
TEXTBOOK:

REFERENCE BOOKS:

OPTICAL COMPUTING

Subject Code : EC823         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. 8 Hrs

TEXT BOOK:

HUMAN RESOURCE MANAGEMENT

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

UNIT - I


UNIT-II

Incentives and Performance based. Payments, Managing Employee benefits and services. Managing Betterment work, Safe and Healthy Environment. Industrial Relations, Trade unions. 16 Hrs

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. 8 Hrs
TEXT BOOK:

REFERENCE BOOK:

Open Electives Offered in VIII Semester for the year 2014-15

MA8X 01 Graph Theory
MA8X 02 Linear Algebra
HU8X 03 Intellectual Property Rights
PH8X 04 Advanced Materials Technology for CV & ME
BT8X 05 Nano Technology
BT8X 06 Instrumental methods of Analysis for CV & ME
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 for EE, EC, CSE & ISE
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

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<th>Subject code</th>
<th>MA8X01</th>
<th>Credits</th>
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<td>Hrs/Week</td>
<td>3</td>
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## 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
Credits : 03
Hrs/Week : 3
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. 7 Hrs

UNIT - II
Vector spaces: Vector spaces; subspaces; bases and dimension; coordinates; summary of row-equivalence; computations concerning subspaces. 7 Hrs

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. 10 Hrs

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. 8 Hrs

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 7 Hrs

TEXT BOOKS:
# INTELLECTUAL PROPERTY RIGHTS (IPR)

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<td>HU8X03</td>
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**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 **8 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.) **8 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. **8 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. 7 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
Hrs/Week : 3  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
Polymer Synthesis and Processing - Polymerization, polymer additives, Forming Techniques for Plastics, Fabrication of fibers and Films and applications  

UNIT - III

UNIT - IV
Shape memory alloys and Metallic glasses:  
Introduction to shape memory alloys, Fundamental characteristics, shape memory effect (psuedoelasticity),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.  

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

TEXT BOOKS:
2. Charles P. Poole Jr,“Introduction to Nano Technology” Wiley Interscience.
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
Hrs/Week: 3                  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

Introduction to nanoscience, A Brief History of the Super Small, Definition of nanotechnology, Nanobiotechnology, scope of nanobiotechnology, Bottom-Up versus Top-Down; Discussions on nanofabrication, Nanolithography(Dip pen, photo, X-ray, Electron beam), nanosphere lithography, Structure-property relationships in materials, biomolecule-surface interactions. Fabrication of Hard Materials.       6 Hrs
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).  

8 Hrs

UNIT - III
NANOTECHNOLOGY FOR DRUG DISCOVERY & DRUG DELIVERY

8 Hrs

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

8 Hrs

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 Nanochips. DNA based MEMS, application of MEMS

9 Hrs

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

38
INSTRUMENTAL METHODS OF ANALYSIS

Subject Code : BT8X06  
Credits : 03

Hrs / 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
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:

REFERENCE BOOKS:

ENVIRONMENTAL IMPACT ASSESSMENT

Subject Code : CV 8X07        Credits : 03
Hrs/ Week : 3            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
Credits : 03
Hrs/ Week : 3
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

Subject Code : ME 8X09    Credits : 03
Hrs/ Week : 3           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. 9 Hrs

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) 10 Hrs

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. 8 Hrs
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

7 Hrs

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
Credits : 3
Hrs / Week : 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

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
Output and Capacity Factor of WECS, Wind site selection consideration, Advantages and Disadvantages of WECS. 5 Hrs

Biomass Energy: Introduction, Photosynthesis process, Biomass fuels, Biomass conversion technologies, Urban waste to Energy Conversion, Biomass Gasification, Biomass to Ethanol Production, Biogas production from waste biomass, factors affecting biogas generation, types of biogas plants – KVIC and Janata model; Biomass program in India. 7 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. 5 Hrs

TEXT BOOKS:

REFERENCE BOOKS:

LINEAR SYSTEMS THEORY

Subject Code : EE8X11 Credits : 03
Hrs / Week : 3 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
Syllabus of VII & VIII Semester B.E. / Electronics & Communication

State space representation using physical variables, phase variables & canonical variables. \hspace{1cm} 6 Hrs

Derivation of transfer function from state model, diagonalisation, eigen values, Eigen vectors, generalized Eigen vectors. \hspace{1cm} 6 Hrs

UNIT - II
Solution of state equation, state transition matrix & its properties, computation using Laplace transformation, power series method, Cayley-Hamilton method, \hspace{1cm} 8 Hrs

Concept of controllability & observability, methods of determining the same. \hspace{1cm} 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 \hspace{1cm} 5 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
INFORMATION AND ELECTRONIC COMMUNICATION TECHNOLOGY

Subject Code : EC 8X12          Credits : 03
Hrs/ Week : 3                 Total Hours : 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  
Credits : 03  
Hrs/ Week : 3  
Total Hours : 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.  

UNIT - II
Sensing: Range, proximity, touch, force and torque sensing.

Low level vision: Image acquisition, illumination, geometry pre processing.

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

Robot programming languages: Characteristics of robot languages, task languages.  

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

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 : 3
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. 7 Hrs

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. 8 Hrs

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.  

**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++”. 

51
ESSENTIALS OF INFORMATION TECHNOLOGY

Subject Code : CS 8X15  
Credits : 03  
Hrs / Week : 3  
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

UNIT - II
Problem Solving Techniques

UNIT - III
Programming & Testing
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

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 : 3  
Total Hours : 39

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

**UNIT - I**

**FUNDAMENTALS:** Electricity, Particle and Wave Motions, Conduction and Radiations, dielectrics, inductors, Vac. tubes, S.S. devices, IC's further advances, Power supply, Circuit functions.  
**SOUND:** Transducers (Micro Phone, Loud Speakers), enclosures, Recordings - disc, Magnetic, Optical, mono-stereo, Amplifiers, Multiplexers, mixers, Synthesizers, Theatre Sound, Studios, Editing.  
15 Hrs

**UNIT - II**

**VISION:** B/W TV, CTV, Video tapes/discs, recording/ play back, Standards, Broad-casting, Video systems, Studios, editing, B/W, Displays, Filters, Cameras, Color displays.  
**TELECOM:** S/W System, Land line Modulation, Carrier, Fiber optics, Data services, mobiles, terrestrial & Satellite Systems, GPS, Computers, internet Services.  
15 Hrs

**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.  
9 Hrs

**TEXT BOOK:**  

**REFERENCES:**  
OPTO ELECTRONIC DEVICES

Subject Code : PH 8X19
Credits : 03
Hrs/ Week : 3
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 8 Hrs
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 50 marks
2) Two questions carrying 20 marks each will be set from each unit and students have to answer any one.
VALUE EDUCATION

Subject Code : HU 8X20  
Credits : 03  
Hrs/ Week : 3  
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.

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.  

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.  

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 : 3  
Total Hours : 39

UNIT - I

Terpenoids: Introduction and classification, isoprene rules, general methods of determination of structure of terpenoids. Structure elucidation, synthesis and biosynthesis of the following terpenoids; Monoterrpenoids-Geraniol, α-pinene, and camphene. Sesquiterpenods-Farnesol, and α-santonine, Diterpenoids- gibberillic acid. Triterpenoids-Squaline, Cyclisation of squaline into α-lanosterol and friedelene.  

UNIT - II

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:  
ESSENTIALS OF IT SERVICE INDUSTRY
(SPAN TECHNOLOGIES)

Subject Code : CS8X22  Credits : 03
Hrs/week : 3  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 od 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 :  3  
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.studytips.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 : 3
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: