# ANNA UNIVERSITY, CHENNAI
## AFFILIATED INSTITUTIONS
### R – 2009
#### I TO VII SEMESTER CURRICULA AND SYLLABI
##### B.E. (PART-TIME) ELECTRONICS AND COMMUNICATION ENGINEERING
### SEMESTER I

<table>
<thead>
<tr>
<th>S. NO.</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>PTMA2111</td>
<td>Applied Mathematics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>PTPH2111</td>
<td>Applied Physics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>PTCH2111</td>
<td>Applied Chemistry</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>PTEC2151</td>
<td>Electric Circuits and Electron Devices</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>PTEC2155</td>
<td>Circuits &amp; Devices Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>12</td>
<td>1</td>
<td>3</td>
<td>15</td>
</tr>
</tbody>
</table>

### SEMESTER II

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>PTMA 2211</td>
<td>Transforms and Partial Differential Equations</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>PTEC 2201</td>
<td>Electromagnetic Fields and Waves</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>PTEC 2202</td>
<td>Electronic Circuits- I</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>PTEC 2206</td>
<td>Signals and Systems</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>PTEC 2204</td>
<td>Electronic Circuits Lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>12</td>
<td>1</td>
<td>3</td>
<td>15</td>
</tr>
</tbody>
</table>

### SEMESTER III

<table>
<thead>
<tr>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTEC2251</td>
<td>Electronic Circuits II</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>PTEC2252</td>
<td>Communication Theory</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>PTEC2203</td>
<td>Digital Electronics</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>PTEC2254</td>
<td>Linear Integrated Circuits</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTEC2257</td>
<td>Electronics circuits II and simulation lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td>12</td>
<td>3</td>
<td>3</td>
<td>17</td>
</tr>
</tbody>
</table>
### SEMESTER IV

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTEC2301</td>
<td>Digital Communication</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2302</td>
<td>Digital Signal Processing</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>PTEC2303</td>
<td>Computer Architecture and Organization</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>PTEC2305</td>
<td>Transmission Lines and Wave guides</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td>Communication System Lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td>12</td>
<td>2</td>
<td>3</td>
<td>16</td>
</tr>
</tbody>
</table>

### SEMESTER V

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTEC2304</td>
<td>Microprocessors and Microcontrollers</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>PTEC2352</td>
<td>Computer Networks</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2353</td>
<td>Antenna and Wave Propagation</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>PTEC2354</td>
<td>VLSI Design</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td>Microprocessor and Microcontroller Lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td>12</td>
<td>2</td>
<td>3</td>
<td>16</td>
</tr>
</tbody>
</table>

### SEMESTER VI

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTEC2401</td>
<td>Wireless Communication</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2402</td>
<td>Optical Communication and Networking</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2403</td>
<td>RF and Microwave Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Elective I</td>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td>Optical &amp; Microwave Lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td>12</td>
<td>0</td>
<td>3</td>
<td>14</td>
</tr>
</tbody>
</table>

### SEMESTER VII

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td>Elective II</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Elective III</td>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Elective IV</td>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Elective V</td>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td>Project Work</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td>12</td>
<td>0</td>
<td>12</td>
<td>18</td>
</tr>
</tbody>
</table>
## LIST OF ELECTIVS

### ELECTIVE - I

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTEC2021</td>
<td>Medical Electronics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2022</td>
<td>Operating Systems</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2023</td>
<td>Solid State Electronic Devices</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTIT2064</td>
<td>Speech Processing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTMA2264</td>
<td>Numerical Methods</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTCS2021</td>
<td>Multicore Programming</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2027</td>
<td>Advanced Microprocessors</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

### ELECTIVE - II

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTEC2028</td>
<td>Internet and Java</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2029</td>
<td>Digital Image Processing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2030</td>
<td>Advanced Digital Signal Processing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2031</td>
<td>Electromagnetic Interference and Compatibility</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTCS2060</td>
<td>High Speed Networks</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2033</td>
<td>Power Electronics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2034</td>
<td>Television and Video Engineering</td>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### ELECTIVE - III

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTCS2053</td>
<td>Soft Computing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTGE2022</td>
<td>Total Quality Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2035</td>
<td>Cryptography and Network Security</td>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PTEC2036</td>
<td>Information Theory</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2037</td>
<td>Multimedia Compression &amp; Communication</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2038</td>
<td>Nano Electronics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2039</td>
<td>Parallel and Distributed Processing</td>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### ELECTIVE - IV

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTEC2041</td>
<td>Avionics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTGE2071</td>
<td>Intellectual Property Rights</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTGE2025</td>
<td>Professional Ethics in Engineering</td>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PTEC2042</td>
<td>Embedded and Real Time Systems</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2043</td>
<td>Wireless networks</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2044</td>
<td>Telecommunication Switching and Networks</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2045</td>
<td>Satellite Communication</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
## ELECTIVE - V

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTEC2046</td>
<td>Advanced Electronic system design</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2047</td>
<td>Optoelectronic Devices</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2048</td>
<td>Telecommunication System Modeling and Simulation</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2049</td>
<td>Radar and Navigational Aids</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2050</td>
<td>Mobile Adhoc Networks</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2051</td>
<td>Wireless Sensor Networks</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2052</td>
<td>Remote Sensing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2053</td>
<td>Engineering Acoustics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTEC2054</td>
<td>Optical Networks</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
UNIT I  MATRICES

UNIT II  FUNCTIONS OF SEVERAL VARIABLES

UNIT III  ANALYTIC FUNCTION
Analytic functions – Necessary and sufficient conditions for analyticity – Properties – Harmonic conjugates – Construction of analytic function – Conformal Mapping – Mapping by functions w = a + z , az, 1/z, - Bilinear transformation.

UNIT IV  COMPLEX INTEGRATION
Line Integral – Cauchy’s theorem and integral formula – Taylor’s and Laurent’s Series – Singularities – Residues – Residue theorem – Application of Residue theorem for evaluation of real integrals – Use of circular contour and semicircular contour with no pole on real axis.

UNIT V  LAPLACE TRANSFORMS

TOTAL : 45 PERIODS

TEXT BOOKS

REFERENCE BOOKS
UNIT I  ULRASONICS

UNIT II  LASERS

UNIT III  FIBER OPTICS & APPLICATIONS
Principle and propagation of light in optical fibres – Numerical aperture and Acceptance angle - Types of optical fibres (material, refractive index, mode) – Double crucible technique of fibre drawing - Splicing, Loss in optical fibre – attenuation, dispersion, bending - Fibre optical communication system (Block diagram) - Light sources - Detectors - Fibre optic sensors – temperature and displacement - Endoscope.

UNIT IV  QUANTUM PHYSICS

UNIT V  CRYSTAL PHYSICS
Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – ‘d’ spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – NaCl, ZnS, diamond and graphite structures – Polymorphism and allotropy - Crystal defects – point, line and surface defects- Burger vector.

TEXT BOOKS:

REFERENCES:

TOTAL: 45 PERIODS
UNIT I  WATER TREATMENT AND POLLUTION CONTROL  9
Treatment of water – impurities and disadvantages of hard water-Domestic and Industrial
treatment - zeolite and ion exchange processes-Portable water-Boiler feed water –
conditioning of boiler feed water. Scale and sludge formation –prevention –caustic
embrittlement-boiler corrosion–priming and foaming Sewage treatment–Primary,
secondary and tertiary treatment–significance of DO, BOD and COD-desalination –
reverse osmosis. Control of water,air and land pollution.

UNIT II  FUELS  9
Classification of fuels-Proximate and ultimate analysis of coal- coke manufacture-Otto
Hoffman by product method-cracking-thermal and catalytic (fixed bed and fluidized bed)-
petroleum-refining-factions-composition and uses synthetic petrol-fischer drops methods-
Bergius process- knocking-octane number and cetane number-Preparation, composition
and uses of producer gas , water gas and natural gas. Flue gas analysis- Orsat
apparatus- gross and net calorific values- calculation of minimum requirement of
air(simple calculations)- Explosive range –spontaneous ignition temperature

UNIT III  THERMODYNAMICS AND SURFACE CHEMISTRY  9
Second law of thermodynamics-entropy and its significance- criteria for spontaneity- free
energy-Gibbs, Helmholts and Gibbs-Helmholts equation-applications and problems –
Adsorption –types of adsorption- adsorption of gases on solids- adsorption isotherm-
Freundlich and Langmuir isotherms-adsorption of solutes from solutions- applications

UNIT IV  ELECTROCHEMISTRY - CORROSION AND CATALYSIS  9
Reversible and irreversible cells-electrode potentials-types of electrodes-cell reactions-
Nernst equations- electrochemical and galvanic series-fuel cells and solar cells-corrosion-
chemical and electrochemical-factors affecting corrosion-sacrificial anode-impressed
current cathodic protection-surface treatment and protective coating- Catalysis –
classification-characteristics of catalysis – auto catalysis- enzyme catalysis

UNIT V  POLYMERS-COMPOSITES AND NANO CHEMISTRY  9
Polymers-definition-classification-thermoplastics and thermosetting plastics differences
Preparation, properties and uses of polystyrene, bakelite, PET, polyurethane, Teflon,
ureafomaldehyde, polycarbonates-Elastomers-Preparation, properties of Buna-S, nitrile,
neoperene and butyl rubber, silicon rubber. Composites-FRP. Nanochemistry-
introduction to nanochemistry- preparation and properties of nonmaterial-nano rods, nano
wires-nanotubes-carbon nanotubes and their applications.

TOTAL : 45 PERIODS

TEXT BOOKS:
Delhi,2002
Delhi 2001

REFERENCE BOOKS:
1. Puri B R.,Sharma L R and Madhan S. Pathania, Principles of Physical Chemistry,
3. V.R.Gowarikar, N.V.Viswanathan and Jayadev Sreedhar, Polymer Science, Wiley
UNIT I  CIRCUIT ANALYSIS TECHNIQUES  12

UNIT II  TRANSIENT RESONANCE IN RLC CIRCUITS  12

UNIT III  SEMICONDUCTOR DIODES  12

UNIT IV  TRANSISTORS  12
Principle of operation of PNP and NPN transistors – study of CE, CB and CC configurations and comparison of their characteristics – Breakdown in transistors – operation and comparison of N-Channel and P-Channel JFET – drain current equation – MOSFET – Enhancement and depletion types – structure and operation – comparison of BJT with MOSFET – thermal effect on MOSFET.

UNIT V  SPECIAL SEMICONDUCTOR DEVICES(Qualitative Treatment only)  12

TOTAL : 60 PERIODS

TEXT BOOKS:

REFERENCES:
1. Verification of KVL and KCL
2. Verification of Thevenin and Norton Theorems.
3. Verification of superposition Theorem.
4. Verification of Maximum power transfer and reciprocity theorems.
5. Frequency response of series and parallel resonance circuits.
6. Characteristics of PN and Zener diode
7. Characteristics of CE configuration
8. Characteristics of CB configuration
9. Characteristics of UJT and SCR
10. Characteristics of JFET and MOSFET

TOTAL : 45 PERIODS

AIM: To facilitate the understanding of the principles and to cultivate the art of formulating physical problems in the language of mathematics.

OBJECTIVES:
- To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems
- To acquaint the student with Fourier transform techniques used in wide variety of situations in which the functions used are not periodic
- To introduce the effective mathematical tools for the solutions of partial differential equations that model physical processes
- To develop Z- transform techniques which will perform the same task for discrete time systems as Laplace Transform, a valuable aid in analysis of continuous time systems

UNIT I  FOURIER SERIES
Dirichlet’s conditions – General Fourier series – Odd and even functions – Half-range Sine and Cosine series – Complex form of Fourier series – Parseval’s identity – Harmonic Analysis.

UNIT II  FOURIER TRANSFORM
UNIT III  PARTIAL DIFFERENTIAL EQUATIONS  9
Formation – Solutions of first order equations – Standard types and Equations reducible to standard types – Singular solutions – Lagrange’s Linear equation – Integral surface passing through a given curve – Solution of linear equations of higher order with constant coefficients.

UNIT IV  APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS  9
Method of separation of Variables – Solutions of one dimensional wave equation and one-dimensional heat equation – Steady state solution of two-dimensional heat equation – Fourier series solutions in Cartesian coordinates.

UNIT V  Z–TRANSFORM AND DIFFERENCE EQUATIONS  9

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:
UNIT IV  PLANE EM WAVES IN ISOTROPIC MEDIA
Wave equation from Maxwell’s Equation, Uniform plane waves in perfect dielectric and conductors, Polarization, Reflection and Refraction of plane waves at different boundaries, Surface impedance, Numerical problems

UNIT V  APPLICATION OF STATIC FIELDS AND COMPUTATIONAL METHODS
Deflection of a charged particle, CRO, Ink Jet Printer, Electro static generator, Magnetic Separator, Cyclotron, Velocity selector and Mass Spectrometer, Electromagnetic pump, Introduction to field computation methods-FDM,FEM,MOM , Numerical problems

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

PTEC 2202  ELECTRONIC CIRCUITS - I  L T P C
3  0  0  3

UNIT I  BIASING OF DISCRETE BJT AND MOSFET
DC Load line, operating point, Various biasing methods for BJT - Design – Stability - Bias compensation, Thermal stability, Design of biasing for MOSFET and JFET

UNIT II  BJT AMPLIFIERS

UNIT III  MOSFET AMPLIFIERS

UNIT IV  IC MOSFET AMPLIFIERS
Single stage IC MOS amplifiers – Active Loads – Depletion MOS, Enhancement MOS, MOS in Triode region, NMOS current source and PMOS Current source, their equivalent circuits and load line on the VI characteristics– Current steering circuit using MOSFET — CMOS common source amplifier and CMOS Common source follower – CMOS differential amplifier - CMRR
UNIT V  HIGH FREQUENCY ANALYSIS AND LARGE SIGNAL AMPLIFIERS

Short circuit current gain, cut off frequency – $f_\alpha$ and $f_\beta$ unity gain and bandwidth - Miller effect–frequency Analysis of CS and CE Amplifiers-Determinations of BW of Single stage and Multistage Amplifier- Analysis of Class A, Class B, Class AB with darlington output stage and with output stage utilizing MOSFETs – Class C, Class D, Class E power amplifiers.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
TEXT BOOKS:

REFERENCES:

PTEC 2204 ELECTRONIC CIRCUITS LAB L T P C
0 0 3 2

1. Frequency Response of CE amplifier
2. Frequency response of CB amplifier
3. CC Amplifier - buffer
4. Frequency response of CS Amplifiers
5. Class A and Class B power amplifiers.
7. CMRR Measurement
8. Cascode amplifier

TOTAL: 45 PERIODS

PTEC 2251 ELECTRONIC CIRCUITS II L T P C
3 1 0 4

AIM
The aim of this course is to familiarize the student with the analysis and design of feedback amplifiers, oscillators, tuned amplifiers, wave shaping circuits, multivibrators and blocking oscillators.

OBJECTIVES
On completion of this course the student will understand
- The advantages and method of analysis of feedback amplifiers
- Analysis and design of LC and RC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, blocking oscillators and time base generators.
UNIT I FEEDBACK AMPLIFIERS
Block diagram, Loop gain, Gain with feedback, Effects of negative feedback – Sensitivity and desensitivity of gain, Cut-off frequencies, distortion, noise, input impedance and output impedance with feedback, Four types of negative feedback connections – voltage series feedback, voltage shunt feedback, current series feedback and current shunt feedback, Method of identifying feedback topology and feedback factor, Nyquist criterion for stability of feedback amplifiers.

UNIT II OSCILLATORS

UNIT III TUNED AMPLIFIERS

UNIT IV WAVE SHAPING AND MULTIVIBRATOR CIRCUITS

UNIT V BLOCKING OSCILLATORS AND TIMEBASE GENERATORS

TUTORIAL= 15 TOTAL = 60 PERIODS

TEXT BOOKS:

REFERENCES:
AIM
To study the various analog communication fundamentals viz., Amplitude modulation and demodulation, angle modulation and demodulation. Noise performance of various receivers and information theory with source coding theorem are also dealt.

OBJECTIVES
- To provide various Amplitude modulation and demodulation systems.
- To provide various Angle modulation and demodulation systems.
- To provide some depth analysis in noise performance of various receiver.
- To study some basic information theory with some channel coding theorem.

UNIT I AMPLITUDE MODULATION SYSTEMS 10
Review of Spectral Characteristics of Periodic and Non-periodic signals; Generation and Demodulation of AM, DSBSC, SSB and VSB Signals; Comparison of Amplitude Modulation Systems; Frequency Translation; FDM; Non – Linear Distortion.

UNIT II ANGLE MODULATION SYSTEMS 8
Phase and Frequency Modulation; Single tone, Narrow Band and Wideband FM; Transmission Bandwidth; Generation and Demodulation of FM Signal.

UNIT III NOISE THEORY 8
Review of Probability, Random Variables and Random Process; Guassian Process; Noise – Shot noise, Thermal noise and white noise; Narrow band noise, Noise temperature; Noise Figure.

UNIT IV PERFORMANCE OF CW MODULATION SYSTEMS 10
Superheterodyne Radio receiver and its characteristic; SNR; Noise in DSBSC systems using coherent detection; Noise in AM system using envelope detection and its FM system; FM threshold effect; Pre-emphasis and De-emphasis in FM; Comparison of performances.

UNIT V INFORMATION THEORY 9
Discrete Messages and Information Content, Concept of Amount of Information, Average information, Entropy, Information rate, Source coding to increase average information per bit, Shannon-Fano coding, Huffman coding, Lempel-Ziv (LZ) coding, Shannon’s Theorem, Channel Capacity, Bandwidth- S/N trade-off, Mutual information and channel capacity, rate distortion theory, Lossy Source coding.

TUTORIAL 15 TOTAL : 60 PERIODS

TEXT BOOKS:

REFERENCES:
AIM
To learn the basic methods for the design of digital circuits and provide the fundamental concepts used in the design of digital systems.

OBJECTIVES
- To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions
- To introduce the methods for simplifying Boolean expressions
- To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits
- To introduce the concept of memories and programmable logic devices.
- To illustrate the concept of synchronous and asynchronous sequential circuits

UNIT I MINIMIZATION TECHNIQUES AND LOGIC GATES

UNIT II COMBINATIONAL CIRCUITS

UNIT III SEQUENTIAL CIRCUITS

UNIT IV MEMORY DEVICES
UNIT V SYNCHRONOUS AND AYNCHRONOUS SEQUENTIAL CIRCUITS

Synchronous Sequential Circuits: General Model – Classification – Design – Use of Algorithmic State Machine – Analysis of Synchronous Sequential Circuits


TUTORIAL =15, TOTAL : 60 PERIODS

TEXT BOOKS:

REFERENCES:

PTEC2254 LINEAR INTEGRATED CIRCUITS

L T P C
3 0 0 3

AIM:
To teach the basic concepts in the design of electronic circuits using linear integrated circuits and their applications in the processing of analog signals.

OBJECTIVES
• To introduce the basic building blocks of linear integrated circuits.
• To teach the linear and non-linear applications of operational amplifiers.
• To introduce the theory and applications of analog multipliers and PLL.
• To teach the theory of ADC and DAC
• To introduce the concepts of waveform generation and introduce some special function ICs.

UNIT I IC FABRICATION AND CIRCUIT CONFIGURATION FOR LINEAR ICS
UNIT II APPLICATIONS OF OPERATIONAL AMPLIFIERS
Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters, adder, subtractor, Instrumentation amplifier, Integrator, Differentiator, Logarithmic amplifier, Antilogarithmic amplifier, Comparators, Schmitt trigger, Precision rectifier, peak detector, clipper and clamper, Low-pass, high-pass and band-pass Butterworth filters.

UNIT III ANALOG MULTIPLIER AND PLL
Analog Multiplier using Emitter Coupled Transistor Pair - Gilbert Multiplier cell - Variable transconductance technique, analog multiplier ICs and their applications, Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL IC 565, application of PLL for AM detection, FM detection, FSK modulation and demodulation and Frequency synthesizing.

UNIT IV ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS

UNIT V WAVEFORM GENERATORS AND SPECIAL FUNCTION ICs
Sine-wave generators, Multivibrators and Triangular wave generator, Saw-tooth wave generator, ICL8038 function generator, Timer IC 555, IC Voltage regulators - Three terminal fixed and adjustable voltage regulators - IC 723 general purpose regulator - Monolithic switching regulator, Switched capacitor filter IC MF10, Frequency to Voltage and Voltage to Frequency converters, Audio Power amplifier, Video Amplifier, Isolation Amplifier, Opto-couplers and fibre optic IC.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
DESIGN OF FOLLOWING CIRCUITS

1. Series and Shunt feedback amplifiers:
   Frequency response, Input and output impedance calculation
2. RC Phase shift oscillator, Wien Bridge Oscillator
3. Hartley Oscillator, Colpitts Oscillator
4. Tuned Class C Amplifier
5. Integrators, Differentiators, Clippers and Clampers
6. Astable, Monostable and Bistable multivibrators

SIMULATION USING PSPICE:

1. Differential amplifier
2. Active filters : Butterworth 2nd order LPF, HPF (Magnitude & Phase Response)
3. Astable, Monostable and Bistable multivibrator - Transistor bias
4. D/A and A/D converters (Successive approximation)
5. Analog multiplier
6. CMOS Inverter, NAND and NOR

LIST OF EQUIPMENTS AND COMPONENTS FOR A BATCH OF 30 STUDENTS
(3 per Batch)

<table>
<thead>
<tr>
<th>S.No</th>
<th>Name of the equipments / Components</th>
<th>Quantity Required</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Variable DC Power Supply</td>
<td>8</td>
<td>(0-30V)</td>
</tr>
<tr>
<td>2</td>
<td>Fixed Power Supply</td>
<td>4</td>
<td>+ / - 12V</td>
</tr>
<tr>
<td>3</td>
<td>CRO</td>
<td>6</td>
<td>30MHz</td>
</tr>
<tr>
<td>4</td>
<td>Multimeter</td>
<td>6</td>
<td>Digital</td>
</tr>
<tr>
<td>5</td>
<td>Multimeter</td>
<td>2</td>
<td>Analog</td>
</tr>
<tr>
<td>6</td>
<td>Function Generator</td>
<td>6</td>
<td>1 MHz</td>
</tr>
<tr>
<td>7</td>
<td>Digital LCR Meter</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>PC with SPICE Simulation Software</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consumables (Minimum of 25 Nos. each)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>BC107, BF195, 2N2222, BC147</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Resistors 1/4 Watt Assorted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Capacitors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Inductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Diodes, Zener Diodes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Bread Boards</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
AIM
To introduce the basic concepts of Digital Communication in baseband and passband domains and to give an exposure to error control coding techniques.

OBJECTIVES
- To study signal space representation of signals and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals.
- To understand baseband and bandpass signal transmission and reception techniques.
- To learn error control coding which encompasses techniques for the encoding and decoding of digital data streams for their reliable transmission over noisy channels.

UNIT I DIGITAL COMMUNICATION SYSTEM

UNIT II BASEBAND FORMATTING TECHNIQUES
Sampling – Impulse sampling, Natural Sampling, Sampler Implementation; Quantisation – Uniform and Non-uniform; Encoding Techniques for Analog Sources- Temporal waveform encoding, Spectral waveform encoding, Model-based encoding, Comparison of speech encoding methods.

UNIT III BASEBAND CODING TECHNIQUES
Error Control Codes - Block Codes, Convolutional Codes, Concept of Error Free Communication; Classification of line codes, desirable characteristics and power spectra of line codes.

UNIT IV BASEBAND RECEPTION TECHNIQUES
Noise in Communication Systems; Receiving Filter – Correlator type, Matched Filter type; Equalising Filter - Signal and system design for ISI elimination, Implementation, Eye Pattern analysis; Synchronisation; Detector – Maximum Likelihood Detector, Error Probability, Figure-of-Merit for Digital Detection.

UNIT V BANDPASS SIGNAL TRANSMISSION AND RECEPTION
Memory less modulation methods - Representation and Spectral characteristics, ASK, PSK, QAM, QPSK, FSK; Bandpass receiving filter, Error performance – Coherent and Non-coherent detection systems.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
AIM
To study the signal processing methods and processors.

OBJECTIVES
- To study DFT and its computation
- To study the design techniques for digital filters
- To study the finite word length effects in signal processing
- To study the non-parametric methods of power spectrum estimations
- To study the fundamentals of digital signal processors.

UNIT I  DISCRETE FOURIER TRANSFORM  9
DFT and its properties, Relation between DTFT and DFT, FFT computations using Decimation in time and Decimation in frequency algorithms, Overlap-add and save methods

UNIT II  INFINITE IMPULSE RESPONSE DIGITAL FILTERS  9

UNIT III  FINITE IMPULSE RESPONSE DIGITAL FILTERS  9

UNIT IV  FINITE WORD LENGTH EFFECTS  9
Fixed point and floating point number representations – Comparison – Truncation and Rounding errors – Quantization noise – derivation for quantization noise power – coefficient quantization error – Product quantization error – Overflow error – Roundoff noise power - limit cycle oscillations due to product roundoff and overflow errors - signal scaling

UNIT V  MULTIRATE SIGNAL PROCESSING  9
Introduction to Multirate signal processing-Decimation-Interpolation-Polyphase implementation of FIR filters for interpolator and decimator -Multistage implementation of sampling rate conversion- Design of narrow band filters - Applications of Multirate signal processing.

L: 45, T: 15, TOTAL= 60 PERIODS

TEXT BOOKS:

REFERENCES:
AIM
To discuss the basic structure of a digital computer and to study in detail the organization of the Control unit, the Arithmetic and Logical unit, the Memory unit and the I/O unit.

OBJECTIVES
- To have a thorough understanding of the basic structure and operation of a digital computer.
- To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
- To study in detail the different types of control and the concept of pipelining.
- To study the hierarchical memory system including cache memories and virtual memory.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.

UNIT I  INTRODUCTION
9

UNIT II  DATA PATH DESIGN
9
Fixed Point Arithmetic, Addition, Subtraction, Multiplication and Division, Combinational and Sequential ALUs, Carry look ahead adder, Robertson algorithm, booth's algorithm, non-restricting division algorithm, Floating Point Arithmetic, Coprocessor, Pipeline Processing, Pipeline Design, Modified booth’s Algorithm

UNIT III  CONTROL DESIGN
9
Hardwired Control, Microprogrammed Control, Multiplier Control Unit, CPU Control Unit, Pipeline Control, Instruction Pipelines, Pipeline Performance, Superscalar Processing, Nano Programming.

UNIT IV  MEMORY ORGANIZATION
9
Random Access Memories, Serial - Access Memories, RAM Interfaces, Magnetic Surface Recording, Optical Memories, multilevel memories, Cache & Virtual Memory, Memory Allocation, Associative Memory.

UNIT V  SYSTEM ORGANIZATION
9
Communication methods, Buses, Bus Control, Bus Interfacing, Bus arbitration, IO and system control, IO interface circuits, Handshaking, DMA and interrupts, vectored interrupts, PCI interrupts, pipeline interrupts, IOP organization, operation systems, multiprocessors, fault tolerance, RISC and CISC processors, Superscalar and vector processor.

TOTAL : 45 PERIODS

TEXTBOOKS:
REFERENCES:

PTEC2305 TRANSmission Lines and Waveguides

AIM
To lay a strong foundation on the theory of transmission lines and wave guides by highlighting their applications.

OBJECTIVES
- To become familiar with propagation of signals through lines
- Understand signal propagation at Radio frequencies
- Understand radio propagation in guided systems
- To become familiar with resonators

UNIT I FILTERS

UNIT II TRANSMISSION LINE PARAMETERS
A line of cascaded T sections - Transmission lines - General Solution, Physical Significance of the equations, the infinite line, wavelength, velocity, propagation, Distortion line, the telephone cable, Reflection on a line not terminated in Zo, Reflection Coefficient, Open and short circuited lines, Insertion loss.

UNIT III THE LINE AT RADIO FREQUENCY
Parameters of open wire line and Coaxial cable at RF – Line constants for dissipation - voltages and currents on the dissipation less line - standing waves – nodes - standing wave ratio - input impedance of open and short circuited lines - power and impedance measurement on lines – λ / 4 line, Impedance matching – single and double-stub matching circle diagram, smith chart and its applications – Problem solving using Smith chart.

UNIT IV GUIDED WAVES BETWEEN PARALLEL PLANES
Application of the restrictions to Maxwell’s equations – transmission of TM waves between Parallel plans – Transmission of TE waves between Parallel planes. Transmission of TEM waves between Parallel planes – Manner of wave travel. Velocities of the waves – characteristic impedance - Attenuators
UNIT V WAVEGUIDES

Application of Maxwell's equations to the rectangular waveguide. TM waves in Rectangular guide. TE waves in Rectangular waveguide – Cylindrical waveguides. The TEM wave in coaxial lines. Excitation of wave guides. Guide termination and resonant cavities.

L: 45, T: 15, TOTAL= 60 PERIODS

TEXT BOOK:

REFERENCES:

PTEC2307 COMMUNICATION SYSTEMS LABORATORY

1. Amplitude modulation and Demodulation.
2. Frequency Modulation and Demodulation
3. Pulse Modulation – PAM / PWM / PPM
4. Pulse Code Modulation
6. Digital Modulation & Demodulation – ASK, PSK, QPSK, FSK (Hardware & MATLAB)
8. PLL and Frequency Synthesizer
9. Line Coding
10. Error Control Coding using MATLAB.
11. Sampling & Time Division Multiplexing.
12. Frequency Division Multiplexing,

TOTAL : 45 PERIODS
AIM
To learn the architecture, programming, interfacing and rudiments of system design of microprocessors and microcontrollers.

OBJECTIVES
- To introduce microprocessors and basics of system design using microprocessors.
- To introduce h/w architecture, instruction set and programming of 8085 microprocessor.
- To introduce the h/w architecture, instruction set and programming of 8086 microprocessor.
- To introduce the peripheral interfacing of microprocessors.
- To introduce through case studies, the system design principles using 8085 and 8086.
- To introduce the h/w architecture, instruction set, programming and interfacing of 8051 microcontroller.

UNIT I INTRODUCTION TO 8 BIT AND 16 BIT MICROPROCESSORS – H/W ARCHITECTURE
Introduction to microprocessor, computer and its organization, Programming system, Address bus, data bus and control bus, Tristate bus, clock generation, Connecting Microprocessor to I/O devices, Data transfer schemes, Architectural advancements of microprocessors. Introductory System design using microprocessors, 8086 – Hardware Architecture, External memory addressing, Bus cycles, some important Companion Chips, Maximum mode bus cycle, 8086 system configuration, Memory Interfacing, Minimum mode system configuration, Maximum mode system configuration, Interrupt processing, Direct memory access.

UNIT II 16 BIT MICROPROCESSOR INSTRUCTION SET AND ASSEMBLY LANGUAGE PROGRAMMING
Programmer’s model of 8086, operand types, operand addressing, assembler directives, instruction set - Data transfer group, Arithmetic group, logical group, control transfer group, miscellaneous instruction groups, programming.

UNIT III MICROPROCESSOR PERIPHERAL INTERFACING
Introduction, Generation of I/O Ports, Programmable Peripheral Interface (PPI)-Intel 8255, Sample-and-Hold Circuit and Multiplexer, Keyboard and Display Interface, Keyboard and Display Controller (8279), Programmable Interval timers (Intel 8253, 8254), D-to-A converter, A-to-D converter, CRT Terminal Interface, Printer Interface.

UNIT IV 8 BIT MICROCONTROLLER- H/W ARCHITECTURE, INSTRUCTION SET AND PROGRAMMING
Introduction to 8051 Microcontroller, Architecture, Memory organization, Special function registers, Port Operation, Memory Interfacing, I/O Interfacing, Programming 8051 resources, interrupts, Programmer’s model of 8051, Operand types, Operand addressing, Data transfer instructions, Arithmetic instructions, Logic instructions, Control transfer instructions, Programming.

UNIT V SYSTEM DESIGN USING MICRO PROCESSOR & MICROCONTROLLER

L: 45, T: 15, TOTAL= 60 PERIODS
TEXT BOOKS:

REFERENCES:

PTEC2352 COMPUTER NETWORKS L T P C 3 0 0 3

AIM
To introduce the concept, terminologies, and technologies used in modern data communication and computer networking.

OBJECTIVES
- To introduce the students the functions of different layers.
- To introduce IEEE standard employed in computer networking.
- To make students to get familiarized with different protocols and network components.

UNIT I PHYSICAL LAYER
Data Communications – Networks - Networks models – OSI model – Layers in OSI model – TCP / IP protocol suite – Addressing – Guided and Unguided Transmission media
Switching: Circuit switched networks – Data gram Networks – Virtual circuit networks
Cable networks for Data transmission: Dialup modems – DSL – Cable TV – Cable TV for Data transfer.

UNIT II DATA LINK LAYER

UNIT III NETWORK LAYER
UNIT IV TRANSPORT LAYER


UNIT V APPLICATION LAYER


TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
1. Wayne Tomasi, “Introduction to Data Communication and Networking”, 1/e, Pearson Education.

PTEC2353 ANTENNA AND WAVE PROPAGATION L T P C

3 1 0 4

AIM
To enable the student to study the various types of antennas and wave propagation.

OBJECTIVES
• To study radiation from a current element.
• To study antenna arrays
• To study aperture antennas
• To learn special antennas such as frequency independent and broad band antennas.
• To study radio wave propagation.

UNIT I ELECTROMAGNETIC RADIATION AND ANTENNA FUNDAMENTALS

Review of electromagnetic theory: Vector potential, Solution of wave equation, retarded case, Hertizian dipole. Antenna characteristics: Radiation pattern, Beam solid angle, Directivity, Gain, Input impedance, Polarization, Bandwidth, Reciprocity, Equivalence of Radiation patterns, Equivalence of Impedances, Effective aperture, Vector effective length, Antenna temperature
UNIT II  WIRE ANTENNAS AND ANTENNA ARRAYS
Wire antennas: Short dipole, Radiation resistance and Directivity, Half wave Dipole, Monopole, Small loop antennas. Antenna Arrays: Linear Array and Pattern Multiplication, Two-element Array, Uniform Array, Polynomial representation, Array with non-uniform Excitation-Binomial Array

UNIT III  APERTURE ANTENNAS

UNIT IV  SPECIAL ANTENNAS AND ANTENNA MEASUREMENTS
Antenna Measurements: Radiation Pattern measurement, Gain and Directivity Measurements, Anechoic Chamber measurement.

UNIT V  RADIO WAVE PROPAGATION

TUTORIAL = 15  TOTAL = 45 + 15 =60 PERIODS

TEXTBOOKS:

REFERENCES:
AIM
To introduce the technology, design concepts and testing of Very Large Scale Integrated Circuits.

OBJECTIVES
• To learn the basic CMOS circuits.
• To learn the CMOS process technology.
• To learn techniques of chip design using programmable devices.
• To learn the concepts of designing VLSI subsystems.
• To learn the concepts of modeling a digital system using Hardware Description Language.

UNIT I CMOS TECHNOLOGY
A brief History-MOS transistor, Ideal I-V characteristics, C-V characteristics, Non ideal I-V effects, DC transfer characteristics - CMOS technologies, Layout design Rules, CMOS process enhancements, Technology related CAD issues, Manufacturing issues

UNIT II CIRCUIT CHARACTERIZATION AND SIMULATION
Delay estimation, Logical effort and Transistor sizing, Power dissipation, Interconnect, Design margin, Reliability, Scaling- SPICE tutorial, Device models, Device characterization, Circuit characterization, Interconnect simulation

UNIT III COMBINATIONAL AND SEQUENTIAL CIRCUIT DESIGN
Circuit families –Low power logic design – comparison of circuit families – Sequencing static circuits, circuit design of latches and flip flops, Static sequencing element methodology- sequencing dynamic circuits – synchronizers

UNIT IV CMOS TESTING
Need for testing- Testers, Text fixtures and test programs- Logic verification- Silicon debug principles- Manufacturing test – Design for testability – Boundary scan

UNIT V SPECIFICATION USING VERILOG HDL
Basic concepts- identifiers- gate primitives, gate delays, operators, timing controls, procedural assignments conditional statements, Data flow and RTL, structural gate level switch level modeling, Design hierarchies, Behavioral and RTL modeling, Test benches, Structural gate level description of decoder, equality detector, comparator, priority encoder, half adder, full adder, Ripple carry adder, D latch and D flip flop.

TOTAL : 45 PERIODS

TEXTBOOKS:

REFERENCES:
2 Wayne Wolf, Modern VLSI design, Pearson Education, 2003
3 M.J.S.Smith: Application specific integrated circuits, Pearson Education, 1997
4 J.Bhasker: Verilog HDL primer, BS publication,2001
5 Ciletti Advanced Digital Design with the Verilog HDL, Prentice Hall of India, 2003
PTEC2308 MICROPROCESSOR AND MICROCONTROLLER LAB

1. Programs for 16 bit Arithmetic operations (Using 8086).
2. Programs for Sorting and Searching (Using 8086).
3. Programs for String manipulation operations (Using 8086).
4. Programs for Digital clock and Stop watch (Using 8086).
5. Interfacing ADC and DAC.
6. Parallel Communication between two MP Kits using Mode 1 and Mode 2 of 8255.
7. Interfacing and Programming 8279, 8259, and 8253.
8. Serial Communication between two MP Kits using 8251.
9. Interfacing and Programming of Stepper Motor and DC Motor Speed control.
11. Programming and verifying Timer, Interrupts and UART operations in 8051 microcontroller.
12. Communication between 8051 Microcontroller kit and PC.

TOTAL : 45 PERIODS

PTEC2401 WIRELESS COMMUNICATION

AIM
To introduce the concepts of wireless / mobile communication using cellular environment. To make the students to know about the various modulation techniques, propagation methods, coding and multi access techniques used in the mobile communication. Various wireless network systems and standards are to be introduced.

OBJECTIVES
- It deals with the fundamental cellular radio concepts such as frequency reuse and handoff. This also demonstrates the principle of trunking efficiency and how trunking and interference issues between mobile and base stations combine to affect the overall capacity of cellular systems.
- It presents different ways to radio propagation models and predict the large – scale effects of radio propagation in many operating environment. This also covers small propagation effects such as fading, time delay spread and Doppler spread and describes how to measures and model the impact that signal bandwidth and motion have on the instantaneous received signal through the multi-path channel.
- It provides idea about analog and digital modulation techniques used in wireless communication.
- It also deals with the different types of equalization techniques and diversity concepts.. It provides an introduction to speech coding principles which have driven the development of adaptive pulse code modulation and linear predictive coding techniques.
- It deals with advanced transceiver schemes and second generation and third generation wireless networks.
### UNIT I SERVICES AND TECHNICAL CHALLENGES  
Types of Services, Requirements for the services, Multipath propagation, Spectrum Limitations, Noise and Interference limited systems, Principles of Cellular networks, Multiple Access Schemes.

### UNIT II WIRELESS PROPAGATION CHANNELS  
Propagation Mechanisms (Qualitative treatment), Propagation effects with mobile radio, Channel Classification, Link calculations, Narrowband and Wideband models.

### UNIT III WIRELESS TRANSCEIVERS  
Structure of a wireless communication link, Modulation and demodulation – Quadrature Phase Shift Keying, π/4-Differential Quadrature Phase Shift Keying, Offset-Quadrature Phase Shift Keying, Binary Frequency Shift Keying, Minimum Shift Keying, Gaussian Minimum Shift Keying, Power spectrum and Error performance in fading channels.

### UNIT IV SIGNAL PROCESSING IN WIRELESS SYSTEMS  
Principle of Diversity, Macrodiversity, Microdiversity, Signal Combining Techniques, Transmit diversity, Equalisers- Linear and Decision Feedback equalisers, Review of Channel coding and Speech coding techniques.

### UNIT V ADVANCED TRANSCEIVER SCHEMES  
Spread Spectrum Systems- Cellular Code Division Multiple Access Systems- Principle, Power control, Effects of multipath propagation on Code Division Multiple Access, Orthogonal Frequency Division Multiplexing – Principle, Cyclic Prefix, Transceiver implementation, Second Generation(GSM, IS–95) and Third Generation Wireless Networks and Standards

**TOTAL : 45 PERIODS**

### TEXT BOOKS:

### REFERENCES:

---

**PTEC2402 OPTICAL COMMUNICATION AND NETWORKING**  
**L T P C**  
3 0 0 3

**AIM**  
To introduce the various optical fiber modes, configurations and various signal degradation factors associated with optical fiber.  
To study about various optical sources and optical detectors and their use in the optical communication system. Finally to discuss about digital transmission and its associated parameters on system performance.
OBJECTIVES
- To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures.
- To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors. Design optimization of SM fibers, RI profile and cut-off wave length.
- To learn the various optical source materials, LED structures, quantum efficiency, Laser diodes and different fiber amplifiers.
- To learn the fiber optical receivers such as PIN APD diodes, noise performance in photo detector, receiver operation and configuration.
- To learn fiber slicing and connectors, noise effects on system performance, operational principles WDM and solutions.

UNIT I INTRODUCTION

UNIT II TRANSMISSION CHARACTERISTICS OF OPTICAL FIBERS

UNIT III SOURCES AND DETECTORS
Optical sources: Light Emitting Diodes - LED structures - surface and edge emitters, mono and hetero structures - internal - quantum efficiency, injection laser diode structures - comparison of LED and ILD
Optical Detectors: PIN Photo detectors, Avalanche photo diodes, construction, characteristics and properties, Comparison of performance, Photo detector noise -Noise sources , Signal to Noise ratio , Detector response time.

UNIT IV FIBER OPTIC RECEIVER AND MEASUREMENTS


UNIT V OPTICAL NETWORKS

TOTAL : 45 PERIODS

TEXT BOOKS:
REFERENCES:

PTEC2403 RF AND MICROWAVE ENGINEERING  

AIM
To enable the student to become familiar with active & passive microwave devices & components used in Microwave communication systems.

OBJECTIVES
• To study about multi-port RF networks and RF transistor amplifiers
• To study passive microwave components and their S-Parameters.
• To study Microwave semiconductor devices & applications.
• To study Microwave sources and amplifiers.

UNIT I  TWO PORT RF NETWORKS-CIRCUIT REPRESENTATION  9
Low frequency parameters-impedance, admittance, hybrid and ABCD. High frequency parameters-Formulation of S parameters, properties of S parameters-Reciprocal and lossless networks, transmission matrix, Introduction to component basics, wire, resistor, capacitor and inductor, applications of RF

UNIT II  RF TRANSISTOR AMPLIFIER DESIGN AND MATCHING NETWORKS  9
Amplifier power relation, stability considerations, gain considerations noise figure, impedance matching networks, frequency response, T and π matching networks, microstripline matching networks

UNIT III  MICROWAVE PASSIVE COMPONENTS  9
Microwave frequency range, significance of microwave frequency range - applications of microwaves. Scattering matrix -Concept of N port scattering matrix representation- Properties of S matrix- S matrix formulation of two-port junction. Microwave junctions -Tee junctions -Magic Tee - Rat race - Corners - bends and twists - Directional couplers - two hole directional couplers- Ferrites - important microwave properties and applications – Termination - Gyrorator- Isolator-Circulator - Attenuator - Phase changer – S Matrix for microwave components – Cylindrical cavity resonators.

UNIT IV  MICROWAVE SEMICONDUCTOR DEVICES  9
Microwave semiconductor devices- operation - characteristics and application of BJT and FETs -Principles of tunnel diodes - Varactor and Step recovery diodes - Transferred Electron Devices -Gunn diode- Avalanche Transit time devices- IMPATT and TRAPATT devices. Parametric devices -Principles of operation - applications of parametric amplifier .Microwave monolithic integrated circuit (MMIC) - Materials and fabrication techniques
UNIT V  MICROWAVE TUBES AND MEASUREMENTS  
Microwave tubes- High frequency limitations - Principle of operation of Multicavity Klystron, Reflex Klystron, Traveling Wave Tube, Magnetron. Microwave measurements: Measurement of power, wavelength, impedance, SWR, attenuation, Q and Phase shift.

TOTAL : 45 PERIODS

TEXT BOOK:

REFERENCES:

PTEC2405  OPTICAL & MICROWAVE LAB  L T P C
0 0 3 2

MICROWAVE EXPERIMENTS:
1. Reflex Klystron – Mode characteristics
2. Gunn Diode – Characteristics
3. VSWR, Frequency and Wave Length Measurement
4. Directional Coupler – Directivity and Coupling Coefficient – S – parameter measurement
5. Isolator and Circulator – S - parameter measurement
6. Attenuation and Power measurement
7. S - matrix Characterization of E-Plane T, H-Plane T and Magic T.
8. Radiation Pattern of Antennas.
9. Antenna Gain Measurement

OPTICAL EXPERIMENTS:
1. DC characteristics of LED and PIN Photo Diode.
2. Mode Characteristics of Fibers
4. Fiber Optic Analog and Digital Link
5. Numerical Aperture Determination for Fibers
6. Attenuation Measurement in Fibers

TOTAL : 45 PERIODS
AIM
To make students to understand the applications of electronics in diagnostic and therapeutic area.

OBJECTIVE
- To study the methods of recording various biopotentials
- To study how to measure biochemical and various physiological information
- To understand the working of units which will help to restore normal functioning
- To understand the use of radiation for diagnostic and therapy
- To understand the need and technique of electrical safety in Hospitals

UNIT I ELECTRO-PHYSIOLOGY AND BIO-POTENTIAL RECORDING 9
The origin of Bio-potentials; biopotential electrodes, biological amplifiers, ECG, EEG, EMG, PCG, EOG, lead systems and recording methods, typical waveforms and signal characteristics.

UNIT II BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENT 9
PH, PO2, PCO2, PHCO3, Electrophoresis, colorimeter, photometer, Auto analyzer, Blood flow meter, cardiac output, respiratory measurement, Blood pressure, temperature, pulse, Blood cell counters.

UNIT III ASSIST DEVICES AND BIO-TELEMETRY 9
Cardiac pacemakers, DC Defibrillator, Telemetry principles, frequency selection, Bio-telemetry, radio-pill and tele-stimulation.

UNIT IV RADIOLOGICAL EQUIPMENTS 9
Ionosing radiation, Diagnostic x-ray equipments, use of Radio Isotope in diagnosis, Radiation Therapy.

UNIT V RECENT TRENDS IN MEDICAL INSTRUMENTATION 9
Thermograph, endoscopy unit, Laser in medicine, Diathermy units, Electrical safety in medical equipment.

TOTAL : 45 PERIODS

TEXTBOOK:

REFERENCES:
AIM
To have a thorough knowledge of the scheduling, memory management, I/O and File System in an Operating system. To have an introduction to distributed operating system.

OBJECTIVES
- To have an overview of components of an operating systems
- To have a thorough knowledge of Process management, Storage management, I/O and File Management.
- To have an understanding of a distributed operating systems.

UNIT I  OPERATING SYSTEM OVERVIEW  9

UNIT II  PROCESS MANAGEMENT  9

UNIT III  MEMORY MANAGEMENT  9

UNIT IV  DEVICE MANAGEMENT AND FILE SYSTEMS  9

UNIT V  MODERN OPERATING SYSTEMS  9
Concepts of distributed operating systems – Real time operating system – Case studies: UNIX, LINUX and Windows 2000.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCE BOOKS:
AIM
To have fundamental knowledge about structure and V-I characteristics of PN Junction diode, Zener diode, MOSFET, BJT, Opto electronic devices, high frequency devices and high power devices.

OBJECTIVES
- To learn crystal structures of elements used for fabrication of semiconductor devices.
- To study energy band structure of semiconductor devices.
- To understand fermi levels, movement of charge carriers, Diffusion current and Drift current.
- To study behavior of semiconductor junction under different biasing conditions. Fabrication of different semiconductor devices, Varactor diode, Zener diode, Schottky diode, BJT, MOSFET, etc.
- To study VI Characteristics of devices and its limitations in factors like current, power frequency.
- To learn photoelectric effect and fabrication of opto electronic devices.
- To learn high frequency and high power devices.

UNIT I CRYSTAL PROPERTIES AND GROWTH OF SEMICONDUCTORS

UNIT II ENERGY BANDS AND CHARGE CARRIERS IN SEMICONDUCTORS AND JUNCTIONS

UNIT III METAL OXIDE SEMICONDUCTOR FET
GaAS MESFET - High Electron Mobility Transistor - Short channel Effects - Metal Insulator Semiconductor FET - Basic Operation and Fabrication - Effects of Real Surfaces - Threshold Voltage - MOS capacitance Measurements - current - Voltage Characteristics of MOS Gate Oxides - MOS Field Effect Transistor - Output characteristics - Transfer characteristics - Short channel MOSFET V-I characteristics - Control of Threshold Voltage - Substrate Bias Effects - Sub threshold characteristics - Equivalent Circuit for MOSFET - MOSFET Scaling and Hot Electron Effects - Drain - Induced Barrier Lowering - short channel and Narrow Width Effect - Gate Induced Drain Leakage.
UNIT IV  OPTOELECTRONIC DEVICES  9
Photodiodes - Current and Voltage in illuminated Junction - Solar Cells - Photo detectors
- Noise and Bandwidth of Photo detectors - Light Emitting Diodes - Light Emitting
Materials - Fiber Optic Communications Multilayer Heterojunctions for LEDs - Lasers
- Semiconductor lasers - Population Inversion at a Junction Emission Spectra for p-n
junction - Basic Semiconductor lasers - Materials for Semiconductor lasers.

UNIT V  HIGH FREQUENCY AND HIGH POWER DEVICES  9
Tunnel Diodes, IMPATT Diode, operation of TRAPATT and BARITT Diodes, Gunn Diode
- transferred - electron mechanism, formation and drift of space charge domains, p-n-p-
 n Diode, Semiconductor Controlled Rectifier, Insulated Gate Bipolar Transistor.

TOTAL : 45 PERIODS

TEXT BOOK:

REFERENCES:
3. Nandita Das Gupta & Aamitava Das Gupta, Semiconductor Devices Modeling a

PTIT2064  SPEECH PROCESSING  L T P C
3 0 0 3

AIM
To introduce the characteristics of Speech signals and the related time and frequency
domain methods for speech analysis and speech compression

OBJECTIVE
• To introduce the models for speech production
• To develop time and frequency domain techniques for estimating speech parameters
• To introduce a predictive technique for speech compression
• To understand speech recognition, synthesis and speaker identification.

UNIT I  MECHANICS OF SPEECH  9
Speech production: Mechanism of speech production, Acoustic phonetics - Digital models
for speech signals - Representations of speech waveform: Sampling speech signals,
basics of quantization, delta modulation, and Differential PCM - Auditory perception:
psycho acoustics.

UNIT II  TIME DOMAIN METHODS FOR SPEECH PROCESSING  9
Time domain parameters of Speech signal – Methods for extracting the parameters
Energy, Average Magnitude, Zero crossing Rate – Silence Discrimination using ZCR and
energy – Short Time Auto Correlation Function – Pitch period estimation using Auto
Correlation Function.
UNIT III FREQUENCY DOMAIN METHOD FOR SPEECH PROCESSING 9

UNIT IV LINEAR PREDICTIVE ANALYSIS OF SPEECH 9

UNIT V APPLICATION OF SPEECH & AUDIO SIGNAL PROCESSING 9

TOTAL : 45 PERIODS

TEXT BOOK:

REFERENCES:

PTMA2264 NUMERICAL METHODS L T P C
3 0 0 3

AIM
With the present development of the computer technology, it is necessary to develop efficient algorithms for solving problems in science, engineering and technology. This course gives a complete procedure for solving different kinds of problems occur in engineering numerically.

OBJECTIVES
At the end of the course, the students would be acquainted with the basic concepts in numerical methods and their uses are summarized as follows:
   i. The roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigen value problem of a matrix can be obtained numerically where analytical methods fail to give solution.
ii. When huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial to represent the data and to find the intermediate values.

iii. The numerical differentiation and integration find application when the function in the analytical form is too complicated or the huge amounts of data are given such as series of measurements, observations or some other empirical information.

iv. Since many physical laws are couched in terms of rate of change of one/two or more independent variables, most of the engineering problems are characterized in the form of either nonlinear ordinary differential equations or partial differential equations. The methods introduced in the solution of ordinary differential equations and partial differential equations will be useful in attempting any engineering problem.

UNIT I  SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS  9

UNIT II  INTERPOLATION AND APPROXIMATION  9
Lagrangean Polynomials – Divided differences – Interpolating with a cubic spline – Newton’s forward and backward difference formulas.

UNIT III  NUMERICAL DIFFERENTIATION AND INTEGRATION  9

UNIT IV  INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS  9

UNIT V  BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS  9
Finite difference solution of second order ordinary differential equation – Finite difference solution of one dimensional heat equation by explicit and implicit methods – One dimensional wave equation and two dimensional Laplace and Poisson equations.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCE BOOKS:
UNIT I  INTRODUCTION TO MULTIPROCESSORS AND SCALABILITY ISSUES

UNIT II  PARALLEL PROGRAMMING

UNIT III  OPENMP PROGRAMMING

UNIT IV  MPI PROGRAMMING
MPI Model – collective communication – data decomposition – communicators and topologies – point-to-point communication – MPI Library.

UNIT V  MULTITHREADED APPLICATION DEVELOPMENT
Algorithms, program development and performance tuning.

TOTAL : 45 PERIODS

TEXT BOOK:
2. Michael J Quinn, Parallel programming in C with MPI and OpenMP, Tata Mcgraw Hill, 2003.

REFERENCES:
AIM
To learn the architecture and programming of advanced microprocessors.

OBJECTIVES
- To introduce the concepts of advanced microprocessors.
- To introduce the programming techniques using MASM, DOS and BIOS function calls.
- To introduce the basic architecture of Pentium family of processors.
- To introduce the architecture programming and interfacing of advanced microprocessors.
- To introduce the concepts and architecture of RISC processor.

UNIT I 80186, 80286, 80386 AND 80486 MICROPROCESSORS

UNIT II PENTIUM MICROPROCESSORS

UNIT III RISC PROCESSORS I

UNIT IV RISC PROCESSORS II (Superscalar Processors)

UNIT V PC HARDWARE OVERVIEW
Functional Units & Interconnection, New Generation Mother Boards 286 to Pentium 4 Bus Interface- ISA- EISA- VESA- PCI- PCIX. Peripheral Interfaces and Controller, Memory and I/O Port Addresses.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
AIM
To learn the basics of Internetworking, Routing, World Wide Web, Java Programming with simple case studies.

OBJECTIVES
- To learn Internetworking with TCP/IP.
- To learn routing for high speed multimedia traffic
- To learn the fundamentals in WWW, HTML and XML.
- To learn Java for Networking application
- To understand the basic concepts in E-com, Network operating system and Web design.

UNIT I  INTERNETWORKING WITH TCP / IP
Review of network technologies, Internet addressing, Address resolution protocols (ARP / RARP), Routing IP datagrams, Reliable stream transport service (TCP) TCP / IP over ATM networks, Internet applications - E-mail, Telnet, FTP, NFS, Internet traffic management.

UNIT II  INTERNET ROUTING
Concepts of graph theory, Routing protocols, Distance vector protocols (RIP), Link state protocol (OSPP), Path vector protocols (BGP and IDRP), Routing for high speed multimedia traffic, Multicasting, Resource reservation (RSVP), IP switching.

UNIT III  WORLD WIDE WEB
HTTP protocol, Web browsers netscape, Internet explorer, Web site and Web page design, HTML, Dynamic HTML, CGI, Java script.

UNIT IV  INTRODUCTION TO JAVA
The java programming environment, Fundamental Programming structures, Objects and Classes, Inheritance, Event handling, Exceptions and Debugging, Multithreading, RMI.

UNIT V  JAVA PROGRAMMING
Networking with Java, Swing: Applets and Applications, Menu’s & Tool Bars, Java and XML – Creating packages, Interfaces, JAR files & Annotations, Javabeans, JDBC.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
AIM
To introduce the student to various image processing techniques.

OBJECTIVES
- To study the image fundamentals and mathematical transforms necessary for image processing.
- To study the image enhancement techniques
- To study image restoration procedures.
- To study the image compression procedures.
- To study the image segmentation and representation techniques.

UNIT I  DIGITAL IMAGE FUNDAMENTALS
Elements of digital image processing systems, Vidicon and Digital Camera working principles, Elements of visual perception, brightness, contrast, hue, saturation, Mach band effect, Color image fundamentals - RGB, HSI models, Image sampling, Quantization, dither, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT, KLT, SVD.

UNIT II  IMAGE ENHANCEMENT
Histogram equalization and specification techniques, Noise distributions, Spatial averaging, Directional Smoothing, Median, Geometric mean, Harmonic mean, Contra harmonic mean filters, Homomorphic filtering, Color image enhancement.

UNIT III  IMAGE RESTORATION

UNIT IV  IMAGE SEGMENTATION

UNIT V  IMAGE COMPRESSION
Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, Vector Quantization, Transform coding, JPEG standard, MPEG.

TOTAL : 45 PERIODS

TEXT BOOK:

REFERENCES:
AIM
To introduce the student to advanced digital signal processing techniques.

OBJECTIVES
- To study the parametric methods for power spectrum estimation.
- To study adaptive filtering techniques using LMS algorithm and to study the applications of adaptive filtering.
- To introduce the student to wavelet transforms.

UNIT I DISCRETE RANDOM PROCESS

UNIT II SPECTRAL ESTIMATION
Bias and Consistency, Periodogram, Modified periodogram, Blackman-Tukey method, Welch method, Parametric methods of spectral estimation, Levinson-Durbin recursion.

UNIT III LINEAR ESTIMATION AND PREDICTION
Forward and Backward linear prediction, Filtering - FIR Wiener filter- Filtering and linear prediction, non-causal and causal IIR Wiener filters, Discrete Kalman filter.

UNIT IV ADAPTIVE FILTERS

UNIT V ADVANCED TRANSFORM TECHNIQUES
2-D Discrete Fourier transform and properties– Applications to image smoothing and sharpening – Continuous and Discrete wavelet transforms – Multiresolution Analysis – Application to signal compression.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
AIM
To understand different electromagnetic Interference problems occurring in Intersystem and in inter system and their possible mitigation techniques in Electronic design

OBJECTIVES
- To understand EMI Sources, EMI problems and their solution methods in PCB level / Subsystem and system level design.
- To measure the emission, immunity level from different systems to couple with the prescribed EMC standards

UNIT I  BASIC CONCEPTS
Definition of EMI and EMC with examples, Classification of EMI/EMC - CE, RE, CS, RS, Units of Parameters, Sources of EMI, EMI coupling modes - CM and DM, ESD Phenomena and effects, Transient phenomena and suppression.

UNIT II  EMI MEASUREMENTS
Basic principles of RE, CE, RS and CS measurements, EMI measuring instruments-Antennas, LISN, Feed through capacitor, current probe, EMC analyzer and detection technique open area site, shielded anechoic chamber, TEM cell.

UNIT III  EMC STANDARD AND REGULATIONS

UNIT IV  EMI CONTROL METHODS AND FIXES
Shielding, Grounding, Bonding, Filtering, EMI gasket, Isolation transformer, opto isolator.

UNIT V  EMC DESIGN AND INTERCONNECTION TECHNIQUES
Cable routing and connection, Component selection and mounting, PCB design- Trace routing, Impedance control, decoupling, Zoning and grounding

TOTAL : 45 PERIODS

TEXT BOOKS

REFERENCES
AIM
To highlight the features of different technologies involved in High Speed Networking and their performance.

OBJECTIVES
- Students will get an introduction about ATM and Frame relay.
- Students will be provided with an up-to-date survey of developments in High Speed Networks.
- Enable the students to know techniques involved to support real-time traffic and congestion control.
- Students will be provided with different levels of quality of service (Q.S) to different applications.

UNIT I HIGH SPEED NETWORKS

UNIT II CONGESTION AND TRAFFIC MANAGEMENT

UNIT III TCP AND ATM CONGESTION CONTROL

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES
Integrated Services Architecture – Approach, Components, Services- Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ – Random Early Detection, Differentiated Services

UNIT V PROTOCOLS FOR QOS SUPPORT

TOTAL : 45 PERIODS

TEXT BOOK:

REFERENCES:
AIM
Application of Electronic knowledge in industry for rectification of polyphase supply voltage and for control of motor speed and for thermal heating.

OBJECTIVES
- To study about power electronic circuits for voltage and current control and protection.
- To learn the switching characteristics of transistors and SCRs. Series and parallel functions of SCRs, Programmable triggering methods of SCR.
- To learn controlled rectification AC supplies.
- To study of converters and inverters.
- To learn about motor control, charges, SMPS and UPS.

UNIT I  POWER ELECTRONICS DEVICES
9

UNIT II  TRIGGERING TECHNIQUES
9
Turn on circuits for SCR – triggering with single pulse and train of pulses – synchronizing with supply – triggering with microprocessor – forced commutation – different techniques – series and parallel operations of SCRs.

UNIT III  CONTROLLED RECTIFIERS
9

UNIT IV  INVERTERS
9
Voltage and current source inverters, resonant, Series inverter, PWM inverter. AC and DC choppers – DC to DC converters – Buck, boost and buck – boost.

UNIT V  INDUSTRIAL APPLICATIONS
9

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
AIM
Television Technology has now become a vital tool to the information revolution that is sweeping across the countries of the world. The syllabus aims at a comprehensive coverage of Television Systems with all the new developments in Television Engineering.

OBJECTIVES
- To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver Picture Tubes and Television Camera Tubes.
- To study the principles of Monochrome Television Transmitter and Receiver systems.
- To study the various Color Television systems with a greater emphasis on PAL system.
- To study the advanced topics in Television systems and Video Engineering.

UNIT I  FUNDAMENTALS OF TELEVISION

UNIT II  MONOCHROME TELEVISION TRANSMITTER AND RECEIVER

UNIT III  ESSENTIALS OF COLOUR TELEVISION

UNIT IV  COLOUR TELEVISION SYSTEMS
UNIT V ADVANCED TELEVISION SYSTEMS
Satellite TV technology-Geo Stationary Satellites-Satellite Electronics-Domestic Broadcast System-Cable TV-Cable Signal Sources-Cable Signal Processing, Distribution & Scrambling- Video Recording-VCR Electronics-Video Home Formats-Video Disc recording and playback-DVD Players-Tele Text Signal coding and broadcast receiver-Digital television-Transmission and reception–Projection television-Flat panel display TV receivers-LCD and Plasma screen receivers-3DTV-EDTV.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:

PTCS2053 SOFT COMPUTING L T P C
UNIT I FUZZY SET THEORY 10

UNIT II OPTIMIZATION 8

UNIT III ARTIFICIAL INTELLIGENCE 10

UNIT IV NEURO FUZZY MODELING 9

50
UNIT V  APPLICATIONS OF COMPUTATIONAL INTELLIGENCE  

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

PTGE2022  TOTAL QUALITY MANAGEMENT  L T P C
3 0 0 3

UNIT I  INTRODUCTION

UNIT II  TQM PRINCIPLES
Leadership – Strategic quality planning, Quality statements - Customer focus – Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement – PDSA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier rating.

UNIT III  TQM TOOLS & TECHNIQUES I

UNIT IV  TQM TOOLS & TECHNIQUES II
UNIT V  QUALITY SYSTEMS

TOTAL : 45 PERIODS

TEXT BOOK:

REFERENCE BOOKS:

PTEC2035  CRYPTOGRAPHY AND NETWORK SECURITY  L T P C
3 0 0 3

AIM
To understand the principles of encryption algorithms; conventional and public key cryptography. To have a detailed knowledge about authentication, hash functions and application level security mechanisms.

OBJECTIVES
- To know the methods of conventional encryption.
- To understand the concepts of public key encryption and number theory
- To understand authentication and Hash functions.
- To know the network security tools and applications.
- To understand the system level security used.

UNIT I  INTRODUCTION

UNIT II  PUBLIC KEY CRYPTOGRAPHY
UNIT III  AUTHENTICATION AND HASH FUNCTION

UNIT IV  NETWORK SECURITY

UNIT V  SYSTEM LEVEL SECURITY

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:

PTEC2036  INFORMATION THEORY

AIM
To introduce the fundamental concepts of information theory.

OBJECTIVES
- To have a complete understanding of error–control coding.
- To understand encoding and decoding of digital data streams.
- To introduce methods for the generation of these codes and their decoding techniques.
- To have a detailed knowledge of compression and decompression techniques.
- To introduce the concepts of multimedia communication.

UNIT I  QUANTITATIVE STUDY OF INFORMATION
Basic inequalities, Entropy, Kullback-Leibler distance, Mutual information, Bounds on entropy, Fisher information , Cramer Rao inequality, Second law of thermodynamics , Sufficient statistic , Entropy rates of a Stochastic process
UNIT II  
CAPACITY OF NOISELESS CHANNEL  
Fundamental theorem for a noiseless channel ,Data compression , Kraft inequality , 
Shannon-Fano codes , Huffman codes , Asymptotic equipartition , Rate distortion theory

UNIT III  
CHANNEL CAPACITY  
Properties of channel capacity , Jointly typical sequences , Channel Coding Theorem, 
converse to channel coding theorem, Joint source channel coding theorem ,

UNIT IV  
DIFFERENTIAL ENTROPY AND GAUSSIAN CHANNEL  
AEP for continuous random variables, relationship between continuous and discrete 
entropy, properties of differential entropy, Gaussian channel definitions, converse to 
coding theorem for Gaussian channel, channels with colored noise, Gaussian channels 
with feedback .

UNIT V  
NETWORK INFORMATION THEORY  
Gaussian multiple user channels , Multiple access channel , Encoding of correlated 
sources , Broadcast channel , Relay channel , Source coding and rate distortion with side 
information , General multi-terminal networks.

TOTAL : 45 PERIODS

TEXT BOOK:

REFERENCE:
1.  Information theory, inference & learning algorithms – David Mackay  year?

PTEC2037  
MULTIMEDIA COMPRESSION AND COMMUNICATION  
L T P C  
3 0 0 3

AIM
To introduce the fundamental concepts of information theory.

OBJECTIVES
- To have a complete understanding of error–control coding.
- To understand encoding and decoding of digital data streams.
- To introduce methods for the generation of these codes and their decoding 
techniques.
- To have a detailed knowledge of compression and decompression techniques.
- To introduce the concepts of multimedia communication.

UNIT I  
MULTIMEDIA COMPONENTS  
Introduction - Multimedia skills - Multimedia components and their chacracteristics - Text, 
sound, images, graphics, animation, video, hardware.

UNIT II  
AUDIO AND VIDEO COMPRESSION  
coding-code excited LPC-perpetual coding Video compression –principles-H.261-H.263-
MPEG 1, 2, 4.
UNIT III TEXT AND IMAGE COMPRESSION 9
Compression principles-source encoders and destination encoders-lossless and lossy compression-entropy encoding –source encoding -text compression –static Huffman coding dynamic coding –arithmetic coding –Lempel ziv-welsh Compression-image compression

UNIT IV VOIP TECHNOLOGY 9
Basics of IP transport, VoIP challenges, H.323/ SIP –Network Architecture, Protocols, Call establishment and release, VoIP and SS7, Quality of Service- CODEC Methods-VOIP applicability

UNIT V MULTIMEDIA NETWORKING 9
Multimedia networking -Applications-streamed stored and audio-making the best Effort service-protocols for real time interactive Applications-distributing multimedia-beyond best effort service-secluding and policing Mechanisms-integrated services-differentiated Services-RSVP.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
1. Marcus goncalves “Voice over IP Networks”, Mcgaraw hill

PTEC2038 NANO ELECTRONICS L T P C
3 0 0 3

UNIT I INTRODUCTION TO NANOTECHNOLOGY 9

UNIT II FUNDAMENTALS OF NANOELECTRONICS 9
UNIT III SILICON MOSFETs & QUANTUM TRANSPORT DEVICES

UNIT IV CARBON NANOTUBES

UNIT V MOLECULAR ELECTRONICS

TOTAL: 45 PERIODS

TEXT BOOKS
2. T.Pradeep, NANO: The Essentials - Understanding Nanoscience and Nanotechnology, TMH, 2007

PTEC2039 PARALLEL AND DISTRIBUTED PROCESSING

AIM:
To learn the concepts of parallel processing and distributed computing bringing out the differences among various architectures and systems.

OBJECTIVES:
- To introduce parallel processing and parallel architectures
- To introduce the concepts of shared memory based and thread based implementations.
- To learn the two modes of distributed computing using message passing and remote procedure calls.
- To learn introductory techniques of parallel debugging, and be introduced to other parallel paradigms.
- To introduce basic concepts of distributed data bases and distributed operating systems.
UNIT I INTRODUCTION TO PARALLEL PROCESSING AND PARALLEL ARCHITECTURES
Need and definition of parallel processing, shared memory multiprocessing, Distributed memory, using parallelism, tools and languages, Parallelism in sequential machines, Multiprocessor architecture, Pipelining, Array processors.

UNIT II SHARED MEMORY PROGRAMMING AND THREAD BASED IMPLEMENTATION
Shared Memory Programming and its general model, Process model under UNIX, Thread management, Example with threads, Attributes of Threads, Mutual Exclusion with threads and Thread implementation.

UNIT III DISTRIBUTED COMPUTING – MESSAGE PASSING AND RPC MODEL
Message-passing model, General model, programming model, PVM, Remote procedure calls (RPC), Parameter passing, JAVA Remote Method Invocation, Distributed computing environment(DCE), Developing Applications in DCE.

UNIT IV DEBUGGING PARALLEL PROGRAMS AND OTHER PARALLELISM PARADIGMS
Debugging Techniques, Debugging Message passing parallel programs and shared memory parallel programs, Dataflow computing, systolic architectures, functional and logic paradigms, distributed shared memory.

UNIT V DISTRIBUTED DATABASES AND DISTRIBUTED OPERATING SYSTEMS
Reasons for and objectives of distributed databases, issues and systems, distribution options, concurrency control, DDBMS structure. Need for Distributed operating systems, network operating systems, distributed OS, Goals of DOS and Design issues.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
UNIT I  INTRODUCTION

UNIT II  RADIO NAVIGATION
Types of Radio Navigation – ADF, DME, VOR, LORAN, DECCA, OMEGA. ILS, MLS

UNIT III  INERTIAL AND SATELLITE NAVIGATION SYSTEMS
Inertial sensors – Gyroscopes, Accelerometers, Inertial navigation systems – Block diagram, Platform and strap down INS. Satellite Navigation - GPS

UNIT IV  AIR DATA SYSTEMS AND AUTOPILOT
Air data quantities – Altitude, Airspeed, Mach no., Vertical speed, Total Air temperature, Stall warning, Altitude warning. Autopilot – basic principles – longitudinal and lateral autopilot.

UNIT V  AIRCRAFT DISPLAYS
Display technologies – LED, LCD, CRT, Flat Panel Display. Primary Flight parameter displays - Head Up Display, Helmet Mounted Display, Night vision goggles, Head Down Display, MFD, MFK, Virtual cockpit.

TOTAL : 45 PERIODS

TEXTBOOKS:

REFERENCES:
UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V
Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
UNIT I  ENGINEERING ETHICS

UNIT II  ENGINEERING AS SOCIAL EXPERIMENTATION
Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – The Challenger Case Study

UNIT III  ENGINEER’S RESPONSIBILITY FOR SAFETY

UNIT IV  RESPONSIBILITIES AND RIGHTS

UNIT V  GLOBAL ISSUES

TOTAL : 45 PERIODS

TEXT BOOKS :

REFERENCES :
AIM
To give sufficient background for undertaking embedded and real time systems design.

OBJECTIVES
- To introduce students to the embedded systems, its hardware and software.
- To introduce devices and buses used for embedded networking.
- To explain programming concepts and embedded programming in C and C++.
- To explain real time operating systems and inter-task communication.

UNIT I  INTRODUCTION TO EMBEDDED COMPUTING
Complex systems and microprocessors – Design example: Model train controller – Embedded system design process – Formalism for system design – Instruction sets Preliminaries – ARM Processor – CPU: Programming input and output – Supervisor mode, exception and traps – Coprocessor – Memory system mechanism – CPU performance – CPU power consumption.

UNIT II  COMPUTING PLATFORM AND DESIGN ANALYSIS
CPU buses – Memory devices – I/O devices – Component interfacing – Design with microprocessors – Development and Debugging – Program design – Model of programs – Assembly and Linking – Basic compilation techniques – Analysis and optimization of execution time, power, energy, program size – Program validation and testing.

UNIT III  PROCESS AND OPERATING SYSTEMS

UNIT IV  HARDWARE ACCELERATES & NETWORKS
Accelerators – Accelerated system design – Distributed Embedded Architecture – Networks for Embedded Systems – Network based design – Internet enabled systems.

UNIT V  CASE STUDY
Hardware and software co-design - Data Compressor - Software Modem – Personal Digital Assistants – Set–Top–Box. – System-on-Silicon – FOSS Tools for embedded system development.

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCE BOOKS:
PTEC2043  WIRELESS NETWORKS  L T P C  3 0 0 3

AIM
To study some fundamental concepts in wireless networks.

OBJECTIVES
- To understand physical as wireless MAC layer alternatives techniques.
- To learn planning and operation of wireless networks.
- To study various wireless LAN and WAN concepts.
- To understand WPAN and geo-location systems.

UNIT I  MULTIPLE RADIO ACCESS  9

UNIT II  WIRELESS WANS  9

UNIT III  WIRELESS LANS  9
Introduction to wireless LANs - IEEE 802.11 WLAN – Architecture and Services, Physical Layer- MAC sublayer- MAC Management Sublayer, Other IEEE 802.11 standards, HIPERLAN, WiMax standard.

UNIT IV  ADHOC AND SENSOR NETWORKS  9
Characteristics of MANETs, Table-driven and Source-initiated On Demand routing protocols, Hybrid protocols, Wireless Sensor networks- Classification, MAC and Routing protocols.

UNIT V  WIRELESS MANs AND PANs  9
Wireless MANs – Physical and MAC layer details, Wireless PANs – Architecture of Bluetooth Systems, Physical and MAC layer details, Standards.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
AIM
To introduce fundamentals functions of a telecom switching office, namely, digital multiplexing, digital switching and digital subscriber access.
To introduce a mathematical model for the analysis of telecommunication traffic.

OBJECTIVES
- To introduce the concepts of Frequency and Time division multiplexing.
- To introduce digital multiplexing and digital hierarchy namely SONET / SDH
- To introduce the concepts of space switching, time switching and combination switching, example of a switch namely No.4 ESS Toll switch.
- To introduce the need for network synchronization and study synchronization issues. To outline network control and management issues.
- To study the enhanced local loop systems in digital environment. To introduce ISDN, DSL / ADSL, and fiber optic systems in subscriber loop.
- To introduce statistical modeling of telephone traffic. To study blocking system characteristics and queuing system characteristics.
- To characterize blocking probability holding service time distributions for in speech and data networks.

UNIT I  MULTIPLEXING

UNIT II  DIGITAL SWITCHING
Switching Functions, Space Division Switching, Time Division Switching, two-dimensional Switching: STS Switching, TST Switching, No.4 ESS Toll Switch, Digital Cross-Connect Systems, Digital Switching in an Analog Environment. Elements of SS7 signaling.

UNIT III  NETWORK SYNCHRONIZATION CONTROL AND MANAGEMENT

UNIT IV  DIGITAL SUBSCRIBER ACCESS

UNIT V  TRAFFIC ANALYSIS

TOTAL: 45 PERIODS
TEXTBOOKS:

REFERENCES:

PTEC2045 SATELLITE COMMUNICATION L T P C
3 0 0 3

AIM
To enable the student to become familiar with satellites and satellite services.

OBJECTIVES
- Overview of satellite systems in relation to other terrestrial systems.
- Study of satellite orbits and launching.
- Study of earth segment and space segment components.
- Study of satellite access by various users.
- Study of DTH and compression standards.

UNIT I SATELLITE ORBITS

UNIT II SPACE SEGMENT AND SATELLITE LINK DESIGN
Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget, E/N calculation- performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations- System reliability and design lifetime.

UNIT III SATELLITE ACCESS
Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Brocast, multiple access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum communication, compression – encryption

UNIT IV EARTH SEGMENT
Earth Station Technology-- Terrestrial Interface, Transmitter and Receiver, Antenna Systems TVRO, MATV, CATV, Test Equipment Measurements on G/T, C/No, EIRP, Antenna Gain.
UNIT V  SATELLITE APPLICATIONS

INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)- Worldspace services, Business TV(BTV), GRAMSAT, Specialized services – E-mail, Video conferencing, Internet

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:

PTEC2046  ADVANCED ELECTRONIC SYSTEM DESIGN

AIM
To get knowledge about usage of electronic devices in Communication Engineering and Power supplies.

OBJECTIVES
• To study RF component such as resonator, filter, transmission lines, etc…
• To learn design of RF amplifiers using transistors.
• To study modern Power Supplies using SCR and SMPS technology
• To learn about signal shielding & grounding techniques and study of A/D and D/A Converters.
• To learn knowledge about fabrication of PCBs using CAD.

UNIT I  INTRODUCTION TO RF DESIGN
UNIT II RF TRANSISTOR AMPLIFIER DESIGN 9
Impedance matching using discrete components. Microstrip line matching networks. Amplifier classes of operation and biasing networks – Amplifier power gain, Unilateral design($S_{12}=0$) – Simple input and output matching networks – Bilateral design - Stability circle and conditional stability, Simultaneous conjugate matching for unconditionally stable transistors. Broadband amplifiers, High power amplifiers and multistage amplifiers.

UNIT III DESIGN OF POWER SUPPLIES 9
DC power supply design using transistors and SCRs, Design of crowbar and foldback protection circuits, Switched mode power supplies, Forward, flyback, buck and boost converters, Design of transformers and control circuits for SMPS.

UNIT IV DESIGN OF DATA ACQUISITION SYSTEMS 9
Amplification of Low level signals, Grounding, Shielding and Guarding techniques, Dual slope, quad slope and high speed A/D converters, Microprocessors Compatible A/D converters, Multiplying A/D converters and Logarithmic A/D converters, Sample and Hold, Design of two and four wire transmitters.

UNIT V DESIGN OF PRINTED CIRCUIT BOARDS 9
Introduction to technology of printed circuit boards (PCB), General lay out and rules and parameters, PCB design rules for Digital, High Frequency, Analog, Power Electronics and Microwave circuits, Computer Aided design of PCBs.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
AIM
To learn different types of optical emission, detection, modulation and opto electronic integrated circuits and their applications.

OBJECTIVES
- 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 their applications.
- To learn the principle of optical detection mechanism in different detection devices.
- To understand different light modulation techniques and the concepts and applications of optical switching.
- To study the integration process and application of opto electronic integrated circuits in transmitters and receivers.

UNIT I ELEMENTS OF LIGHT AND SOLID STATE PHYSICS

UNIT II DISPLAY DEVICES AND LASERS

UNIT III OPTICAL DETECTION DEVICES
Photo detector, Thermal detector, Photo Devices, Photo Conductors, Photo diodes, Detector Performance.

UNIT IV OPTOELECTRONIC MODULATOR

UNIT V OPTOELECTRONIC INTEGRATED CIRCUITS
Introduction, hybrid and Monolithic Integration, Application of Opto Electronic Integrated Circuits, Integrated transmitters and Receivers, Guided wave devices.

TOTAL : 45 PERIODS

TEXTBOOK

REFERENCES
AIM
To model the random variables and random process applied to telecommunication system and to learn the methods of system simulation and performance evaluation.

OBJECTIVES
- To learn simulation of random variables and random process
- To learn modeling of radio communication channels
- To understand various simulation techniques
- To understand simulation methodologies and performance evaluation
- To analyse some digital communication optical communication and satellite communication techniques as case studies through simulation.

UNIT I SIMULATION METHODOLOGY
Introduction, Aspects of methodology, Performance Estimation, Sampling frequency, Low pass equivalent models for bandpass signals, multicarrier signals, Non-linear and time varying systems, Post processing, Basic Graphical techniques and estimations

UNIT II SIMULATION OF RANDOM VARIABLES RANDOM PROCESS
Generation of random numbers and sequence, Guassian and uniform random numbers Correlated random sequences, Testing of random numbers generators, Stationary and uncorrelated noise, Goodness of fit test.

UNIT III MODELING OF COMMUNICATION SYSTEMS
Radio frequency and optical sources, Analog and Digital signals, Communication channel and models, Free space channels, Multipath channel and discrete channel noise and interference.

UNIT IV ESTIMATION OF PERFORMANCE MEASURE FOR SIMULATION
Quality of estimator, Estimation of SNR, Probability density function and bit error rate, Monte Carlo method, Importance sampling method, Extreme value theory.

UNIT V SIMULATION AND MODELING METHODOLOGY
Simulation environment, Modeling considerations, Performance evaluation techniques, error source simulation, Validation.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
AIM
To make the student understand the principles of Radar and its use in military and civilian environment.
Also to make the student familiar with navigational aids available for navigation of aircrafts and ships.

OBJECTIVES
- To derive and discuss the Range equation and the nature of detection.
- To apply Doppler principle to radars and hence detect moving targets, cluster, also to understand tracking radars.
- To refresh principles of antennas and propagation as related to radars, also study of transmitters and receivers.
- To understand principles of navigation, in addition to approach and landing aids as related to navigation.
- To understand navigation of ships from shore to shore.

UNIT I INTRODUCTION TO RADAR
Basic Radar — The simple form of the Radar Equation— Radar Block Diagram— Radar Frequencies — Applications of Radar — The Origins of Radar

THE RADAR EQUATION

UNIT II MTI AND PULSE DOPPLER RADAR

UNIT III DETECTION OF SIGNALS IN NOISE

Radar Transmitters: Introduction — Linear Beam Power Tubes — Solid State RF Power Sources — Magnetron — Crossed Field Amplifiers — Other RF Power Sources — Other aspects of Radar Transmitter.

Radar Receivers — The Radar Receiver — Receiver noise Figure — Superheterodyne Receiver — Duplexers and Receiver Protectors— Radar Displays.
UNIT IV


Radio Ranges - The LF/MF Four course Radio Range - VHF Omni Directional Range(VOR) - VOR Receiving Equipment - Range and Accuracy of VOR - Recent Developments.


UNIT V

DME and TACAN
Distance Measuring Equipment - Operation of DME - TACAN - TACAN Equipment

Aids to Approach and Landing - Instrument Landing System - Ground Controlled Approach System - Microwave Landing System(MLS)


Satellite Navigation System - The Transit System - Navstar Global Positioning System (GPS)

TOTAL : 45 PERIODS

TEXTBOOK

REFERENCES

PTEC2050 MOBILE ADHOC NETWORKS L T P C
3 0 0 3

UNIT I

INTRODUCTION
Introduction to adhoc networks - definition, characteristics features, applications. Characteristics of Wireless channel, Adhoc Mobility Models.- Indoor and out door models.

UNIT II

MEDIUM ACCESS PROTOCOLS
MAC Protocols: design issues, goals and classification. Contention based protocols- with reservation, scheduling algorithms, protocols using directional antennas. IEEE standards: 802.11a, 802.11b, 802.11g, 802.15. HIPERLAN.
UNIT III NETWORK PROTOCOLS 9

UNIT IV END-TO-END DELIVERY AND SECURITY 9

UNIT V CROSS LAYER DESIGN AND INTEGRATION OF ADHOC FOR 4G 9
Cross layer Design: Need for cross layer design, cross layer optimization, parameter optimization techniques, Cross layer cautionary prespective. Intergration of adhoc with Mobile IP networks.

TOTAL : 45 PERIODS

TEXT BOOKS:
1. C.Siva Ram Murthy and B.S.Manoj, Ad hoc Wireless Networks Architectures and protocols, 2nd edition, Pearson Education. 2007

REFERENCES:
4. A survey of integrating IP mobility protocols and Mobile Ad hoc networks, Fekri M.
5. Abduljalil and Shrikant K. Bodhe, IEEE communication Survey and tutorials, v 9.no.1 2007
UNIT III NETWORKING SENSORS

UNIT IV INFRASTRUCTURE ESTABLISHMENT
Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

UNIT V SENSOR NETWORK PLATFORMS AND TOOLS

TEXT BOOKS:

REFERENCES:

PTEC2052 REMOTE SENSING L T P C
3 0 0 3

UNIT I REMOTE SENSING

UNIT II EMR INTERACTION WITH ATMOSPHERE AND EARTH MATERIALS
UNIT III  OPTICAL AND MICROWAVE REMOTE SENSING  9
Satellites - Classification – Based on Orbits and Purpose – Satellite Sensors - Resolution
– Description of Multi Spectral Scanning – Along and Across Track Scanners –
Description of Sensors in Landsat, SPOT, IRS series – Current Satellites - Radar –
Radiometer – Geometrical characteristics ; Sonar remote sensing systems.

UNIT IV  GEOGRAPHIC INFORMATION SYSTEM  9
GIS – Components of GIS – Hardware, Software and Organisational Context – Data –
Spatial and Non-Spatial – Maps – Types of Maps – Projection – Types of Projection -
Data Input – Digitizer, Scanner – Editing – Raster and Vector data structures –
Comparison of Raster and Vector data structure – Analysis using Raster and Vector data –
Retrieval, Reclassification, Overlaying, Buffering – Data Output – Printers and Plotters

UNIT V  MISCELLANEOUS TOPICS  9
Visual Interpretation of Satellite Images – Elements of Interpretation - Interpretation Keys
Characteristics of Digital Satellite Image – Image enhancement – Filtering – Classification -
Integration of GIS and Remote Sensing – Application of Remote Sensing and GIS –
Urban Applications- Integration of GIS and Remote Sensing – Application of Remote
Sensing and GIS – Water resources – Urban Analysis – Watershed Management –

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
6. Floyd F. Sabins, Remote sensing, “Principles and interpretation”, W H Freeman and
Company 1996.
AIM
This course aims at providing an overview of engineering acoustics.

OBJECTIVES
- To provide mathematical basis for acoustics waves
- To introduce the concept of radiation reception absorption and attenuation of acoustic waves.
- To present the characteristic behaviour of sound in pipes, resonators and filters.
- To introduce the properties of hearing and speech
- To describe the architecture and environmental inclusive of reverberation and noise.
- To give a detailed study on loud speakers and microphones.

UNIT I  ACOUSTICS WAVES
Reflection and Transmission: Transmission from one fluid to another normal and oblique incidence – method of images.

UNIT II  RADIATION AND RECEPTION OF ACOUSTIC WAVES
Radiation from a pulsating sphere – Acoustic reciprocity – continuous line source - radiation impedance - Fundamental properties of transducers.
Absorption and attenuation of sound
Absorption from viscosity – complex sound speed and absorption – classical absorption coefficient

UNIT III  PIPES RESONATORS AND FILTERS
Resonance in pipes - standing wave pattern absorption of sound in pipes – long wavelength limit – Helmholtz resonator - acoustic impedance - reflection and transmission of waves in pipe - acoustic filters – low pass, high pass and band pass.
Noise, Signal detection, Hearing and speech

UNIT IV  ARCHITECTURAL ACOUSTICS:
Sound in endosure – A simple model for the growth of sound in a room – reverberation time - Sabine, sound absorption materials – measurement of the acoustic output of sound sources in live rooms – acoustics factor in architectural design.
Environmental Acoustics:
Weighted sound levels speech interference – highway noise – noise induced hearing loss – noise and architectural design specification and measurement of some isolation design of portions.

UNIT V  TRANSDUCTION

TOTAL : 45 PERIODS
TEXT BOOKS:

REFERENCES:

PTEC2054 OPTICAL NETWORKS

UNIT I OPTICAL SYSTEM COMPONENTS

Light propagation in optical fibers – Loss & bandwidth, System limitations, Non-Linear effects; Solitons; Optical Network Components – Couplers, Isolators & Circulators, Multiplexers & Filters, Optical Amplifiers, Switches, Wavelength Converters.

UNIT II OPTICAL NETWORK ARCHITECTURES

Introduction to Optical Networks; SONET / SDH, Metropolitan Area Networks, Layered Architecture; Broadcast and Select Networks – Topologies for Broadcast Networks, Media-Access Control Protocols, Testbeds for Broadcast & Select WDM; Wavelength Routing Architecture.

UNIT III WAVELENGTH ROUTING NETWORKS

The optical layer, Node Designs, Optical layer cost tradeoff, Routing and wavelength assignment, Virtual topology design, Wavelength Routing Testbeds, Architectural variations.

UNIT IV PACKET SWITCHING AND ACCESS NETWORKS


UNIT V NETWORK DESIGN AND MANAGEMENT

Transmission System Engineering – System model, Power penalty - transmitter, receiver, Optical amplifiers, crosstalk, dispersion; Wavelength stabilization; Overall design considerations; Control and Management – Network management functions, Configuration management, Performance management, Fault management, Optical safety, Service interface.

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES: