SCHEME OF EXAMINATION

for

(From Aug’2007 to June’2012)

MASTER OF TECHNOLOGY
[Electronics and Communication Engineering]
WEEKEND PROGRAMME

Offered by

INDIRA GANDHI INSTITUTE OF TECHNOLOGY
(A Constituent college of GGSIP University)
Kashmere Gate Delhi-110006
www.ipu.ac.in

Applicable to batch upto admitted in Aug 2011
Admission Criteria & Eligibility

Admission Criteria:

Admission will be based on the merit list of the candidates in the qualifying examination.

Entry Level: 60% or equivalent in the qualifying examination.

Eligibility/Qualifications:

Group-A

1. B.Tech. / B.E. in Electronics & Communication / Electronics Engineering / Electrical & Electronics or Equivalent
2. M. Sc. in Electronics or equivalent / M.Sc (Physics) with Specialization in Electronics
3. Grad. I E T E / AMIE (ECE)

Group-B*

1. B.Tech./ B.E. in Computer Science & Engineering / Computer Engineering or equivalent
2. B.Tech./ B.E. in Electrical / Instrumentation & Control

Experience:

In addition to above qualification(s), candidates should also have at least one year of professional/teaching experience after completing the qualifying examination as on 30th June.

Merit List:

Merit List will be prepared on the following basis:
1) Percentage of Qualifying degree
2) One Mark per additional year of experience up to maximum of five.

*If the seats from Group A are not filled, then candidates from Group B may be considered

Applicable to batch upto admitted in Aug 2011
## M. Tech
[Electronics and Communication Engineering]
Weekend Programme

### First Semester

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs./Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECW– 601</td>
<td>Digital System Design</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>ECW– 603</td>
<td>Detection and Estimation Theory</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>ECW– 605</td>
<td>Modern Digital communication Systems</td>
<td>3</td>
<td>40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Practicals</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ECW– 651</td>
<td>Digital System Design Lab</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>ECW– 653</td>
<td>Modern Digital Communication System Lab</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>ECW– 655</td>
<td>Term Paper -1 &amp; Expert Lecture*</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

*Non University Exam System

Applicable to batch upto admitted in Aug 2011
### M. Tech
[Electronics and Communication Engineering]
Weekend Programme

#### Second Semester

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs./Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECW – 602</td>
<td>Microelectronics Technology</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>ECW – 604</td>
<td>Advanced Digital signal processing</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>ECW – 606</td>
<td>Optical Fiber Communication systems and Networks</td>
<td>3</td>
<td>40</td>
</tr>
</tbody>
</table>

**Practicals**

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECW – 652</td>
<td>Advanced Digital signal processing Lab</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>ECW – 654</td>
<td>Optical Fiber Communication systems and Networks Lab</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>ECW – 656</td>
<td>Term Paper-II &amp; Expert Lecture</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>16</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Non University Exam System

Applicable to batch upto admitted in Aug 2011
## Third Semester

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs.</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECW – 701</td>
<td>Advanced VLSI Design</td>
<td>3</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>ECW – 703</td>
<td>Digital Mobile Cellular Systems</td>
<td>3</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>ECW – 705</td>
<td>Digital Image processing</td>
<td>3</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td><strong>Practicals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW – 751</td>
<td>Advanced VLSI Design Lab</td>
<td>2</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>ECW – 753</td>
<td>Digital Mobile Cellular Systems Lab</td>
<td>2</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>ECW – 755</td>
<td>Digital Image processing Lab</td>
<td>2</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>ECW – 757</td>
<td>Term Paper – III &amp; Expert Lecture*</td>
<td>3</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>18</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Non University Exam System

Applicable to batch upto admitted in Aug 2011
M. Tech
[Electronics and Communication Engineering]
Weekend Programme

Fourth Semester

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs./Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECW – 702</td>
<td>Industrial Systems</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>ECW – 704</td>
<td>Microwave Integrated Circuits</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>Elective I (choose any one)</td>
<td></td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>ECW – 706</td>
<td>Speech processing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW – 708</td>
<td>Advanced Radiation Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW – 710</td>
<td>Embedded Systems and design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW – 712</td>
<td>Radar and Satellite Communication technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW - 714</td>
<td>Advanced mobile Computing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW- 716</td>
<td>Knowledge Management</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Practicals**

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECW – 752</td>
<td>Elective-I</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>ECW – 754</td>
<td>Microwave Integrated Circuits Lab</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>ECW – 756</td>
<td>Minor Project</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

*Non University Exam System

Applicable to batch upto admitted in Aug 2011
## M. Tech
[Electronics and Communication Engineering]
Weekend Programme

### Fifth Semester

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs./Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECW– 801</td>
<td>Enterprise Resource Planning (ERP) and beyond</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>Elective II (choose any one)</td>
<td></td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>ECW– 803</td>
<td>Quantam computing and Nanotechnology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW– 805</td>
<td>MEMS and Sensor Technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW– 807</td>
<td>Multimedia Technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW– 809</td>
<td>Smart Antennas systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW– 811</td>
<td>Open ended topic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective III (choose any one)</td>
<td></td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>ECW– 817</td>
<td>Network Security</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW– 819</td>
<td>Advanced Computer Communication Networks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW– 821</td>
<td>Virtual Instrumentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW– 823</td>
<td>Soft Computing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW- 825</td>
<td>Artificial Intelligence and expert systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECW-827</td>
<td>Open ended research topic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Practicals**

| ITW – 851  | Elective-II Lab                                 | 2       | 30                    |
| ITW – 853  | Elective-III Lab                                | 2       | 30                    |
| ITW – 855  | Major Project Part-I                             | 4       | -                     |
| **TOTAL**  |                                                 | 17      |                       |

*Non University Exam System

Applicable to batch upto admitted in Aug 2011
M. Tech
[Electronics and Communication Engineering]
Weekend Programme

Sixth Semester

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs./ Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECW – 802</td>
<td>Major Project Part-II/ Dissertation</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td>ECW – 804*</td>
<td>Seminar &amp; Progress Reports</td>
<td>03</td>
<td>-</td>
</tr>
<tr>
<td>ECW– 806*</td>
<td>Comprehensive Viva</td>
<td>03</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>22</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Non University Exam System

**Note:**

1. The total number of credits of the programme M. Tech [Information Technology] = 106
2. Each student shall be required to appear for examinations in all courses. However, for the award of the degree a student shall be required to earn the minimum of 100 credits.

**Note:** Elective course(s) will be offered only if it is opted by 33% of actual strength of the class.

Applicable to batch upto admitted in Aug 2011
Subject: Digital System Design

Paper Code: ECW-601

Total Hrs: 40

Unit-I

Digital System Design Using HDL

10 Hrs

Basic concepts of Hardware Description Languages, Verilog, VHDL, Modelling digital system using Verilog, VHDL. Design and implementation using HDLs, case study.

Unit-II

Programmable Logic Devices

10 Hrs

Introduction to Programmable logic, programmable technologies, JTAG, standardized file formats for programming PLDs FPGAs, Structure of standard PLD, FPGA. Field programmable gate arrays (FPGA), Xilinx FPGA, Actel FPGA,

Unit-III

ASICS

10 Hrs

Introduction to ASICS, library design, logic cells, I/O cells, interconnects. Design software, design entry, logic synthesis, Simulation test. ASIC Construction, floor-planning and placement, Routing.

Unit-IV

Timing Issues In Digital Circuits

10 Hrs

Classification, clock distribution, synchronizers and arbiters. Self timed circuits, clock synthesis, synchronization using PLL. Distributive clocking using DLL. Optical clock distribution.

Recommended Books:

2. The Designers’s guide to VHDL by Peter J Ashenden, 2nd ed, Elsevier

Applicable to batch upto admitted in Aug 2011
M. Tech. (Electronics & Communications Engg.)
SYLLABUS (1st Semester)

Subject : Detection & Estimation Theory
Paper code: ECW-603 Total Hr: 40

Unit-I

Review of Random Process 10 Hrs
Review of Probability Theory, Basic concepts of random processes, random variables, basic concepts from systems theory and stochastic processes, Stationary and non stationary process, correlation function, Ergodicity and power spectral density, transformation random process by linear system, Special random process : white Gaussian noise, Wiener levy, Shot noise, Markov Process

Unit-II

Hypothesis Testing 10 Hrs
Simple binary hypothesis test, Decesion Criteria, Neyman Pearson tests, Bayes Criteria
Multiple hypothesis testing, Composite hypothesis testing

Unit-III

Detection Theory 10 Hrs
Sequential detection Walds test Detection of known signals in white noise, Detection of known signal in colored noise, Maximum SNR Criteria, Detection of signals with unknown parameters

Unit-IV

Estimation Theory 10 Hrs
Bayes Estimation, Real parameter estimation, Maximum likelihood estimation, Cramer Rao Inequality, lower bound on the minimum mean square error in estimating a random parameter, Multiple parameter estimation, types of estimation and errors bounds, General Gaussian problem, EM algorithm, Wiener-Hopf and Kalman filtering. Applications to communication, radar and sonar systems.

Recommended Books :

3. H. V. Poor, An introduction to signal detection and estimation 2nd ed, New York : Springer-Verlag

Applicable to batch upto admitted in Aug 2011
4. M.D. Srinath, R.K. Rajasekaran, and R. Viswanathan, Introduction to Statistical Signal processing with Applications

**M. Tech. (Electronics & Communications Engg.)**

**SYLLABUS (1st Semester)**

Subject: Modern Digital Communication Systems  Total Hrs 40

Paper Code: ECW-605

**Unit-1** 10 Hrs


**Unit-2** 10 Hrs


**Unit-3** 12 Hrs


**Unit-4** 8 Hrs

D S and F H spread spectrum. CDMA system based on FH spread spectrum signals. Synchronization of spread spectrum signals.

**Recommended Books :**

2. S.Lin & D.J.Costello, Error Control Coding (2/e) Pearson, 2005

Applicable to batch upto admitted in Aug 2011
M. Tech. (Electronics & Communications Engg.)

SYLLABUS (II\textsuperscript{nd} Semester)

Subject: Microelectronics Technology

Paper Code: ECW-602 Total Hrs: 40

Unit-I

**IC Fabrication** 15 Hrs


Unit-II

**Yield and Reliability** 05 Hrs

Defects and Contamination. IC failure modes, soft errors, Testing, functionality tests, manufacturing tests, Wire bonding, Flip-chip techniques, Reliability evaluation. Packaging-types and considerations

Unit-III

**MOS Fabrication Process** 10 Hrs

NMOS, PMOS process, control of threshold voltage, Silicon gate technology, isolation and wells. Self aligned MOSFET structure. Short channel MOS structures, DMOS, VMOS. Twin well CMOS process,. Monolithic resistors and capacitors. Silicon On Insulator(SOI)

Unit-IV

**Bipolar IC Technology** 10 Hrs

NPN, PNP fabrication, power transistors, P-N junction isolation, dielectric isolation. Isoplanar and other IC structures, Punch through transistors, Schottky barrier transistors, superbeta transistors. Integrated diodes, Resistors and capacitors. BiCMOS fabrication in an n-well process, Introduction to GaAs technology, doping process, energy band structure, fabrication.

Applicable to batch upto admitted in Aug 2011
Books:

1. VLSI Fabrication Principles by S.K. Ghandhi, John wiley
2. VLSI Technology editor S.M. Sze, Tata. MH

M. Tech. (Electronics & Communications Engg.)
SYLLABUS (II\textsuperscript{nd} Semester)

Subject : Advanced Signal Processing
Paper code: ECW-604
Total Hr : 40

Unit-I

Review of Basic DSP
10 Hrs
Discrete Fourier Transform, linear filtering method based on the DFT, FFT at various radices.
Digital filter design

Multirate Digital Signal
10 Hrs
Decimation, Interpolation Sampling rate conversion by rational factor, Filter design for sampling rate conversion, multistage implementation of sampling rate conversion, sampling rate conversion by an arbitrary factor.

Unit-II

Linear Prediction and Optimum Linear Filters
10 Hrs
Representation of a stationary random process, Forward and Backward linear prediction, solution of normal equations (levinson-durbin), lattice structure, wiener filter for filtering and prediction.

Unit-III

System Modeling and Identification
10 Hrs
System modeling and identification (MA, AR, ARMA), least square filter design for prediction, matrix formulation for least square estimation: SVD, LDU decomposition, Gram-Schmidt orthogonalization, QR decomposition

Unit-IV

Adaptive Filtering
10 Hrs
Least square method –delay line structure, Least Mean Squares(LMS) and Recursive Least square(RLS) algorithms and their convergence performance, Kalman filter Adaptive Direct –Form FIR filters And application of adaptive filters

Applicable to batch upto admitted in Aug 2011
**Books:**


**M. Tech. (Electronics & Communications Engg.)**

**SYLLABUS (II\(^{nd}\) Semester)**

**Subject: Optical Fiber Communication Systems & Networks**

**Paper Code: ECW- 606**

**Total Hrs: 40**

**Unit-1**

10 Hrs


**Unit-II**

12 Hrs


**Unit-III**

08 Hrs


**Unit-IV**

10 Hrs


**Books:**


Applicable to batch upto admitted in Aug 2011
Subject: Advanced VLSI Design          Total Hrs: 40
Paper Code: ECW-701

Unit-I

Semiconductors, junctions and MOSFET overview        10 Hrs
Two terminal MOS structure, flat band condition, three terminal MOS structure, body effect, pinchoff voltage, four terminal MOS structure, general charge sheet models
MOS transistors with ion implanted channels

Unit-II

Small Dimension Effects        10 Hrs
Channel length modulation, barrier lowering, two dimensional charge sharing, short channel devices, narrow channel devices, punch through, hot carrier effects, scaling, surface and drain resistances, effects due to thin oxides and high doping.

Unit-III

Large and Small signal Modelling       10 Hrs
MOS Transistor dynamic operation, evaluation of charges in quasi static operation, transit time under DC conditions, limitations of quasi static model, non-quasi static model, low frequency medium frequency and high frequency small signal models, MOSFET modeling for RF applications

Unit-IV

MOSFET Modelling for circuit Simulation       10 Hrs

Applicable to batch upto admitted in Aug 2011
Types of models, combining several effects into one physical model, parameter extraction, accuracy, properties of good models, considerations and choices, benchmark tests, non technical considerations.

**Recommended Books:**

2. S.M. Sze, Physics of semiconductor devices, John Wiley

---

**M. Tech. (Electronics & Communications Engg.)**

**SYLLABUS (III\textsuperscript{rd} Semester)**

**Subject: Digital Mobile Cellular Systems**

**Paper Code: ECW- 703**

**Total Hrs: 40**

**Unit-I**

10 Hrs


**Unit-II**

10 Hrs


**Unit-III**

10 Hrs


**Unit-IV**

10 Hrs


Applicable to batch upto admitted in Aug 2011
Recommended Books:


2) Theodore S. Rappaport, Wireless Communications Principles & Practice, Pearson Education

3) Jochen Schiller, Mobile Communications, Pearson Education.

4) Raj Pandya, Mobile & Personal Communication Systems And Service, PHI.

M. Tech. (Electronics & Communications Engg.)
SYLLABUS (IIIrd Semester)

Subject: Digital Image Processing

Paper Code: ECW - 705 Total Hrs: 40

Unit-I
Introduction and Digital Image Fundamentals  10 Hrs
Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Basic relationships like Neighbors, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations. Introduction to 2D Fourier Transform and Liner Algebra

Unit-II
Image Enhancement in the Spatial Domain and Frequency Domain  (10 Hrs)
Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Spatial Filters, Smoothening and Sharpening Combining Spatial Enhancement Methods and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters, Homomorphic Filtering.

Unit-III
Image Restoration and Compression  10 Hrs

Applicable to batch upto admitted in Aug 2011

**Unit-IV**

**Image Segmentation and Description**

10 Hrs

Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region Oriented Segmentation, Motion based segmentation. Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Various Morphological Algorithms, Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods.

**Recommended Books:**


**Reference Books:**

1. Rosefield Kak, “Digital Picture Processing”

---

**M. Tech. (Electronics & Communications Engg.)**

**SYLLABUS (IVth Semester)**

**SUBJECT: Industrial Engineering and Systems**

**Total Hrs 40**

**Paper Code : ECW-702**

Industrial Engineering.: Definition and Evolution, Understanding Industrial System Focus: Production/Service System. Performance measures of a Production System -Production, Productivity, Efficiency, Effectiveness, Quality, Flexibility, Agility etc.


Increasing Integration in Industrial Enterprises: From MRP to ERP to Supply Chain Management; Career Opportunities in Industrial Engineering.- Career Options, Types of Jobs and Employers, Entrepreneurship .Industrial Engineering Tool Kit.-Technical skills: IE problem Solving and OR. ;Human skills– Teamwork, Communication skills.; IT skills

Applicable to batch upto admitted in Aug 2011
M. Tech. (Electronics & Communications Engg.)
SYLLABUS (IVth Semester)

Subject: Microwave Integrated Circuits

Paper Code ECW-704        Total Hrs: 40

Unit I
Introduction of strip Lines        10 Hrs
Review of development and application of the modem transmission line structure as interconnect and as a medium for realization of components for the MIC and MMIC: quasi – static and frequency dependent medium closed form models of microstrip line for effective relative permittivity, capacitance ,characteristic impedance analysis and dielectric and conductor losses: Effect of conductor thickness, top shield and side walls on the propagation characteristics of a microstrip line.

Unit II
Microstrip Passive Components        10 Hrs
Circuit models of discontinuities in microstrip lines and the coplanar waveguide,open ended, short ,gaps, step, bent, T- junction, Hybrid line coupler, parallel coupled line and directional couplers, filters .

Unit III
Microwave Amplifier Design        10 Hrs

Applicable to batch upto admitted in Aug 2011
Microwave transistors, Stability considerations, Power-gain definitions, Simultaneous conjugate matching, Consideration for unilateral design.

Unit IV

**Microwave Oscillator Design**

Negative Resistance Oscillators, Transistor Oscillators.

(10 Hours)

**Textbook**


**Suggested Books**


**SYLLABUS**

**M.TECH (Electronics & Communication)**

**Subject: Speech Processing**

**Paper Code: ECW - 706**

**Total Hrs: 40**

**Unit -I**

**INTRODUCTION**

3hrs

Digital speech processing, acquaintance with various fields of study like parameter extraction, front end processing of speech, analysis of speech, digital transmission and storage of speech, speech synthesis systems, speaker verification and identification systems, speech coding, speech recognition and enhancement of speech quality.

**Unit -II**

**DIGITAL MODELS FOR THE SPEECH SIGNAL**

10hrs

a) The mechanism of speech production in human body
b) Physiology of speech organs(the lungs, larynx, vocal folds ,vocal tract)
c) Articulatory phonetics
d) Acoustic phonetics
e) Digital model of speech signal

Applicable to batch upto admitted in Aug 2011
Unit -III
SHORT TIME SPEECH ANALYSIS  
14hrs
a) Time domain parameters:
Short time energy and average magnitude, short time average zero crossing rate, pitch period estimation, short time autocorrelation function
b) Frequency domain parameters:
Filter bank analysis, short time spectrum analysis – linear
Filtering interpretation, Fourier transform interpretation
c) Linear predictive coding analysis:
Least square autocorrelation method, least square covariance method
d) Cepstral analysis

Unit –IV
DIGITAL REPRESENTATION OF SPEECH AND SPEECH CODING  
13hrs
Sampling, Quantization, Companding, Linear Predictive Coding – fundamental aspect of Various LPC coders, CELP, ACELP. Application of Speech Processing in Speech and Speaker Recognition System

Books:

SYLLABUS
M.TECH (Electronics & Communication)

Subject: Advanced Radiation system

Paper Code ECW-708

Total Hours(40)

Unit I

(10 hours)

Unit II
Two element and multi elements array, isotropic and non–isotropic array.

(10 hours)

Unit III
Design consideration of Antennas : Parabolic reflector antenna, Micro strip antenna Rectangular and circular patch. Feed network of micro strip antenna array

(10 hours)

Unit IV
Antenna for mobile communication: hands set antenna and base station antenna. Computer – aided design and analysis of wire antennas, feed network and antenna arrays using antenna CAD software.

(10 hours)

Textbook

Suggested Texts:
Kraus and Marhefke,”Antennats: For all applications,” McGraw Hill.

SYLLABUS

M.TECH (Electronics & Communication)

Subject: Embedded Systems Designs

Paper Code: ECW - 710

Total Hrs: 40

Unit-I
Introduction to an embedded systems design:
Introduction to Embedded system, Embedded System Project Management, ESD and Codesign issues in System development Process, Design cycle in the development phase for an embedded system, Use of target system or its emulator and In-circuit emulator, Use of software tools for development of an ES.

Unit-II
Processes and Operating Systems:

Applicable to batch upto admitted in Aug 2011
Unit-III  
**Microcontroller:**  

Unit-IV  
**Networks for Embedded Systems**  

Text Books:  
1. Embedded Systems by Raj Kamal, TMH  
2. The 8051 Microcontroller by K.J. Ayala, Penram International  

References:  
1. An Embedded Software Primer by David E. Simon, Pearson Education  
2. Designing Embedded Hardware by John Catsoulis, O’reilly  
3. Embedded System Design by Frank Vahid, Tony Givargis,”, John Wiley & Sons, Inc  
4. Building Embedded Linux Systems by Karim Yaghmour, O’reilly

**SYLLABUS**

**M.TECH (Electronics & Communication)**

**Subject: Radar & Satellite Communication Technology**

**Paper Code: ECW-712**  
**Total Hrs: 40**

**Unit-I**  
**Introduction to satellite communications**  
10 Hrs  
Historical background, communication networks and services, comparison of network transmission technologies. Orbits and perturbations, geostationary orbit, limits of visibility. Launching methods and propulsion. Atmospheric losses, ionospheric effects and other propagation impairments. Polarization and antennas.

Applicable to batch upto admitted in Aug 2011
Unit-II

Spacecraft and earth station 10 Hrs
Power supply, attitude control, station keeping, TT&C subsystem, transponders. Earth station equipments, tracking systems. Modulation, coding and multiplexing. Satellite access, FDMA, CDMA, TDMA, Demand assignment multiple access. Satellite services and the internet, VSATs, GPS, Direct broadcast satellite services, DTH

Unit-III

Link design 10 Hrs
Equivalent Isotropic Radiated Power, transmission losses, system noise, carrier to noise ration, uplink, downlink, effects of rain combined uplink and downlink C/N ratio, Intermodulation noise, interference, energy dispersal.

Unit-IV

RADAR 10 Hrs
RADAR range equation, pulsed radar system, Modulators, radar displays, target detection, scanning and tracking, Doppler effect, CW radar, MTI(Moving target indicator radar, Radio navigational aids, Loop antenna, Adcock antenna, Phased array radars.

Books

3. RADAR system by Scolnik.

SYLLABUS

M.TECH (Electronics & Communication)

Subject: Advanced Mobile Computing

Paper Code: ECW- 714 Total Hrs: 40

Unit-1 10 Hrs

Unit-II 10 Hrs
Applicable to batch upto admitted in Aug 2011

**Unit-III**


**Unit-IV**

Wireless Local Loop Technologies. WLL Architecture Model. Mobile AD HOC Networks. AD HOC Routing Protocols. DSDV, DSR and AODV Routing Techniques. Quality of service in Mobile Ad hoc Networks. 10 Hrs

**Books:**


2) Raj Pandya, Mobile & Personal Communication Systems And Service, PHI.


5) Jochen Schiller, Mobile Communication, Pearson Education.

---

**SYLLABUS**

M.TECH (ELECTRONICS AND COMMUNICATION)

**SUBJECT: Knowledge Management**

Total hr 40

**Paper Code: ECW-716**

Introduction, definitions, industrial motivation, Evolving Industrial Competition (multi attributed competition), flexibility, integration and automation in enterprises, growing need for Knowledge Applicable to batch upto admitted in Aug 2011
and its effective Management (KM), role of IT, KM and challenges of CIMS, intelligent manufacturing, ERP, SCM and CRM, E-manufacturing etc.

KM technical concepts: (data vs information vs knowledge), The Knowledge Edge, Knowledge Engineering, KM Framework (process steps), Aligning KM with Manufacturing Strategy, Business Strategy etc., design and deployment of KM in industrial enterprises (KM team, KM system analysis, Developing Effective Systems, Knowledge Audit), IT based tools, role of performance measurement, KM and competitive link, intelligent manufacturing, agile enterprises, cases, presentations, group exercises. Role of Simulation and Intelligent Systems, KM Deployment, Managing Innovation, Performance Measurement, Applications.

M. Tech. (Electronics & Communications Engg.)
SYLLABUS (Vth Semester)

Subject: ENTERPRISE RESOURCE PLANNING

Paper Code: ECW-801  Total Hrs: 40

Applicable to batch upto admitted in Aug 2011
**Unit-I**


**Unit-II**

ERP & Competitive advantage, Basic Constituents of ERP, Selection criteria for ERP Packages. procurement process for ERP Package Overview of ERP packages – PEOPLE SOFT, SAP-R/3, BAAN IV, MFG/PRO, IFS/AVALON, ORACLE-FINANCIAL, Survey of Indian ERP Packages regarding their Coverage, performance & cost.

**Unit-III**

ERP Implementation - issues, Role of Consultants, Vendors, Users, Need for training, customization. ERP implementation methodology and post implementation issues and options. Basics of Supply Chain Management – Order Management, Logistics. SCM basic principles, tasks and competencies, interfaces and complexities

**Unit-IV**

Types of SCM, potential benefits of SCM, possible obstacles, Application systems supporting SCM – engineering, Product Data Management, Sales, Procurement, Production, MRP, Distribution. ERP Case Studies in HRM, FINANCE, PRODUCTION, PRODUCT DATABASE, MATERIALS, SALES & DISTRIBUTION

**Recommended Books**:


2. Enterprise Resource Planning by S Sadagopan – PHI


**SYLLABUS**

M.TECH (ELECTRONICS AND COMMUNICATION)

Applicable to batch upto admitted in Aug 2011
Subject: Quantum Computing and Nano Technology

Code No: ECW-803      Total Hrs: 40

Introduction
Introduction to nanoscale systems, Length energy and time scales, Top down approach to Nano lithography, Spatial resolution of optical, deep ultraviolet, X-ray, electron beam and ion beam lithography, Single electron transistors, coulomb blockade effects in ultra small metallic tunnel junctions

Quantum Mechanics
Quantum confinement of electrons in semiconductor nano structures, Two dimensional confinement (Quantum wells), Band gap engineering, Epitaxy, Landeure – Buttiker formalism for conduction in confined geometries, One dimensional confinement, Quantum point contacts, quantum dots and Bottom up approach, Introduction to quantum methods for information processing.

Molecular Techniques
Molecular Electronics, Chemical self assembly, carbon nano tubes, Self assembled mono layers, Electromechanical techniques, Applications in biological and chemical detection, Atomic scale characteriztion techniques, scanning tunneling microscopy, atomic force microscopy

Text:

References:
2. Y. Imry “ Introduction to Mesoscopic Physics, Oxford University press 1997

SYLLABUS
M.TECH (Electronics & Communication)
Applicable to batch upto admitted in Aug 2011
Subject: MEMS and Sensor Technology

Paper Code: ECW-805  Total Hrs: 40

Unit-I
Micromachining Technologies & Applications  10 Hr

Unit-II
MEMS Process integration  10 Hr

Unit-III
Electronics for MEMS  10 Hr
Microactuation Mechanisms Electrostatic Actuation, Piezoelectric, etc. Microsystems Capacitive Sensing, Resistive, etc. Mechanical Properties of MEMS Materials Electromechanical Interface, MEMS Simulators. Interface circuits such as A/D converter and pre-amplifiers, Electronic circuit as composition basis of the sensing system (analog circuit, filter circuit, arithmetic circuit). The Future of MEMS

Unit-IV
Sensors  10 Hr
Principles of various sensors and applications using the sensors, chemical sensors: gas/vapor phase, liquid phase Field sensor: temperature, pressure, strain, flow measurement. Physical quantity sensor: force, speed, sound, ultrasonic wave. Physics and chemical sensor: optical sensor, infrared analysis, gas chromatography, smell, taste, bio.

Books
The Foundations of MEMS by Dr. Chang Liu, Prentice Hall and authored

Applicable to batch upto admitted in Aug 2011
Subject: Multimedia Technology (Elective)

Paper Code: ECW-807       Total Hrs: 40

Unit –I

Introduction:
Concept of Multimedia, Multimedia Applications, Hardware Software requirements, Multimedia products & its evaluation.

Unit –II

Components of multimedia: Text, Graphics, Audio, Video.
Design & Authoring Tools, Categories of Authority Tools, Types of products.

Unit –III

Animation:
Introduction, Basic Terminology techniques, Motion Graphics 2D & 3D animation.

Unit –IV

Introduction to MAYA (Animating Tool):
Fundamentals, Modeling: NURBS, Polygon, Organic, animation, paths & boxes, deformers.
Working with MEL: Basics & Programming
Rendering & Special Effects: Shading & Texturing Surfaces, Lighting, Special effects.

BOOKS:


Applicable to batch upto admitted in Aug 2011
SYLLABUS

M.TECH (Electronics & Communication)

Subject: Smart Antenna Systems

Paper Code: ECW- 809  Total Hrs: 40

Unit-1  08 Hrs

Unit-II  10 Hrs

Unit-III  10 Hrs

Unit-IV  12 Hrs

Books:

1. T.S.Rappaport & J.C.Liberti, Smart antennas for wireless Communication, Printice Hall,1999

2. R.Janaswamy, Radiowave propagation and Smart antennas for wireless communication, Kluwer,2001

Applicable to batch upto admitted in Aug 2011
Subject: Advanced Analog Signal Processing (Elective)

Paper Code: ECW-811       Total Hrs: 40

Unit I

**Review of Active Elements and Their Applications** 10 Hrs
Introduction to active elements, primary and secondary building blocks, operational amplifier (op-amp), operational transconductance amplifier (OTA), immittance converters and inverters, generalized immittance converter, pathological elements (Nullator, Norator and Nullor) and their use in realizing controlled sources and other active elements, active network synthesis.

Unit II

**Translinear Bipolar and MOS Circuits** 10 Hrs
BJT Translinear principal, MOS Translinear principle, various Translinear circuits, Squarer/ divider, square rooting, vector magnitude circuit, multipliers, Translinear current amplifiers etc.

Unit III

**Voltage Mode Signal Processing** 10 Hrs

Unit IV

**Current Mode Signal Processing** 10 Hrs
Current Mode Signal Processing, Current Mode compared to voltage-mode, mixed mode signal processing, mixed mode signal processing using OTAs, mixed mode signal processing using current conveyors.

**Suggested Texts**

1. C. Toumazou, F.J. Lidgey and D.G.Haigh, ‘Analog IC design: the current mode approach, Peter Peregrinus Ltd. on behalf of IEE, 1993.

Applicable to batch upto admitted in Aug 2011
M. Tech. (Electronics & Communications Engg.)
SYLLABUS (Vth Semester)

SUBJECT: Network Management and Security Total hr.40

Paper Code: ECW 817

UNIT-I
Introduction

UNIT-II
Encryption Techniques

UNIT-III
Designing Secure Networks

UNIT-IV
Network Security Platform Options IPsec VPN Design

Applicable to batch upto admitted in Aug 2011
Secure Network Management and Network Security Management

Text:

2. William Stalling “Cryptography and Network Security” Pearson Education

SYLLABUS

M.TECH (Electronics & Communication)

Subject: ADVANCED COMPUTER COMMUNICATION NETWORK

Paper Code ECW-819

Total Hours(40)

Unit I
LAN NETWORKING AND DATA TRANSMISSION PROTOCOL:
IP, IPX, Apple-Talk, Ethernet, FDDI, token ring, wireless 802.11(b), 802.11(g), 802.16.
(05 hours)

WAN DIGITAL TRANSMISSION TECHNOLOGIES:
T-Carrier, SONET, SDH/PDH, Frame Relay, Isdn, Global Cellular.
(05 hours)

Unit II
Design AND IMPLEMENTATION OF ENTERPRISE NETWORK:
Router And Switches, Router Configuration Multi protocol, Network Traffic, Routing In PDN and Internet Environments, Network Performance Management And Trouble Shooting Concepts Including SNMP.
(10 hours)

Unit III
CELLULAR MOBILE COMPUTER COMMUNICATION:
GSM TECHNOLOGY, NA-TDM, PCN, VOIP AND FOIP, SMS, CISCO’S IGRP/EIGRP, ACL, NAT, TUNNELING AND IOS BASICS.
(10 hours)

Unit IV
SATELITE AND BROADBAND ISDN NETWORK
ISDN Channels, Access Interfaces, Functional Devices And References, Overview Of Isdn Services, Protocol Structure, D-Channel Layer 3 Protocols, Networking And Addressing, Isdn Products.
Broadband Networks-Need, Fast Packet Switching, Frame Relay, Cell Relay, and ATM, FDDI LMDS, SMDS, AIN.
Frame Relay- Basic Definition, Protocol Architecture, Permanent And Switched VC, Frame Relays Standard, Multicast Services.
ATM- ATM Standards, Terms And Concepts, B-ISDN, Protocol Architecture, Physical Layer, ATM Layer, AAL, ATM Services, ATM Switches.
SMDS-Overview, SMDS Interfaces And Services.
ISDN, B-ISDN and INTERNET Protocol.
(10 hours)

Textbook
Applicable to batch upto admitted in Aug 2011
OBJECTIVE
This course gives an extensive information and application of virtual instrumentation for all types of measurement systems and analysis.

Unit I
Review of virtual instrumentation 10 Hrs
Historical perspective and traditional bench-top instruments - General functional description of a digital instrument- Block diagram of a Virtual Instrument – Physical quantities and analog interfaces- Hardware and Software – User Interfaces – Advantages of Virtual Instruments over conventional instruments – Architecture of a Virtual Instruments and its relation to the operating system.

Unit II
Data Flow Techniques 10 Hrs

Unit III

Applicable to batch upto admitted in Aug 2011
Programming techniques and data acquisitions basics   10 Hrs

FOR Loops, WHILE loops, Shift Registers, CASE structure, formula nodes-Sequence structures-Arrays and Clusters- Array operations – Bundle, Unbundle – Bundle/Unbundle by name, graphs and charts – string and file I/O – High level and Low level file I/Os – attribute nodes local and global variables.

Basics of DAQ Hardware and Software – Concepts of Data Acquisition and terminology – Installing Hardware, Installing drivers -Configuring the Hardware – addressing the hardware in LabVIEW- Digital and Analog I/O function – Buffered I/O – Real time Data Acquisition

Unit IV

Applications of VI and VI applications in various fields   10 Hrs

Simple programs in VI- Advanced concepts in LabVIEW- TCP/IP VI’s, Synchronization – other elements of Virtual Instrumentation – Bus extensions – PXI - Computer based instruments - Image acquisition –Motion Control.

Textbook


Suggested Texts


Applicable to batch upto admitted in Aug 2011
SYLLABUS
M.TECH( ELECTRONICS AND COMMUNICATION)

Subject: Soft Computing Total hr 40

Paper Code: ECW-823

UNIT I
Basic mathematics, Brief idea of biological neuron, artificial neurons, comparison of measurement of activation functions in real and artificial neurons, study of various neuron signal functions, McCulloch-Pitts neuron model, Feedforward networks: architecture and determination of activation functions, Feedback neural networks,

UNIT II
Learning and adaptation, STM, LTM, habituation, sensitization, supervised and unsupervised learning, learning algorithms, supervised learning, unsupervised learning, Hebbian learning, Perceptron learning, Delta learning, Gradient descent rules, perceptron learning algorithm, linearly non-separable data, LMS learning, steepest descent search, back propagation, BP learning algorithm, training data set, number of training cycles, initialization of weights, proper learning rate and their adjustment. Need of hidden layers, multilayer feed forward neural networks

UNIT III
Introduction to fuzzy logic, fuzzy sets, linguistic variables, fuzzy rules, inference, defuzzification, Operations on fuzzy sets, properties of fuzzy sets, fuzzy relations, fuzzy graphs and fuzzy arithmetic, fuzzy if-then rules.

UNIT IV
Basics of Genetic algorithms, designing a genetic algorithm, improving the convergence rule, A case study of GA

Reference books:

1. Introduction to Artificial Neural Systems .....Jacek M. Zurada

Applicable to batch upto admitted in Aug 2011
2. Introduction to Neural networks……………..Alison Carling
4. Neural network fundamentals with graphs…..Bose and Liang
5. Fuzzy Logic…………………………………….. Harrington

SYLLABUS
M.TECH( ELECTRONICS AND COMMUNICATION)

Subject: Artificial Intelligence and Experts Systems                          Total hr 40

Paper Code: ECW-825

Introduction:
Introduction to intelligent agents

Problem solving:
Solving problems by searching : state space formulation, depth first and breadth first search, iterative deepening

Intelligent search methods:
A* and its memory restricted variants

Production systems:
Design implementation and limitations, case studies

Game Playing:
Minimax, alpha-beta pruning

Knowledge and reasoning:
Propositional and first order logic, semantic networks, building a knowledge base, inference in first order logic, logical reasoning systems

Planning:
STRIPS partial order planning, uncertain knowledge and reasoning, probabilistic reasoning systems, Baysian networks

Learning from observations:
Applicable to batch upto admitted in Aug 2011
Inductive learning, learning decision trees, computational learning theory, Explanation based learning

Applications:
Environmental Science, Robotics, Aerospace, Medical Science etc.

Text Books:
1. "AI, a modern approach" by Russel and Norvig, Pearson Education
2. "AI" by Rich and Knight, Tata McGraw Hill
3. "Neural Networks in Computer Intelligence" by KM Fu, McGraw Hill

Applicable to batch upto admitted in Aug 2011