SHIVAJI UNIVERSITY,
KOLHAPUR.

Revised Syllabus of

( B.E. Electronics & Telecommunication Engineering
Sem - VII & VIII )

To be introduced from the academic year 2010-11
(i.e. from June 2010 ) Onwards

(Subject to the modifications will be made from time to time)
### B.E. (ELECTRONICS & TELECOMMUNICATION ENGG.) (Sem VII)

<table>
<thead>
<tr>
<th>SR.NO</th>
<th>SUBJECT</th>
<th>TEACHING SCHEME</th>
<th>EXAM.SCHEME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
</tr>
<tr>
<td>1.</td>
<td>Computer Communication Network</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>Wireless Communication</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>Microwave Engineering</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>4.</td>
<td>Embedded Systems</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>Elective-I</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>6.</td>
<td>Project</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>20</td>
<td>-</td>
</tr>
</tbody>
</table>

[Note :- Examination scheme and term work marks strictly as per above structure]

### B.E. (ELECTRONICS & TELECOMMUNICATION ENGG.) (Sem VIII)

<table>
<thead>
<tr>
<th>SR.NO</th>
<th>SUBJECT</th>
<th>TEACHING SCHEME</th>
<th>EXAM.SCHEME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
</tr>
<tr>
<td>1.</td>
<td>Audio &amp; Video Engg.</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>Broadband Communication</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>Image Processing</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>4.</td>
<td>Elective-II</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>Project</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>16</td>
<td>-</td>
</tr>
</tbody>
</table>

[Note :- Examination scheme and term work marks strictly as per above structure]
B.E. (ELECTRONICS & TELECOMMUNICATION ENGG.) 2010-11

B.E. Part-I                                                                 B.E. Part-II

Elective-I                                                                 Elective-II

1. Digital Signal Processors                                                 1. Speech Processing
2. Integrated Communication Systems                                         2. Pattern Recognition
4. Remote sensing & GIS                                                      4. Real time Systems
B.E.(Electronics and Telecommunication)

1. Subject : Computer Communication Network
   w.e.f July 2010

Lectures : 4 hrs / week                              Theory : 100 Marks
Practical : 2 hrs / week                           TW : 25 Marks

OE: 50 Marks

SECTION – I

1) Introduction to computer networks                    5 Hrs
   Network definition & requirements Network topology, Types of networks, Network
   Software issues, reference models – OSI, TCP/IP.

2) Physical Layer – Transmission media                 8 Hrs
   Guided media-twisted pair, coaxial cable, optical fiber. Unguided media – RF allocation,
   terrestrial microwave, satellite communication, cellular telephone. EIA 232 D interface
   standard, Modems – types, block schematic & standards Network Devices: Network
   Connectors, Hubs, Switches, Routers, Bridges, NIC.

3) Data Link Layer                                      7 Hrs
   Design issues, error detection and correction, elementary data link protocols, sliding
   window protocols. HDLC – types of stations, modes of operation, HDLC frame formats,
   additional features. Medium Access Sublayer – Channel allocation problem, multiple
   access Protocols, IEEE standard 802 for LANs and WANs.

SECTION-II

4) High speed Ethernet                                 5 Hrs
   Fast Ethernet physical layer, Fast Ethernet networks, Gigabit Ethernet

5) Network Layer                                       6 Hrs
   Design issues, Routing algorithms – shortest path, distance vector routing, link state
   routing, flow based routing, routing for mobile hosts, Congestion control – congestion
   prevention policies-leaky bucket algorithm, token bucket algorithm, congestion control in
   virtual circuit subnet and choke packets.

6) TCP/IP Protocol Suit Overview                       9 Hrs
   TCP/IP and Internet, IP protocol and it’s header format, addressing, subnetting, other
   network layer protocols – ARP, RARP, ICMP, IGMP, TCP, UDP, Domain name system
   (DNS), IP/V.6
**References:**

1. Data Communication and Networking Forouzan-IIInd edition
2. Computer Networks Tanenbaum
3. Computer Networks Natalia olifer, Victor olifer

Note: Any 10 experiments based on above syllabus.
SHIVAJI UNIVERSITY, KOLHAPUR
B.E.(Electronics and Telecommunication)

2. Subject: Wireless Communication
w.e.f July 2010

Lectures: 4 hrs / week
Theory: 100 Marks
TW: 25 Marks

SECTION I

1. Review: 2G, 3G wireless networks, WLL, Cellular Concept 6 Hrs.

2. Mobile Radio Propagation 7 Hrs.

3. Mobile Radio Propagation 7 Hrs.
Small-Scale Fading and Multipath: Small-Scale Multipath Propagation, Impulse Response Model of a Multipath Channel, Small-Scale Multipath Measurements, Parameters of Mobile Multipath Channels, Types of small-Scale Fading, Rayleigh and Ricean Distributions, Statistical Models for Multipath Fading Channels.

SECTION II

4. Multi Access Technique for wireless communication 6 Hrs.
Introduction, Frequency Division multiple Access (FDMA), Time Division Multiple Access (TDMA) Spread Spectrum Multiple Access, Space Division Multiple Access (SDMA) Packet Radio, Capacity of cellular Systems,

5. Wireless Networking: Introduction to wireless Networks 7 Hrs.
Difference Between Wireless and Fixed Telephone Networks, Development of Wireless Networks, Fixed Network Transmission Hierarchy, Traffic Routing in Wireless Networks, Wireless Data Services, Common Channel Signaling (CCS), Integrated services Digital networks (ISDN), Signaling System No. 7 (SS7), An Example of SS7-Global Cellular Network Interoperability, Personal Communication services / Networks (PCS/PCNs), protocols for Network Access, Network Databases, Universal Mobile Telecommunication System (UMTS).
6. Wireless Systems & Standards


Reference Books

1. Wireless Communications Principals & Practice- Theodore S. Rappaport, (P.E.)
3. Fundamental of Wireless Communication- David Tse, Pramod Viswanath (Cambridge)
Section I

1. Microwave Wave Guides: 6 Hrs
Rectangular and circular wave guides: TE, TM and TEM modes in wave guides, power transmission in wave guide, power losses in wave guide, excitation modes in wave guide, Characteristics of standard wave guides.

2. Microwave Components 6 Hrs
Scattering parameters, microwave cavities, microwave hybrid circuits, directional coupler, circulators and isolators, microwave attenuators, slotted lines, parallel, coplanar & shielded micro strip lines. (Operating principle & S-parameter equations of above mentioned microwave components.)

3. Microwave Tubes 8 Hrs
Linear beam: klystrons, reflex klystrons, TWTs. Microwave Crossed Field Tubes: Magnetrons, forward wave crossed field amplifier (FWCFA), m-carcinotron oscillators, high power gyrotrons. (Operating principle, construction & analytical treatment of above mentioned microwave tubes.)

Section II

4. Microwave Solid State Devices 6 Hrs
Microwave tunnel diodes, microwave FETs, gunn effect diodes, RWH Theory, LSA diodes, InP diodes, CdTe diodes, Impatt diodes, PIN diodes, ruby laser, MESFETs and HEMT. (Operating principle, construction & analytical treatment of above mentioned microwave devices.)

5. Microwave Measurements 8 Hrs
Detection of microwave power: measurement of microwave power bridge circuit, thermister parameters, waveguide thermister mounts, barreters, theory of operation of barreters, direct reading barreters bridges, Measurement of wavelengths: single line cavity coupling system, frequency pulling by reactive load, Transmission cavity wavemeter & reaction wavemeter, measurement of VSWR, measurements of attenuation, free space attenuation, conversion of transmitting and receiving power to electric field intensity, conversion of receiving voltage to electric field intensity.

6. Monolithic Microwave Integrated Circuits & Hazards 6 Hrs.
Materials: substrate, conductor dielectric & resistive MMIC growth, thin film formation, hybrid microwave I.C. fabrication microwave hazards.

Text Books –

1. Microwave Devices and Circuit – Samul Liao (Prentice hall of India)

Reference Books –

2. Microwave Engineering-David M. Pozer., Wiley Publications
3. Microwave Engineering-Annapurna Das ,TMH Publications
4. Techniques of Microwave Measurement-Carol G. Montgomery
5. Microwave Active Devices vaccum and solid state – M.L. Sisodia
SHIVAJI UNIVERSITY, KOLHAPUR

B.E.(Electronics and Telecommunication)
4. Subject : Embedded Systems
w.e.f July 2010

Lectures : 4 hrs / week Theory : 100 Marks
Practical : 2 hrs / week TW : 25 Marks

POE: 50 Marks

Section – I

1. Introduction to Embedded Systems 3 Hrs.
Embedded system (ES) definition, Embedded System Evaluation, ES Types with examples, Distinguish a Real Time Embedded System from other systems, Components of an Embedded system, Embedded system design issues & Design flow.

2. Embedded Processor 7Hrs.
The RISC Design philosophy, The ARM design Philosophy, ES hardware, Es software, ARM Architecture Details: registers, CPSR, Pipeline concept, Exceptions Interrupts & vector Table, Core extentions, Architecture revision, families.

3. Introduction to the ARM Instruction Set, THUMB Instruction Set 10hrs.
- ARM Data flow model
- Data processing Instructions
- Load-store Instructions
- Software int. Instructions
- Branch Instructions
- Stack Instructions
- Different addressing modes

Section – II

4. Real Time Operating System (RTOS) 05 Hrs.
Introduction to RTOS concept, embedded software architectures: Round robin, round robin with interrupts, Function queue scheduling and real time operating system, Tasks and task states, Task scheduling, shared data and reentrancy, semaphores and shared data using semaphores, protecting shared data.

5. Communication / Networking standards for embedded Systems 10 Hrs.
a. USART (serial port)
b. I2C, SPI
c. Universal Serial Bus (USB)
d. Ethernet network
e. Controller Area Network (CAN)
6. Case studies of an embedded system

Problem specification, resolving timing problems, use of an RTOS, work division into tasks dealing with shared data, Encapsulating semaphores and queues, Saving Space and Power.

Text Books:

1. Embedded System Design By Peter Marwedel, Springer publication.
2. An Embedded Software Primer, David E. Simon Pearson Education, Asia Publication
3. ARM System Developers Guide Designing & Optimizing System Software By Andrew N., Dominic Sloss, and Chris Wright.

Ref. Books:
1. Embedded System Design A Unified Hardware/ Software Introduction By Frank Vahid/ Tony Givargis , Wiley publication

List of experiments:
1. Four experiments based on assembly language.
2. Four experiments based on Embedded C language.
3. Two Experiments using ARM Boards.
4. Two Experiments based on Bus communication Protocols.
(Use Assemblers, Compilers, Flash Programmers, Debuggers & ARM Boards)
SHIVAJI UNIVERSITY, KOLHAPUR

B.E.(Electronics and Telecommunication)

5. Subject : DIGITAL SIGNAL PROCESSORS (Elective I)

w.e.f July 2010

Lectures : 4 hrs / week  Theory : 100 Marks

SECTION-I

1. **INTRODUCTION TO DSP PROCESSORS**  5 Hrs


2. **ARCHITECTURE FOR PROGRAMMABLE DSP DEVICES**  8 Hrs

Basic Architectural features, DSP computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed issues Features for External interfacing.

3. **EXECUTION CONTROL AND PIPELINING**  5 Hrs

Hardware looping, Interrupts, Stacks, Relative Branch Support, Pipelining and performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects, pipeline Programming models.

SECTION-II

4. **PROGRAMMABLE DIGITAL SIGNAL PROCESSORS**  9 Hrs


5. **Analog DSP Processor family**  5 Hrs

Analog 21061 series SHARC Processor block diagram, Interrupt Hardware, Memory quantization, Central arithmetic logic unit, system control etc.
6. IMPLEMENTATION OF BASIC DSP ALGORITHMS  

FIR Filters, IIR Filters, interpolation Filters, Decimation filters, Adaptive Filters, 2-D Signal Processing.

Text & References:

1. Analog Devices & Texas Instruments Users Manuel of TMS320C67XX and ADSP 21061.
3. Digital Signal Processors- Kuo and Gan, Pearson Education
4. DSP Processor Fundamentals: architectures and Features, by Phil Lapsley, Wiley
5. DSP Applications using C and the TMS320C6x DSP
SHIVAJI UNIVERSITY, KOLHAPUR
B.E.(Electronics and Telecommunication)

   w.e.f July 2010

Lectures : 4 hrs / week

Theory : 100 Marks
TW : 25 Marks

SECTION -I

1. Amplifiers & Comparators 8 Hrs
Review of basic theory of amplifiers, frequency response & performance analysis of- high
frequency amplifier – MC1490, MC 1350(any one), wideband general purpose amplifiers-
used in AGC, RF/Video amplifiers - MC4558.

2. RF communication Systems 8 Hrs
Review of basic theory & performance analysis of systems- Balanced modulator &
FM transmitter/receiver- MC 2833,FM-IF amplifier-MC3335, AM Receiver- MC 13030,
Remote control amplifier/detector- transmitter- MC 14497, receiver –MC 3373

3. Telephone Systems 4 Hrs
Basic theory , Block schematics, working of systems- Subscriber Loop Interface Circuit
(SLIC-MC 33120), PBX- Master MC14522, Slave MC- 145426.

SECTION – II

4. Telephone Systems 4 Hrs
ISDN voice/ Data Circuits MC 145472, Telephone tone ringer- MC 342117, Speech network
dialer- MC 34014/ 34114, Speaker – MC 34018

5. Telephone Accessory Circuits 8 Hrs
Basic theory , Block schematics, working of systems
Audio amplifier – MC 34119 (or any other low power amplifier circuit)
FSK Modem – MC 145442, calling line identification receiver (CLID) with ring detector
– MC 145447/ MC 1455460.
6. **Wireless Sensor Networks**  
   8 Hrs
   Basics of Sensor Networks, Communication Protocols for Sensor networks, Medium Access Control (MAC) in WSN, Zigbee,
   Applications of Wireless Sensor Network, Case Study as Environmental Parameter Monitoring – Block Diagram and Design of Network System

**References:**
1. MOTOROLA Analog/ Interface ICs Device Data Manual Vol. 1 & II
SHIVAJI UNIVERSITY, KOLHAPUR

B.E. (Electronics and Telecommunication)

5. Subject : Satellite Communication (Elective – I)

Lectures: 4 Hrs/Week Theory: 100 Marks

Section – I

1. Orbital Mechanics and Launchers

History of Satellite Communication, satellite communication in 2000.

Orbital Mechanics, Look angle determination, Orbital perturbations, Orbital determination, Launchers and Launch Vehicles, Orbital effects in communication system performance.

2. Satellites

Satellite Subsystems, Attitude and control systems (AOCS), Telemetry, Tracking, Command and Monitoring, Power systems, Communication subsystems, Satellite antennas, Equipment reliability and space qualification.

3. Satellite Link Design


4. VSAT System

Introduction, Overview of VSAT Systems, Network Architecture, VSAT Earth Station Engineering

Section – II

5. Multiple Access

Introduction : TDMA, FDMA, CDMA, DAMA.

6. Low Earth Orbit and Non Geo-Stationary Satellite Systems

Introduction, Orbit considerations, Coverage and frequency Consideration, Delay and Throughput consideration, Operational NGSO constellation design: Iridium, Teledesic

7. Direct Broadcast Satellite Television And Radio

C- Band and Ku- Band Home Satellite TV, Digital DBS TV, Satellite Radio Broadcasting

8. Satellite Navigation and the Global Positioning System

**Text Books:**


**Reference Books:**


Note: Students, as a part of their term work, should visit satellite earth station and submit a report of visit.
Section – I

1. Introduction 05 hrs
Definition of GIS, The origins of GIS, What is CADD? What is AM/FM? What is GIS?
Applications, GIS industry and GIS software: GIS software vendors, GIS products, GIS
users,GIS services, benefits of GIS, Map data security, Elimination of redundancy, Map
revisions, search and analysis of map data, productivity of employees, integration of map data.

2. GIS Technology Trends 03 hrs
Data networks, Data communications, computer hardware, operating system, software
engineering.

3. GIS Data 06 hrs
Sources, collection and Entry, Digitizing, GPS surveying, Digital orthophotography, satellite
imagery, GIS Data formats and standards, vector data, Raster data, Raster images, DOD
spatial Data standards (SDS), spatial data transfer standard (SDTS), Open Geo-data
interoperability specification (OGIS).

4. GIS Analysis, Planning and Implementation 06 hrs
Network analysis, Digital terrain modeling and analysis, Grid cell GIS modeling and
analysis, GIS plan, Components of GIS plan, phases – planning, analysis, implementation
successful implementation of GIS, management support leadership and vision, Data
conversion and maintenance, Hardware and software, User training, Data communication,
Software customization, User support, Funding.

Section – II

5. Pitfalls of GIS 04 hrs.
Failures, outstanding benefits, experimentation, undefined goals, Lack of long term planning
and management support, computerizing existing problems, user involvement, Lack of user
training and R and D support, Budget overrun/ underestimation etc.

6. Maintenance and Management of GIS Database 06 hrs.
Centralized GIS database, Distributed GIS database, Master and transaction GIS database,
Data maintenance issues, Financial and legal aspects of GIS: GIS costs, on going costs,
savings, Additional benefits, GIS model for financial justification, Laws for access, pricing,
privacy, liability, copyright practice etc.

Data collection, data types, EM spectrum, radiation and earth, simulated – and earth,
simulated –and false-color images, LUT s and band correlation, processing remotely sensed
data, rectification, Band stretching, haze corrections, ratios, principal component analysis,
image enhancement, edge detection, change detection, GPS data acquisition, classification of remotely sensed data, simple discriminant, supervised and unsupervised. Putting it together, types of data and their uses, conflict resolution, visualization, topical issues.

8. Case Study
Land record, utility management, oil and gas, global change.

Reference Books:
2. Geological Information System – By Ian wood, Sarah Cornelius, Steve Carver
3. Remote Sensing Application and Geographic Information Systems Recent Trends – By Muralikrishna I.V. TMH
SHIVAJI UNIVERSITY, KOLHAPUR

B.E.(Electronics and Telecommunication)

6. Subject : Project
w.e.f July 2010

Practical : 4 hrs / week                                                                                     TW : 50 Marks

The project is to be carried out in two semester of B.E(Electronics and Telecommunications ) Part-I and Part-II. The practical batch size for project will be of 15 students. The batch will be preferably divided into groups each consisting of not more than 3 students.

In semester one, group will select a project with the approval of guide and submit the synopsis of project in the month of August. The group is expected to complete detail system design, layout etc. in semester one, as a part of the term work in the form of joint report. In addition all students of project groups will deliver the seminar on the proposed project only.
Section I

1. Fundamentals of Audio-Video Recording and Playback Techniques  
Methods of sound recording & reproduction, optical recording, CD recording, CD & DVD player, MP3 player, MPEG player, audio standards.

2. Fundamentals of Studio Acoustics and Advancements in Audio Technology  
Studio acoustics & reverberation, acoustic chambers, P.A. system for auditorium, Cordless microphone system, special types of speakers & microphones, satellite radio.

3. Elements of a television system  
Picture and sound transmission and reception, CCIR-B standards, aspect ratio, horizontal and vertical resolution, video bandwidth and interlaced scanning, composite video signal, H & V sync details, VSB transmission and channel bandwidth: Modulation of picture and sound signals, positive and negative modulation.

4. Colour signal transmission and reception  
TV camera tubes, Composite color signals, compatibility considerations, frequency interleaving process, Low level IF modulated color TV transmitter block diagram, Color TV receiver, color mixing theory, luminance, hue and saturation, color difference signals, chromaticity diagram, color signal transmission- bandwidth and modulation of color difference signals, coders and decoders of NTSC, PAL – D & SECAM, Color Picture Tubes, picture tubes purity & convergence, automatic degaussing.

Section II

5) Digital television  
6) High definition TV
Component coding, MAC signals, MAC encoding format, scanning frequencies, D2-MAC Packet Signal, Duobinary Coding, HDTV Standards & compatibility, colorimetric characteristics & parameters of HDTV systems

7) Advanced TV Systems

TEXT & REFERENCE BOOKS:


Minimum 10 to 12 Experiment based on syllabus.

NOTE: One industrial visit to T.V. Relay center/ Broadcasting station is expected.
SHIVAJI UNIVERSITY, KOLHAPUR

B.E.(Electronics and Telecommunication)

2. Subject : Broadband Communication
w.e.f  2010-11

Lectures : 4 hrs / week  Theory : 100 Marks
Practical : 2 hrs / week  TW : 25 Marks

SECTION – I

1. ISDN
   8 Hrs
   Switching Techniques, Principles of ISDN, Architecture, ISDN standards, I-series
   Recommendations, Transmission structure, User network interface, ISDN protocol
   architecture, ISDN connections, Addressing, Interworking,

2. B-ISDN architecture and standards, B-ISDN Services
   6 Hrs
   Conversational, Messaging, Retrieval, Distribution, Business and Residential
   requirements.

3. B-ISDN protocols
   6 Hrs
   User plane, Control plane, Physical layer, Line coding, Transmission structure, SONET-
   Requirement, Signal Hierarchy, System Hierarchy.

SECTION-II

4. ATM – Overview, Virtual channels
   8 Hrs
   Virtual paths, VP and VC switching, ATM cells, Header format, Generic flow control,
   Header error control, Transmission of ATM cells, Adaptation layer, AAL services and
   protocols.

5. ATM switching
   6 Hrs
   ATM switching building blocks, ATM cell processing in a switch, Matrix type switch,
   Input, Output buffering, Central buffering, Performance aspects of buffering switching
   networks.

6. ATM Traffic and congestion Control
   6 Hrs
   Requirements for ATM Traffic and Congestion Control, Cell-Delay Variation, ATM
   Service Categories, Traffic and Congestion Control Framework, Traffic Control,
   Congestion Control,
Ref:


Note: Term work should consist of minimum eight experiments / tutorials based on above syllabus.
SHIVAJI UNIVERSITY, KOLHAPUR

B.E.(Electronics and Telecommunication)

3. Subject : Image Processing
w.e.f July 2010

Lectures : 4 hrs / week  Theory : 100 Marks
Practical: 2 hrs/week  TW: 25 Marks
OE : 50 Marks

SECTION I

1. Digital Image Fundamentals.  7 hrs

Elements Of Visual Perception, fundamentals steps in DIP, A simple image formation model, Basic concept of sampling and quantization, Representation of binary, Gray level, colour image, Metric & topological properties of digital image, colour model.

2. Image enhancement in spatial domain.  5 hrs

Gray level transformation function: image negation, Log transformation, power law transformation, Piecewise linear transformation functions, Histogram equalization, Enhancement using arithmetic / Logic operation.

3. Image filtering  6 hrs

Basics of spatial filtering, smoothening linear filter, Sharpening spatial filter: Gradient and laplacian filter, Filtering in frequency domain: basic properties, filtering in frequency domain

SECTION II

4. Morphological image processing  6 hrs

Dilation & erosion, opening and closing operation, Hit- or –miss transformation. Basic morphological algorithms: Boundary extraction, region filling, thinning and thickening, skeletons.

5. Image segmentation  6 hrs

Detection of discontinuities: Point detection, line detection, edge detection, Sobel, Prewitt, Laplacian mask for edge detection, Thresholding, Role of illumination, global and adaptive thresholding, Region based segmentation: region growing, region splitting and merging.

6. Image compression  6 hrs

Fundamentals, Coding redundancy, interpixel redundancy, fidelity criteria, image compression model, lossless predictive coding, Lossy predictive coding, DCT compression.
**Text Books:**

1) Digital image processing : Rafael C Gonzalez, Richard E. Woods: Pearson Publication
2) Processing analysis and Machine vision: Milan sonka, Vaclav Hlavac : Thomson Publication

**Reference:**

1) Digital image processing- S. Jayraman, S Esakkiarajan, Veerakumar: MGH
2) Digital image processing and Analysis- B. Chanda, D. Datta, majnudar: PHI
3) Digital image processing using Matlab- Rafael C Gonzalez.

**Practical based on MATLAB programs:**

1. Reading & displaying of image (various image file format)
2. Simple gray level transformation.
3. Histogram processing.
4. Image smoothening operation.
5. Edge detection.
7. Segmentation using thresholding.
8. Image compression using DCT.
SHIVAJI UNIVERSITY, KOLHAPUR

B.E.(Electronics and Telecommunication)

4. Subject : Speech Processing (Elective II)
    w.e.f July 2010

Lectures: 4 hrs / week  Theory: 100 Marks
TW: 25 Marks

SECTION -I

1. Digital models for the speech signal 5 Hrs.
Process of speech production, Acoustic theory of speech production, Lossless tube models, and Digital models for speech signals.

2. Time domain models for speech processing 6 Hrs.
Time dependent processing of speech, Short time energy and average magnitude, Short time average zero crossing rate, Speech vs silence discrimination using energy & zero crossings, Pitch period estimation, Short time autocorrelation function, Short time average magnitude difference function, Pitch period estimation using autocorrelation function, Median smoothing.

3. Digital representations of the speech waveform 5 Hrs.

4. Short time Fourier analysis 4 Hrs.
Linear Filtering interpretation, Filter bank summation method, Overlap addition method, Design of digital filter banks, Implementation using FFT, Spectrographic displays, Pitch detection, Analysis by synthesis, Analysis synthesis systems.

SECTION – II

5. Homomorphic speech processing 5 Hrs.
Homomorphic systems for convolution, complex cepstrum, Pitch detection, Formant estimation, Homomorphic vocoder.

6. Linear predictive coding of speech 6 Hrs.
Basic principles of linear predictive analysis, Solution of LPC equations, Prediction error signal, Frequency domain interpretation, Relation between the various speech parameters, Synthesis of speech from linear predictive parameters, Applications.

7. Speech Enhancement 4 Hrs.
Spectral subtraction & filtering, Harmonic filtering, parametric re-synthesis, Adaptive noise cancellation.
8. **Speech Synthesis**  
5 Hrs.  
Principles of speech synthesis, Synthesizer methods, Synthesis of intonation, Speech synthesis for different speakers, Speech synthesis in other languages, Evaluation, Practical speech synthesis.  

**Text Books:**  

**Reference Books**  

SHIVAJI UNIVERSITY, KOLHAPUR  
B.E.(Electronics and Telecommunication)  
4. Subject : Pattern Recognition(Elective-II)
Lectures : 4 hrs / week            Theory : 100 Marks
TW : 25 Marks

Section – I

1. Introduction                  03 Hrs
Application of pattern recognition, statistical decision theory.

2. Probability                   05 Hrs.
Moments of random variables, estimation of parameters from samples, minimum risk estimators.

3. Statistical decision making   06 Hrs
Introduction, Bay’s theorem, multiple features, conditionally independent features, decision boundaries, unequal cost of error, estimation of error rates, the leaving one-out technique, characteristic curves, estimating the composition of population.

4. Non parametric decision making 06 Hrs
Introduction, histograms, kernel and window estimators, nearest neighbour classification techniques, adaptive decision boundaries, adaptive discriminate functions, minimum squared error discriminant functions, choosing a decision technique.

Section – II

5. Clustering                     08 Hrs.
Introduction, hierachecal clustering :- single linkage, complete linkage, Average linkage, Algorithms, wards method. Partitional clustering : - Forgy’s, K means, Isodata algorithm.

6. Object Recognition             06 Hrs.
Knowledge representation, statistical pattern recognition, Neural Nets:- feed forward network, unsupervised learning, hopefield neural net, Syntactic pattern recognition, fuzzy Optimization technique in recognition :- genetic algorithm, simulated ananealing.

7. Case Studies                   06 Hrs.
Optical Music recognition system, automated identification of airway trees, automated image analysis in cardiology.

Text Books :
2) Pattern recognition principles. J.T.Toy, R.C. Gonzalez, (Addison Wesley)

SHIVAJI UNIVERSITY, KOLHAPUR
B.E.(Electronics and Telecommunication)
4. Subject: Mobile Communication (Elective II)  
      w.e.f July 2010

Lectures: 4 hrs / week  
Theory: 100 Marks  
TW: 25 Marks

Section – I

1. Introduction to Mobile Communication  
   6 Hrs.
   Mobile and Personal Communication, mobile and wireless devices, Specialized packet and mobile radio networks, circuit switched data services on cellular networks, packet switched data services on cellular networks

2. Wireless LAN  
   9 Hrs.
   Introduction, Infrared radio transmission infrastructure and adhoc networks, Detailed study of IEEE 802.11, HIPER LAN, Bluetooth, Wireless ATM

3. Mobile Network Layer  
   5 Hrs.
   Mobile IP, DHCP (Dynamic Host Control Protocol), Mobile adhoc networks

Section – II

4. Mobile Transport Layer  
   7 Hrs.
   Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast and Selective retransmission and recovery, Transaction oriented TCP, TCP over 2.5/3G wireless networks.

5. Support for Mobility  
   7 Hrs.
   File systems, WWW, Wireless application protocol, i-mode, SyncML, WAP 2.0.

6. Security issues in wireless systems  
   6 Hrs.
   Need for wireless security, Attacks on wireless networks, security services, WEP, VPN

Reference Book:

1. Mobile Communications: Jachen Schiller (Addison Westy)

Practical: Any 8 experiments based on above syllabus.

SHIVAJI UNIVERSITY, KOLHAPUR

B.E.(Electronics and Telecommunication) Part- I
4. Subject: REAL TIME SYSTEMS (Elective II)

w.e.f July 2010

Lectures: 4 hrs / week

Theory: 100 Marks
TW: 25 Marks

Section I

1. INTRODUCTION 5 Hrs.


2. TASK AND SCHEDULING 8 Hrs.

Task Assignment and Scheduling – Classical uniprocessor scheduling algorithms, Uniprocessor scheduling of IRIS tasks, Task assignment, Mode changes, and Fault Tolerant Scheduling.

3. PROGRAMMING LANGUAGES AND TOOLS 7 Hrs.

Programming Languages and Tools – Desired language characteristics, Data typing, Control structures, Facilitating Hierarchical Decomposition, Packages, Run – time(Exception) Error handling, Overloading and Generics, Multitasking, Low level programming, Task Scheduling, Timing Specifications, Programming Environments, Run – time support.

Section II

4. REAL TIME DATABASES 6 Hrs.

Basic Definition, Real time Vs General Purpose Databases, Main Memory Databases, Transaction priorities, Transaction Aborts, Concurrency control issues, Disk Scheduling Algorithms, Two – phase Approach to improve Predictability, Maintaining Serialization Consistency, Databases for Hard Real Time Systems.

5. COMMUNICATION 8 Hrs.


6. EVALUATION TECHNIQUES 6 Hrs.


TEXT BOOK:

REFERENCE BOOKS:

2. Real-Time systems by Jane W. S. Liu

Term work: Total eight assignment based on Section I and Section II
The project group of semester one will continue the project work in semester two and complete the project in all respect (assembly, testing, fabrication, tabulation, test results etc). The project work along with project report should be submitted as part semester two on or before the last day of the semester two.
Subject equivalence for revised syllabus of B.E. (E & TC) w.e.f. 2010-2011

**B.E. Part – I**

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Old Syllabus Subjects</th>
<th>Equivalent Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Digital Communication</td>
<td>Digital Communication*</td>
</tr>
<tr>
<td>2</td>
<td>Computer Communication Network</td>
<td>Computer Communication Network</td>
</tr>
<tr>
<td>3</td>
<td>Industrial and Power Electronics</td>
<td>Microwave Engineering</td>
</tr>
<tr>
<td>4</td>
<td>Satellite Communication</td>
<td>Satellite Communication</td>
</tr>
<tr>
<td>5</td>
<td>Elective – I</td>
<td>Elective – I</td>
</tr>
<tr>
<td></td>
<td>VLSI Technology</td>
<td>VLSI Technology*</td>
</tr>
<tr>
<td></td>
<td>Image Processing</td>
<td>Image Processing</td>
</tr>
<tr>
<td></td>
<td>Fuzzy logic</td>
<td>Fuzzy logic*</td>
</tr>
</tbody>
</table>

Note :- * Syllabus for these subjects is as per old Syllabus.

**B.E. Part – II**

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Old Syllabus Subjects</th>
<th>Equivalent Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Broadband Communication</td>
<td>Broadband Communication</td>
</tr>
<tr>
<td>2</td>
<td>Mobile Communication</td>
<td>Mobile Communication</td>
</tr>
<tr>
<td>4</td>
<td>Elective – II</td>
<td>Elective – II</td>
</tr>
<tr>
<td></td>
<td>Digital Signal Processors</td>
<td>Digital Signal Processors</td>
</tr>
<tr>
<td></td>
<td>Embedded Systems</td>
<td>Embedded Systems</td>
</tr>
<tr>
<td></td>
<td>Pattern Recognition</td>
<td>Pattern Recognition</td>
</tr>
</tbody>
</table>