### DEPARTMENT: ELECTRONICS & COMMUNICATION ENGINEERING

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Qualification</th>
<th>Position</th>
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<tbody>
<tr>
<td>1.</td>
<td>Dr. K. Rajesh Shetty</td>
<td>Ph.D.</td>
<td>Professor/HOD</td>
</tr>
<tr>
<td>2.</td>
<td>Dr. M.K. Parasuram</td>
<td>Ph.D.</td>
<td>Director</td>
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<tr>
<td>3.</td>
<td>Dr. Rekha Bhandarkar</td>
<td>Ph.D.</td>
<td>Professor</td>
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<tr>
<td>4.</td>
<td>Dr. K. V. S. S. S. Sairam</td>
<td>Ph.D.</td>
<td>Professor</td>
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<tr>
<td>5.</td>
<td>Prof. S. Chandrakanth Naik</td>
<td>M.S/MBA</td>
<td>Asso. Professor</td>
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<tr>
<td>6.</td>
<td>Mr. Durga Prasad</td>
<td>M.Tech(Ph.D.)</td>
<td>Asso. Professor</td>
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<td>7.</td>
<td>Mrs. Sushma P.S.</td>
<td>M.Tech</td>
<td>Asso. Professor</td>
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<td>8.</td>
<td>Mrs. Shrividya G.</td>
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<td>9.</td>
<td>Mrs. Padmavathi K.</td>
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<td>10.</td>
<td>Mrs. Prabha Niranjan</td>
<td>M.Tech(Ph.D.)</td>
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<td>11.</td>
<td>Mr. Sukesh Rao M.</td>
<td>M.Tech(Ph.D.)</td>
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<td>13.</td>
<td>Mr. Mahaveera K.</td>
<td>M.Tech</td>
<td>Asst. Prof Gd III</td>
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<tr>
<td>14.</td>
<td>Mrs. Sunitha Lasrado</td>
<td>M.Tech(Ph.D.)</td>
<td>Asst. Prof Gd III</td>
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<tr>
<td>15.</td>
<td>Mrs. Vidya Kudva</td>
<td>M.Tech(Ph.D.)</td>
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<td>16.</td>
<td>Mr. Satheesh Rao</td>
<td>M.Tech</td>
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<td>17.</td>
<td>Mr. Ravindra K.S.</td>
<td>M.Tech</td>
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<td>18.</td>
<td>Mr. Pradyumna G.R.</td>
<td>M.Tech</td>
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<td>19.</td>
<td>Mrs. Roopa B. Hegde</td>
<td>M.Tech</td>
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<td>Mrs. Charishma</td>
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<td>Mrs. Shubha B.</td>
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<td>23</td>
<td>Mr. Anil Kumar Bhat</td>
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<td>24</td>
<td>Ms. Ranjitha Ravindran</td>
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<td>25</td>
<td>Mrs. Deepa K.</td>
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<td>Mr. Dileep Kumar M.J.</td>
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<td>Mr. Sudharshana</td>
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<td>Asst. Prof Gd-I</td>
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<td>Mrs. Nagapriya Kamath K.</td>
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<td>Mrs. Ramya Shetty</td>
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<td>31</td>
<td>Mr. Prajwal Hegde N.</td>
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<td>32</td>
<td>Mr. Karthik</td>
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<td>Mrs. Anupama B.</td>
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<td>35</td>
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<td>39</td>
<td>Mrs. Ashwini</td>
<td>M.Tech</td>
<td>Asst. Prof Gd I</td>
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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

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

Programme Educational Objectives (PEOs):

1. The Graduate should have a solid foundation in Mathematics, Science and Electronics Engineering fundamentals required to solve Electronics & Communication Engineering problems which will also help to pursue higher studies and life-long learning needed for a successful professional career.
2. To inculcate in graduates professional, effective communication skills, teamwork skills, multidisciplinary approach and an ability to relate engineering issues to broader social context.

**Programme Outcomes (POs):**

1. Students will be able to identify, analyze and solve basic Electronics Engineering problems, in specific areas, by applying knowledge of Mathematics, Science and Engineering with modern Engineering tools.

2. Students will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks.

3. Students will be able to understand engineering practice in the context of global, economic, environmental and societal realities.
## DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
### SCHEME OF TEACHING AND EXAMINATION

#### V Semester

<table>
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<tr>
<th>Sl. No.</th>
<th>Code</th>
<th>Subject</th>
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<td>4</td>
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<td>System Design Using Microprocessor / Microcontroller</td>
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### DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

#### SCHEME OF TEACHING AND EXAMINATION

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### Electives:

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<td>Elective I</td>
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<td>Fiber Optics</td>
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<td>13EC512</td>
<td>DSP Processors &amp; Architecture</td>
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<td>13EC513</td>
<td>Programming in C++</td>
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<td>Project Management</td>
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<td>Elective II</td>
<td>13EC611</td>
<td>Modern Radar &amp; Navigational Aids</td>
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<td>13EC612</td>
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<td>Fuzzy Logic</td>
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<td>13EC623</td>
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<td>13EC624</td>
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<td>13EC625</td>
<td>Control Systems</td>
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DIGITAL SIGNAL PROCESSING

Sub Code : 13EC501     Credits : 04
Hrs/Week : 4+0+0+0     Total Hours : 52

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

1. Analyze the behavior of discrete-time systems in time & frequency domain.
2. Analyze and implement FFT algorithms.
3. Convert a given analog filter to a digital filter.
4. Visualize applications of DSP in various fields.
5. Design, analyze and implement digital filters
6. Relate theoretical concepts to practical applications.

UNIT- I

Discrete Fourier Transform: Its Properties And Applications:

11 Hours

UNIT- II

Efficient Computation of DFT: Fast Fourier Transform Algorithms:
Efficient Computation of the DFT: FFT Algorithms, Direct Computation of the DFT. Radix – 2 FFT algorithms, Decimation in time FFT algorithm and In-place computations. Decimation in frequency FFT algorithm and In-place computations, Chirp Z- Transform, Goertzel Algorithm.

10 Hours

UNIT- III

Design Of Analog Filters And Frequency Transformations:
Characteristics of commonly used Analog filters and Design of Butterworth and Chebyshev analog filters. Frequency Transformations in the Analog Domain, Frequency Transformations in the Digital domain,
Bilinear, Impulse Invariance Transformations. 10 Hours

UNIT- IV


UNIT-V


Digital Filter Structures: Basic IIR Filter structures: direct forms (I & II), Cascade and parallel realizations, signal flow graph, Transposed structure.
Basic FIR filter structures: Direct form structure, Frequency sampling structure, Lattice structure, Linear phase FIR structure. 11 Hours

TEXT BOOK:


REFERENCE BOOKS:

DIGITAL COMMUNICATION

Sub Code : 13EC502    Credits : 04
Hrs/Week : 4+0+0+0    Total Hours : 52

Course Outcomes:

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

1. The basic sampling theorem, Reconstruction of the signal from samples.
2. Types of signal distortion in sampling and Generation of natural and flat top samples.
3. Pulse amplitude modulation and Time division multiplexing.
4. Geometric interpretation of signals, Correlation receiver and Matched filter receiver.
6. Different types of Waveform Coding Techniques- PCM, DPCM, DM.
7. Base-band shaping for data transmission.
8. ISI and its solutions, Nyquist’s criterion, Correlative coding.

UNIT-I

Introduction: Sources and signals, Basic signal processing operations in digital communication, Channels for digital communication.

Sampling Process: Sampling theorem, Quadrature sampling of BP signal, Reconstruction of a message from its samples, Signal distortion in sampling, Practical aspects of sampling and signal recovery, PAM, TDM.  

10 Hours

UNIT-II

Waveform Coding Techniques: PCM, Channel noise and error probability, Quantization noise and SNR, Robust quantization, DPCM, DM, Coding speech at low bit rates, Applications.

12 Hours

UNIT-III

Base-band shaping for data transmission: Discrete PAM signal, Power spectra of discrete PAM signals, ISI, Nyquist’s criterion for distortionless base-band binary transmission, Correlative coding, eye pattern, Base-band M-ary PAM systems, Adaptive equalization for data transmission.

10 Hours

UNIT-IV

Digital modulation techniques: Digital modulation formats, Coherent binary modulation techniques, Coherent quadrature modulation techniques, Non-coherent binary modulation techniques, Comparison of binary and quaternary modulation techniques, M-ary modulation techniques, Effect of ISI-bit versus symbol error probability, Synchronization and applications.

12 Hours

UNIT-V

Spread spectrum modulation: Pseudo noise sequences, notion of spread spectrum, Direct sequence spread coherent binary PSK, Signal space dimensionality and processing gain, Probability of error, Frequency hop spread spectrum, Applications.

8 Hours

TEXT BOOKS:

REFERENCE BOOK:


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TRANSMISSION LINES & WAVEGUIDES

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<tr>
<td>Hrs/Week</td>
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Course Outcomes:

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

1. **Derive** the general solutions for a line in terms of Voltage and Current.
2. **Draw** the waveforms for waves propagating within the lines at various time intervals.
3. **Derive** expressions for cut off frequency and inductance and Capacitance. (L3)
4. **Design** any filters(LPF/HPF) for the given specifications and write the final circuit(L3)
5. **Understand** the concept of Standing waves and **draw** standing wave pattern for any load termination.
6. **Apply** the Smith chart for finding any parameter of the line.
7. **Distinguish** between TE, TM and TEM waves and **derive** E and H field equations.
8. Use **Maxwell’s equations** to **determine** field equations for TM,TE and TEM waves propagating inside a waveguide.
UNIT -I

Transmission- Line Theory: The transmission Line general solution, The distortion less Line, The telephone cable, Reflection on a line not terminated in $Z_0$, Open and short circuited Lines, Reflection loss, Insertion loss, Constant $K$ LPF & HPF. 10 Hours

UNIT-II

Line At Radio Frequencies: Parameters of open wire Line at high frequencies, parameters of the coaxial Line at high frequencies, Constants for the Line of zero dissipation, Standing waves; nodes; standing wave ratio, input impedance of open and short circuited Lines. 10 Hours

UNIT-III

Impedance Matching: The quarter wave Line; impedance matching, the exponential Line for impedance transformation, The smith circle diagram, Applications of the smith chart, Quarter, Half and eighth wave Lines of small dissipation. 10 Hours

UNIT-IV

Guided Waves: Applications of restrictions to Maxwell’s equation, types of propagation; TM, TE and TEM waves in parallel planes. TE, TM, TEM waves in infinitely conducting planes. Characteristics of TE, TM & TEM waves, wave impedance. 12 Hours

UNIT-V

Wave Guides: Application Maxwell’s equations to the rectangular wave guides, The $TM_{m,n}$ wave in the rectangular guide, $TE_{m,n}$ wave in the rectangular guide, The TEM wave in the coaxial Line, Excitation of wave guides, Guide terminations, Resonant cavities. 10 Hours

TEXT BOOKS:

T2. Liao S., “Microwave Devices and Circuits”, PHI.
REFERENCE BOOKS:


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SYSTEM DESIGN USING MICROPROCESSOR / MICROCONTROLLER

Sub Code : 13EC504  
Credits : 04
Hrs/Week : 4+0+0+5*  
Total Hours : 52

*Self Study to be exercised under the supervision of course instructor and to be restricted to not more than 10% of the total teaching hours.

Course Outcomes:

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

1. **Realize** the use/meaning of Memory, Central Processing Unit, Arithmetic and logical unit (ALU), Address Bus, Data Bus and Control lines of an embedded system.
2. **Distinguish** Microcontroller and Microprocessor design Architecture and the functionality.
3. **Understand** the Assembly Language Programming for the microprocessor and microcontroller.
4. **Write** assembly language program for 8086 & 8051 in sequential logic using all possible kinds of Mnemonics.
5. **Design** and use Timer/Counter programming application in 8051 microcontroller.
6. **Design** and use interrupt in 8086 & 8051.
7. **Design** any real time system using timer/counter or interrupts (if necessary) application of 8051.
8. **Design** and study basic interfacing like matrix keypad, DC Motor speed control, Analog to Digital Conversion, Stepper Motor and Liquid Crystal Display.

**UNIT – I**

*Introduction to 16 bit Microprocessor 8086:* Introduction to microprocessor, computer and its organization, Internal Architecture of 8086 microprocessor, Programming Model, Program-Memory addressing, Address bus, data bus and control bus, Addressing Modes. **8 Hours**

**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, MACROS, programming(with BIOS function). **12 Hours**

**UNIT- III**

*Microprocessor Peripheral Interfacing:* Introduction, Generation of I/O Ports, Programmable Peripheral Interface (PPI)-Intel 8255, Keyboard and Display Interface. **10 Hours**

**UNIT – IV**

*8 bit Microcontroller 8051- H/W Architecture, Instruction Set and Programming:* Introduction to 8051 Micro-controller, Architecture, Memory organization, I/O Port configuration, Programmer’s model of 8051, Operand types, Operand Addressing, Data transfer instructions, Arithmetic instructions, Logic instructions, Control transfer instructions, Programming, I/O Interfacing, interrupts, timer configuration. **14 Hours**

**UNIT-V**

TEXT BOOKS:


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TELECOMMUNICATION AND SWITCHING NETWORKS

Sub Code : 13EC505  Credits : 04
Hrs/Week : 4+0+0+0  Total Hours : 52

Course Outcomes:

After studying this course, the student should be able to:
1. Trace the evolution of Telecommunication system
2. Get a knowledge of the Basics of LAN and WAN
3. Have knowledge of switching system
4. Acquire an understanding of traffic and the various mathematical models employed therein.
5. Solve the problems of traffic using probability equations
6. Appreciate the use of multistage networks
7. Understand the space and time switches
8. Grasp the significance of various signals use in telecom systems.
9. Gain a technical understanding of the working of MODEM and FAX machines.
UNIT- I


UNIT- II

Switching Networks: Single stage networks, Link systems: General, Two-stage networks, Three-stage networks, four stage networks. Grade of Service of link systems, two stage, three stage networks, four stage networks. Application of graph theory to link systems, Use of expansion, Call packing, Rearrangeable networks. 10 Hours

UNIT- III


Signalling: Customer line signalling, Audio frequency junctions and trunk circuits, FDM carrier systems: Out-band signalling, In-band(VF) signaling, PCM signalling, Inter-register signalling, Common channel signaling principles. 12 Hours

UNIT- IV

Telephone Services- MODEMS and FAX Machines: MODEM, Asynchronous Character Format, 5-bit and 7-bit codes, Asynchronous Operation, Synchronous Operation, Isochronous Operation, Modulation
and Demodulation, Asynchronous Modem Operation, System Interconnection, 1200-bps asynchronous Modem, Bell 103- Type Modem, Advances in Modern Modems, Standards for digital equipment interface, Error detection and correction, Standards, High Speed Modems, Data Compression Techniques, Protocols, Facsimile, FAX Modem, Computer FAX devices.  

**UNIT- V**


**TEXTBOOK:**


**REFERENCE BOOKS:**


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**MICROPROCESSOR / MICROCONTROLLER APPLICATION LAB**

<table>
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Course Outcomes:

1. Able to classify the machine language and assembly language.
2. Develop the coding logic for the algorithm
3. Document the code in the systematic approach
4. Understand the signal driving mechanism for the external hardware interfacing.

LIST OF EXPERIMENTS

I) SOFTWARE PROGRAMMING USING 8086 ASSEMBLY LANGUAGE

1. Data transfer instructions:
   I. Byte and word data transfer in different Addressing modes.
   II. Block move (with and without overlap)
   III. Block interchange

2. Arithmetic & logical operations:
   I. Addition and Subtraction of Byte, Word and multiple byte data.
   II. Multiplication and Division of signed and unsigned Hexadecimal numbers.
   III. ASCII adjustment instructions
   IV. Code conversions
   V. Arithmetic programs to find square cube, LCM, GCD, factorial of numbers

3. Bit manipulation instructions:
   I. Whether given data is positive or negative
   II. Whether given data is odd or even
   III. Logical 1’s and 0’s in a given data
   IV. Bit wise and nibble wise palindrome

4. Branch/Loop instructions like:
I. Arrays: addition/subtraction of N numbers, Finding largest and smallest numbers and ascending and descending order.
II. Near and Far Conditional and Unconditional jumps, Calls and Returns

5. Programs on String manipulation like string transfer, string reversing, searching for a string.

6. Programs involving Software interrupts Programs to use DOS interrupt INT 21h Function calls for Reading a Character from keyboard, Buffered Keyboard input, Display of character/String on console

II) HARDWARE PROGRAMMING USING 8051
7. Interfacing simple switches’ and LED’s
8. Interfacing Seven segment Display
9. Interfacing Hex Keyboard interface to 8051
10. Interfacing ADC0809/08 with 8051
11. Generate different waveforms Sine, Square, Triangular, Ramp etc. using DAC interface to 8051 and change the frequency and amplitude
12. Stepper and DC motor control interface to 8051

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BASIC COMMUNICATION LAB

| Sub Code : | 13EC507 | Credits : | 02 |
| Hrs/Week : | 0+0+3+0 | Total Hours : | 52 |

Course Outcomes:

1. Study the characteristics of narrow and wide - band pass and band elimination filters
2. Understand the generation and detection of DSB-SC and SSB signals
3. Study the behavior of different type of attenuators
4. Generation of frequency modulation
5. Study the working of pre-emphasis and de-emphasis circuits
6. Generation and detection of Amplitude Modulation
7. Understand various pulse modulation schemes – PAM, PWM, PPM
8. Study of Transistor mixer

List of Experiments

1. Active low-pass and High-pass filters
2. Active band pass and band elimination filters
3. Balanced modulation and SSB generation
4. Various types of Attenuators.
5. Frequency modulation and Demodulation
6. Pre-emphasis and De-emphasis circuits.
7. AM-IC circuit (modulation and demodulation using IC).
8. PAM (modulation and demodulation).
9. Pulse modulation and demodulation
   a. PPM (modulation and demodulation).
   b. PWM (modulation and demodulation).
10. Transistor mixer – up/down conversions.

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IMMERSIVE GROUP WORKSHOP (IGW)

Sub Code : 13EC508          Credits : 00
Hrs/Week : 0+0+3+0

Module 1: Minds-on and hands-on simulation project
- Understanding Task environment – Goals, responsibilities, Task focus
- Working in Teams towards common goals
- Organizational performance expectations—technical and behavioural competencies. 7.5 Hours

Module 2: Re-enforcement of critical individual skills and behaviours
• Application of individual effectiveness skills in team and organizational context – improving self awareness, goal setting, time management, communication and presentation skills.  

3.5 Hours

Module 3: Etiquettes and Ethics
• Professional etiquettes at workplace – dressing, telephone, e-mail, meeting and general behaviour
• Basic honesty & respect for law / rules
• Conflict of interest
• Use of organizational resources
• Misrepresentation and misappropriation
• Intellectual property
• propertyWhistle blowing 7 Hours

Module 4: Interpersonal Behaviour & relationship skills
• Establishing trust based relationships in team & organizational environment
• Trust equation – credibility, responsiveness, integrity, self-interest 3.5 Hours

Module 5: Dealing with Conflicts

Orientation towards conflicts in team and organizational environment
• Understanding sources of conflicts
• Conflict resolution styles and techniques 3.5 Hours

Pedagogical tools & techniques used in the workshop
• Organizational templates for simulating a organizational context-structures, units, roles and activities
• Metaphoric scenarios for simulating real –life tasks and dynamics in a team/project context
• LEGO™ building blocks for simulating last-mile technical activity in teams
Case studies, Role play scenarios group learning activities, observation and feedback.

**Note:** Evaluation is done and a grade of P (pass) or NP (not pass) is awarded

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### FIBRE OPTICS

**Sub Code:** 13EC511  
**Credits:** 03  
**Hrs/Week:** 3  
**Total Hours:** 39

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**UNIT - I**


**Laser Fundamentals:** Fundamental characteristics of Lasers – three level and four level lasers – laser modes – resonator configuration – Q-switching and mode locking – cavity dumping – types of lasers gas lasers, solid lasers, and liquid lasers and semiconductor lasers (Basic working principle only).

15 Hours

**UNIT- II**

**Industrial Application Of Optical Fibers and Lasers:** Fiber optic sensors – interferometric method of measurement of length – measurement of pressure, temperature, current, voltage, liquid level and strain – fiber optic gyroscope – polarization maintaining fibers.

Laser for measurement of distance, velocity, acceleration,– material processing – laser heating, welding melting and trimming of materials – removal and vaporization.

16 Hours

**UNIT-III**
Laser In Holography And Medical Application: Holography – basic principle; methods; holographic interferometry and applications, holography for non-destructive testing, medical applications of lasers; laser and tissue interaction – laser instruments for surgery, removal of tumors, brain surgery, plastic surgery. 8 Hours

TEXT BOOKS:

REFERENCE BOOKS:

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DSP PROCESSORS AND ARCHITECTURE

Sub Code : 13EC512  Credits : 03
Hrs/Week : 3  Total Hours : 39

UNIT- I


Architectures for Programmable Digital Signal-Processors: Introduction, Basic Architectural Features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities,
Address Generation Unit, Programmability and Program Execution, Features for External Interfacing.  

15 Hours

UNIT- II


Implementation of Basic DSP Algorithms: Introduction, the Q-notation, FIR Filters, IIR Filters, Interpolation and Decimation Filters (one example in each case).  

15 Hours

UNIT-III


Interfacing Memory and Parallel I/O Peripherals to DSP Devices: Introduction, Memory Space Organization, Memory interface. Introduction to TMS320C6713 Processor (Architecture).  

9 Hours

TEXT BOOK:

REFERENCE BOOKS:


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PROGRAMMING IN C++

Sub Code : 13EC513 Credits : 03
Hrs/Week : 3 Total Hours : 39

Course Outcomes:

After studying this Course, the student should be able to:
1. Recall C language data types, operators, input and output
2. Work on basics of functions and pointers.
3. Work on fundamentals of arrays and structures
4. Recall Principle of Object Oriented Programming
5. Work on objects, member functions, constructors and destructors
6. Work on basics of Inheritance

UNIT - I

Getting started: General format, data types, variable declaration, operators, and miscellaneous topics, keyboard input and screen output
Control statement and loops: relational and Logical operators, if and switch statements, loops in general, for, while and do while loops.
Pointers, addresses & indirection operator: Importance of pointers, data variables and memory, address operators, pointers

Functions basics: Functions in C++, basic format, requirement for writing functions, local, static and global variables, pointers and functions.

UNIT - II

16 Hours
Arrays: Using single data variables, array fundamentals, one dimensional arrays and functions, character strings

User defined data types: Customized data types, data structures, accessing structure elements, structure arrays, structure within structures, structures and functions, structure arrays and functions, enumerated data types

Classes and objects: Object oriented principles and definitions, classes and objects, writing member functions, class constructors and destructors, examples, array of objects, pointer and classes. 16 Hours

UNIT- III

Class relationships: Using C++ language classes, user defined classes, Inheritance  Importance of Inheritance and basics.  7 Hours

TEXT BOOK:

REFERENCE BOOK:

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PROJECT MANAGEMENT

Sub Code : 13EC514  Credits : 03
Hrs/Week : 3  Total Hours : 39

UNIT- I

Introduction: Characteristics of project, neat types and forms. Systems approach: Concepts project as a system, design algorithm.

Project organization: Formal and informal organization, forms of organization of structures, project organization, matrix organization, pure project organization, selection of structures. 15 Hours

UNIT - II
Work definition: Planning, work break down, responsibility integration with organizational structure detailed project plan.

Project scheduling: Activities, events Gantt charts network scheduling pert, CPM resource constraints.

Project costing: Estimation and budgeting, project cost, account systems cost, schedules, forecasting, financial evaluation of a project, social costs.

15 Hours

UNIT- III

Project control and management: Phases types, variance analysis problems, role of project manager, team work and leadership.

Project termination: Varieties of project termination processes, final report.

Computers in project management: Monitoring information, system software packages, utility and limitations.

9 Hours

TEXT BOOK:

REFERENCE BOOKS:

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INFORMATION THEORY AND CODING

Sub Code : 13EC601  Credits : 04
Course Outcomes:

After the completion of the course students should be able to:

1. Describe information source and evaluate the rate of information.
2. Develop statistical models representing the basic properties of the digital communication channels.
3. Understand various encoding algorithms.
4. Calculating efficiency and redundancy for various encoding algorithms.
5. Identifying communication channels based on their channel diagram.
6. Calculate entropy, mutual information and channel capacity.
7. Describe a Linear block code in the matrix form.
8. Estimate the error detection capability of the given linear block code.
9. Correcting one/two bit errors present in the linear block code.
10. Understand the Binary cyclic codes.
11. Design an encoder and syndrome calculation circuit for the binary cyclic codes.
12. Working of encoder and decoder for Convolutional codes using various approaches.

UNIT - I

Information Theory: Introduction, Model of a communication system, Elements of digital communication system[T1-1], Review of Probability theory[T1-3], Measure of information, Average information content(entropy) of symbols in long independent sequences[T1-4], Information rate, Properties of entropy, Extension of discrete memory less (zero-memory) sources [T2-2], Average information content(entropy) of symbols in long dependent sequences, Markov statistical model for information source, Entropy and information rate of Markov sources[T1-4].

10 Hours
UNIT - II

Source Coding: Properties of codes- Block codes, Non-singular codes, Uniquely decodable codes. Instantaneous codes and Optimal codes, Prefix of a code, Test for instantaneous property, Construction of Instantaneous code, decision tree, Kraft’s inequality, Source coding theorem(Shannon’s Noiseless coding theorem)[T2-2], Shannon’s encoding algorithm, Shannon-Fano encoding algorithm (binary, ternary) [T1-4], Huffman minimum redundancy code (binary, ternary and quaternary), code efficiency and redundancy [T2-2]. 10 Hours

UNIT - III

Channels and Mutual Information: Introduction, Discrete communication channels, Representation of a channel, Probability relations- priori, posteriori entropy, equivocation, mutual information, properties[T2-2], rate of information transmission over a discrete channel, capacity of a discrete memoryless channel, Shannon’s theorem on channel capacity(Shannon’s second theorem), Special channels- symmetric, binary symmetric, binary erasure, noiseless, deterministic and cascaded channels, Estimation of channel capacity by Muroga’s method, Continuous channels, Shannon-Hartley theorem and its implications, Shannon’s limit [T1-4]. 10 Hours

UNIT - IV

Error Control Coding-I: Introduction, Types of errors, Examples, Methods of controlling errors, Types of codes, Linear Block Codes- matrix description, encoding circuit, syndrome and error detection, syndrome circuit, Hamming weight, Hamming distance, Minimum distance of a block code [T3-3] error detection and correction capabilities of a linear block code, single error-correcting hamming codes, table lookup decoding using standard array [T1-9], general decoder for a linear block code [T3-3]. Binary cyclic codes, Algebraic structures of cyclic codes, Generator and parity-check matrices of cyclic codes, Encoding using (n-k) bit shift register, syndrome calculation, error detection and error correction [T1-9]. 12 Hours
UNIT - V

Error Controlling Coding-II: BCH codes, RS codes, Golay codes, Shortened cyclic codes, Burst error correcting codes, Burst and Random error correcting codes [Self Study]. Convolution codes-encoders, Time domain approach, Transform domain approach, code tree, trellis, state diagram, Sequential search and Viterbi algorithm [T1-9], Principle of Turbo coding [T3-1]. 10 Hours

TEXT BOOK:

REFERENCE BOOKS:

MICROWAVE DEVICES & COMMUNICATION

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Course Outcomes:

After studying this subject, the student should be able to understand:
1. Use of Smith chart to solve impedance matching problems.
2. Characteristic impedance, losses of different types of microstrip lines.
3. S-parameters for different microwave devices and their working.
4. Microwave Amplifiers and oscillators.
5. Parametric Amplifiers, Gunn diode, Tunnel diode etc.

UNIT- I

Micro Strip lines: Characteristic impedance, parameters, losses and quality factor Q of micro strip lines, coplanar strip lines and shielded strip lines parameters and its properties. Applications
Power and impedance relations: eighth, quarter and half wave line, impedance matching. Construction, single and double stub matching using Smith Chart.  

UNIT- II

Microwave devices:

UNIT- III

High frequency Limitations of conventional microwave devices, Velocity modulation, power output and efficiency and electronic admittance, Reflex Klystrons, Helix TWTS, Slow wave structure, amplification process, convection current, axial electric field, wave modes and gain consideration.

UNIT- IV

Mode of oscillation, Magnetron oscillators, cylindrical magnetron, Parametric devices, nonlinear reactance and Manley Rowe power relations, Parametric amplifier, Gunn diode - Gunn Effect, differential negative resistance, two valley model theory, Modes of operations, Tunnel diode, IMPATT Diode.

UNIT- V

System aspects of antenna, Wireless communication system, Radar system, Radiometer systems, Microwave propagation of waves, Ground
waves, Sky wave propagation, Space waves Troposphere scatter propagation.  

**TEXT BOOKS:**
2. Annapurna Das & Sisir K. Das, “Microwave Engineering”

**REFERENCE BOOK:**

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**VLSI CIRCUITS**

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*Self Study to be exercised under the supervision of course instructor and to be restricted to not more than 10% of the total teaching hours.

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

1. Understand the fundamentals of digital VLSI design, design flow, CMOS fabrication process.
2. Design CMOS circuits for any given complex logic function and draw the layout diagrams for them.
3. Perform DC analysis and transient analysis of a given CMOS circuit.
4. Design for minimum delay using driving large capacitive load and logical effort techniques.
5. Design advanced CMOS logic circuits such as C²MOS circuit, Domino CMOS circuit and dual rail logic networks.
6. Design basic CMOS Analog Circuits: single stage amplifiers, differential amplifiers and current mirrors.

UNIT- I

Introduction to VLSI: Design flow, VLSI chip types, Moore’s law, ideal switches, NMOS, PMOS transistor, current equations, threshold voltage. MOSFET operation, CMOS inverter, noise margin, basic logic gates in CMOS, complex logic gates in CMOS, transmission gate circuits, clocking and data flow, SR- latch, clocked SR- latch, A CMOS Positive Level Sensitive D-latch, Positive edge triggered D register.

10 Hours

UNIT- II

Basic CMOS Technology: Semiconductor technology overview, basic CMOS technology, p well / n well / twin well process. Physical structure of CMOS integrated circuits: Integrated circuits layers, sheet resistance, P and N- MOSFET layers, CMOS layers, interconnect layers. Stick diagram, Lambda rules for layout, electrical rules, and layout of basic structures, cell concepts, FET sizing and unit transistor, Physical design of logic gates, design hierarchies [Self Study]. Latch-up in CMOS and prevention.

12 Hours

UNIT- III

Electronic analysis of CMOS logic gates: DC characteristics of the CMOS inverter, inverter switching characteristics, power dissipation, DC characteristics of NAND and NOR gates, NAND and NOR transient response, analysis of complex logic gates, gate design for transient performance, pass transistors.

10 Hours

UNIT- IV

Designing with high speed CMOS logic networks: Gate delays, driving large capacitive loads, logic efforts, Timing Analysis (T2) [Self Study].

10 Hours
UNIT V

Advanced techniques in CMOS logic circuits: Mirror circuits, pseudo-NMOS, tri-state circuits, clocked CMOS, dynamic CMOS logic circuits.

MOS Analog Circuits: Basic current mirror, single stage CS (T3, 3.2.1 & 3.2.3) and CD (T3,3.3)MOS amplifiers, differential amplifier(with current source load).

10 Hours

TEXT BOOKS:

REFERENCE BOOKS:

ANTENNAS & WAVE PROPAGATION

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Course Outcomes:

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

1. Define basic antenna parameters.
2. Draw the phase/power/field patterns for any type of antenna.
3. **Develop** general equations and draw field pattern for array of antenna.
4. **Develop** theoretical maxima, half power beam width (HPBW), beam width between first nulls (BWFN) etc. using the field equation.
5. **Derive** E and H field equations for Electrical dipole and Loop antenna.
6. **Understand** the design parameters for Helical, Yagi antenna.
7. **Understand** the design equations of frequency dependent and independent antennas.
8. **Know** the principle of operations of antennas that are used for special communication purposes.
9. **Understand** the principle of ground and tropospheric wave propagation.
10. **Derive** expressions for basic parameters of Electromagnetic wave propagating in free space using geometrical configurations.

**UNIT -I**

**Antenna Basics:** Basic antenna parameters, patterns, beam area, Radiation Intensity, Beam efficiency, Directivity and Gain, Antenna aperture, Effective height,

**Point Sources:** Introduction, point sources, Power patterns, Power theorem and applications, Radiation intensity, Examples of Power patterns, field patterns, Phase patterns.

**Antenna Arrays:** Arrays of two isotropic point sources, Non-isotropic similar point sources, pattern multiplication, pattern synthesis, **Linear** array of n-isotropic sources of equal amplitude and spacing.

**UNIT-II**

**Null Directions:** Null directions of arrays. Array of two driven $\lambda/2$ elements (broad side case, end-fire case and general case with equal currents of any phase)

**ELECTRIC DIPOLE AND THIN LINEAR ANTENNAS:** The short electric dipole, the fields of short dipole, radiation resistance, thin linear antenna, radiation resistance of $\lambda/2$ antennas.
LOOP ANTENNA: The small loop, The Loop antenna (general case), Far – field Patterns of circular Loop Antennas and Uniform Current, The small loop as a special case, Radiation resistance of loops. 

10 Hours

UNIT- III

HELICAL ANTENNA AND YAGI-U DA ARRAY: Helical antenna, Helical geometry, The Helix Modes, Practical Design considerations of Monofilar axial-mode helical antenna, dipole arrays with parasitic elements, the yagi-uda array, Axial- mode pattern and phase velocity of wave propagation on Monofilar Helices, wide band characteristics of Monopilar axial- mode helical antenna.

ANTENNA TYPES: Slot antenna, Babinet’s principle and Complementary antenna, Horn antenna, The rectangular Horn Antenna, Reflector antenna (Flat sheet reflector, corner reflector, paraboloidal reflector), Broad band frequency independent antenna, Basics, Rumsey’s principle, The log- periodic antennas.

Antennas for special applications: Antennas for terrestrial mobile communication systems, Antennas for Ground Penetrating Radar (GPR), Embedded antennas, Ultra-wide band antennas for digital applications, plasma antennas.

12 Hours

UNIT- IV

WAVE PROPAGATION: Ground wave propagation, plain-earth reflections, space waves and surface waves, elevated dipole antenna above plain earth, wave tilt, spherical earth propagations, Tropospheric waves.

10 Hours

UNIT- V

IONOSPHERIC PROPAGATION: The Ionosphere, Reflection and Refraction of waves by Ionosphere, Regular and irregular variations of Ionosphere, Attenuation factor, Sky wave transmission, Effect of earth’s magnetic field, wave propagation in Ionosphere, Faraday rotation and measurement of total electron content.

10 Hours

TEXT BOOKS:


REFERENCE BOOKS:

MODERN RADAR AND NAVIGATIONAL AIDS

Sub Code : 13EC611  Credits : 03
Hrs/Week : 3  Total Hours : 39

Course Outcomes:

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

1. Have an appreciation of the working of a variety of radars
2. Know the principles of working of diverse navigational aids.
3. Understand the application of EM waves in range/velocity measurements
4. Derive different simple performance factors and know their limitations
5. Have a deeper understanding of various radars and their subsystems
6. Have an appreciation of diversity in radar applications
7. Know the basic parameters of electronic navigations
8. Gather the principles of working of different navigational instruments
9. Arrive at the limits of each type of electronic instrument
10. Get a detailed knowledge of present day complex navigation systems

UNIT- I

**Elementary Modern radar:** Radar overview, Radar range equation, Radar search and detection, Radar antennas, Radar transmitters, Radar receivers.  
15 Hours

UNIT-II

**Influencing factors:** Propagation effects, clutter, target reflectivity, target fluctuations, detection criteria, detection theory, exciter, signal processing, pulse compression.

**Radar Measurements:** Parameter Measurements, Doppler phenomenology, Doppler processing.  
16 Hours

UNIT- III

**Navigation:** Radio direction finding, VOR, Hyperbolic systems of navigation-LORAN, DECCA, OMEGA; DME, TACAN; Doppler navigation, inertial navigation, GPS.

**Aids to approach and landing:** ILS, MLS, precision approach radar.  
8 Hours

**TEXT BOOKS:**
REFERENCE BOOKS:

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ARM PROCESSOR

Sub Code : 13EC612  Credits : 03
Hrs/Week : 2+0+2+0  Total Hours : 39

NOTE: 1. CIE Evaluation: MSE-1 + MSE-2 + Mini project :
15Marks + 15 Marks +20 Marks

1. No. of Hours allotted for Lab: 11 Hours

Course Outcomes:

By the end of the course students should be able to:

1. Gain a thorough understanding of C programming for ARM microcontrollers from basic techniques through to advanced concepts such as serial communication, and interrupts.
2. Develop the skills and techniques required to write C programs of some complexity from scratch.
3. Develop a good understanding of how electronic systems are controlled.

UNIT-I
ARM Processor: Introduction to ARM 7, ARM – THUMB Mode, Programming Model, Instruction Set.  

UNIT - II


UNIT - III

Programming In Embedded C – Assembly Language, Source File To Hex File Translation, Embedded Firmware Development Languages/Options – Assembly Language – Source File To Hex File Translation, Embedded Firmware Development Languages/Options – High Level Language – Source File To Hex File Translation, Mixing Of Assembly Language With High Level Language, ‘C’ Verses Embedded C, Keywords, Data Type, Storage Class, Arithmetic Operators, Logic Operator, Branching And Loop Control Instructions, Arrays, Pointers, Characters and Strings, Input Output Operations, String operations, Functions, Structures, Union, Preprocessor and Macros, Delay, Bit Manipulation Operation, Coding Interrupt Service Routine, Reentrant Verses Recursive Function, Dynamic Memory Allocation, Memory Management Functions.

TEXT BOOKS:


COMPUTER OPERATING SYSTEMS

Sub Code : 13EC613  
Credits : 03
Hrs/Week : 3  
Total Hours : 39

UNIT - I

Introduction And Overview Of Operating Systems: Operating system, Goals of an O.S, Operation of an O.S, Resource allocation and related functions, User interface related functions, Classes of operating systems, O.S and the computer system, Batch processing system, Multi programming systems, Time sharing systems, Real time operating systems, distributed operating systems.

Structure of the Operating Systems: Operation of an O.S, Structure of the supervisor, Configuring and installing of the supervisor, Operating system with monolithic structure, layered design, Virtual machine operating systems, Kernel based operating systems, and Microkernel based operating systems.  
15 Hours

UNIT- II


Memory Management: Memory allocation to programs, Memory allocation preliminaries, Contiguous and noncontiguous allocation to programs, Memory allocation for program controlled data, kernel memory allocation.  
15 Hours

UNIT- III
Virtual Memory: Virtual memory basics, Virtual memory using paging, Demand paging, Page replacement, Page replacement policies, Memory allocation to programs, Page sharing, UNIX virtual memory.

Scheduling: Fundamentals of scheduling, Long-term scheduling, Medium and short term scheduling, Real time scheduling, Process scheduling in UNIX.  

TEXT BOOK:

REFERENCE BOOK:

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COMPUTER ORGANIZATION & ARCHITECTURE

Sub Code : 13EC614  
Credits : 03  
Hrs/Week : 3  
Total Hours : 39

UNIT - I

Basic Structure of Computers Computer types: Functional units, Basic operational Concepts, Bus structures, Performance, Historical Perspective. Machine Instructions and Programs. Numbers, Arithmetic operations and characters, Memory locations and addresses, characters and character strings addressing modes, assembly language, stack and queues, subroutines, instructions, encoding of machine instruction.


UNIT - II

The memory system: Semiconductor RAM Memories, Read only memories, Cache memories, Virtual memories, Secondary storage.

**Arithmetic:** Addition and Subtraction of signed numbers, ALU unit, Design of fast adders, Multiplication of positive numbers, Fast multiplication, Integer Division, Floating point numbers and operations.

15 Hours

**UNIT - III**

**Basic Processing Unit:** Register transfers, Execution of a complete instruction, Multiple bus organization, Hardwired control, Microprogrammed control, Embedded systems.

9 Hours

**TEXT BOOK:**


**REFERENCE BOOK:**


FUZZY LOGIC

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**UNIT - I**

**Introduction:** Background, Uncertainty and imprecision, Uncertainty in information, Fuzzy sets and membership, Classical sets, Fuzzy sets, Sets as points in hypercubes.

Membership functions: Standards, fuzzification, assignments, Inference, Rank. Neural networks, Genetic algorithms, Inductive reasoning.

Fuzzy arithmetic: Lambda-cuts, Defuzzification methods, fuzzy, Fuzzy transform (Mapping), Practical considerations, Approximate methods, DSW algorithm, Comparisons. 16 Hours

UNIT- II

Classical logic and fuzzy logic: Classical predicate logic-tautologies, Contradictions, Equivalence, Logical proofs, Deductive Inferences, Fuzzy logic, Fuzzy tautologies, contradictions, Equivalence and logical proofs, Other forms of the implication operation.

Fuzzy rule-based systems: Natural language, hedges, Rule-based system-canonical rule forms, Decomposition, Likelihood and truth qualification, Aggregation, Graphical techniques of inference. Fuzzy synthetic evaluation, ordering, decision making under fuzzy states. 15 Hours

UNIT- III

Fuzzy classification: Classification by equivalence relations-crisp relations, Fuzzy relations cluster analysis, Cluster validity, c-Means clustering-hard c-Means (HCM), Fuzzy c-Means (FCM), classification metric, Hardening the fuzzy c-Partition, Similarity relations from clustering. 8 Hours

TEXT BOOK:

REFERENCE BOOK:
ADVANCED SIGNAL PROCESSING

Sub Code : 13EC622 Credits : 03
Hrs/Week : 3 Total Hours : 39

UNIT-I

Review of prerequisites for advanced digital signal processing:
Signals, Fourier representations, DFT & FFT, IIR and FIR filters

Homomorphism signal processing: Homomorphic system, complex
Cepstrum, properties of complex cepstrum, complex cepstrum of
exponential signals, Real Cepstrum, Implementation of cepstrum using
DFT, Hilbert transform relations in cepstral analysis,

Homomorphic systems: convolution and deconvolution, Examples of
Homomorphic signal processing, Communication signal processing and
speech processing. 16 Hours

UNIT-II

Adaptive filtering: Principle of Adaptive filters, Tapped delay Line and
Weiner filters, Steepest Descent Algorithm, Least Mean Square (LMS)
Algorithm, Direct Least Square and Recursive Least Square (RLS)
Algorithms

Application of Adaptive filters: Noise canceller, Echo canceller, Side
Lobe Canceller, Adaptive Line Enhancer.

Multi-rate Signal Processing: Multi-rate Systems, Decimation and
Interpolation (integer and fractional), Decimation Filters, Interpolation
File 15 Hours

UNIT-III

Interpolated FIR filters for decimation and interpolation filters. Uniform
DFT filter banks, QMF banks Perfect Reconstruction, Poly Phase Filter
structure, Poly Phase Filter structure for Decimation and Interpolation,
Filter Banks, Half band and Multiband filters, PR systems.
TEXT BOOKS:
T2. Vaidyanathan P.P, “Multirate Systems and Filter Banks”,
T4. DSP Handbook.
T5. Elliot et al Hayes M H, “Statistical Signal Processing and

REFERENCE BOOKS:
Processing”, Prentice Hall, 1992

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DATA BASE MANAGEMENT SYSTEM

Sub Code : 13EC623  Credits : 03
Hrs/Week : 3 Total Hours : 39

UNIT-I

Introduction: DBMS Administrators, designers, Users, Developers &
maintenance users of DBMS.
DBMS: Architecture, Schemes & Interfaces. Entity-Relationship model,
Record storage & primary file organization: Hashing techniques, Index
structures, Multilevel indexes using B-trees.
Relational data model & Relational algebra: Queries in relational
algebra. 16 Hours

UNIT - II
SQL: a Relational Database language. Different clauses & example queries.

**Database Design:** I, II, III Normal forms, BCNF, Join dependencies, IV & V Normal forms.  

**UNIT - III**

Query processing & Optimization, Transactions, Recovery & Concurrency control. Security & Integrity constraints.  

9 Hours

**TEXT BOOK:**

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**CONTROL SYSTEMS**

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**Course Outcomes:**

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

1. Model the system in the different analogues form.
2. Determine the transfer function of the system using different techniques.
3. Determine the time response of the system for different types of inputs.
4. Determine the stability of the system using various methods.

**UNIT -I**

**Modeling of Systems:** The control system, Mathematical models of physical systems- Differential equations of physical systems- Electrical systems, Mechanical system.
Block diagrams and signal flow graphs: Transfer functions, Block diagram algebra, and Signal flow graphs. Time response of feedback control systems: Unit step response of First and Second order systems, Time response specifications, Time response specifications of Second order systems, steady-state errors and error constants. 16 Hours

UNIT-II

Root – Locus Techniques: Introduction, the root locus concepts.
Stability in the frequency domain: Mathematical preliminaries, Nyquist stability criterion, (Inverse polar plots excluded), Assessment of relative stability using Nyquist criterion, (Systems with transportation lag excluded). 15 Hours

UNIT-III

Frequency domain analysis: Introduction, Correlation between time and frequency response, Bode plots (construction and analysis of Bode plots for simple systems). 8 Hours

TEXT BOOK:

REFERENCE BOOKS:

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DIGITAL SIGNAL PROCESSING LAB

Sub Code : 13EC605 Credits : 02
Course Outcomes:

Upon successful completion of this lab, students will be able to

1. Apply sampling theorem to know at what condition reconstruction is possible.
2. Understand linear convolution, its relationship with circular convolution, how linear convolution can be computed by circular convolution and DFT, IDFT method to compute circular convolution.
3. Verify the properties of a signal such as Energy, Symmetricity and Periodicity.
4. Find the impulse response of an LTI system for a given difference equation. Analyze and observe magnitude and phase characteristics of N-point DFT to obtain high resolution, high density spectrum.
5. Analyze and observe frequency response characteristics of FIR filters using windowing techniques and frequency response characteristics of digital IIR Butterworth & Chebyshev filters using bilinear transformation technique.
6. Implement DSP algorithms using C programming with TMS320C6713 floating point DSP processor with CCStudio Platform.

LIST OF EXPERIMENTS USING MATLAB

<table>
<thead>
<tr>
<th>Experiment No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>i) Familiarization with MATLAB software and general functions</td>
</tr>
<tr>
<td></td>
<td>ii) Generation of Elementary signals</td>
</tr>
<tr>
<td></td>
<td>• Sinusoidal</td>
</tr>
<tr>
<td></td>
<td>• Square</td>
</tr>
</tbody>
</table>
• Complex waveform
• Unit Step
• Unit Ramp
• Exponential
• Noise

2 Verification of Sampling theorem
   i) Under Sampling
   ii) Sampling at Nyquist rate
   iii) Over Sampling

3 Finite and Infinite Response of an LTI System
   i) Impulse Response
   ii) Frequency Response

4 Linear Convolution of two given sequences.
   i) One sided sequences
   ii) Two sided sequences

5 Circular Convolution of two given sequences.
   i) Equal length sequences
   ii) Unequal length sequences

6 Auto Correlation of a given sequence and verification of its properties.
   i) Symmetry (Even)
   ii) Energy
   iii) Periodicity

7 Cross Correlation of a given sequence and verification of its properties.
   i) Conjugate Symmetry

8 Response of a system described by given difference equation.
   i) Impulse Response
   ii) Step Response
   iii) Steady state Response
   iv) Complete Response with a given initial condition

9 Computation of N point DFT of a given sequence and plot high density, high resolution Magnitude and Phase Spectrum.
   i) Using FFT command
   ii) Without using FFT command

10 Convolution of two given sequences using DFT and IDFT.
i) Linear Convolution
ii) Circular Convolution

11 Design and implementation of FIR filter to meet the given specifications using Rectangular /Bartlett /Hanning /Hamming /Blackman window for the following types of filters,
   i) LPF
   ii) HPF
   iii) BPF
   iv) BSF

12 Design and Implementation of Analog and Digital IIR filter to meet the given specifications for the following types of filters,
   i) LPF
   ii) HPF
   iii) BPF
   iv) BSF

**LIST OF EXPERIMENTS USING DSP PROCESSOR**

<table>
<thead>
<tr>
<th>Experiment No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Linear convolution of two given sequences.</td>
</tr>
<tr>
<td>2</td>
<td>Circular convolution of two given sequences.</td>
</tr>
<tr>
<td>3</td>
<td>Computation of N point DFT of a given sequence.</td>
</tr>
<tr>
<td>4</td>
<td>Impulse response of a given system of a given system of first and second order.</td>
</tr>
<tr>
<td>5</td>
<td>Realization of an FIR filter (any type) to meet given specification.</td>
</tr>
</tbody>
</table>

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**ADVANCED COMMUNICATION LAB**

Subject Code : 13EC606  
Credits : 02  
Hrs/Week : 3
**Course Outcomes:**

1. Verification of sampling theorem using flat top samples.
2. Realization of various binary digital modulation and demodulation schemes.
4. Study of optical fibers – to find various losses and numerical aperture.

**LIST OF EXPERIMENTS**

1) Verification of sampling theorem using flat top samples.
2) ASK generation and detection (binary)
3) FSK generation and detection (binary).
4) PSK generation and detection (binary).
5) DPSK encoder and decoder.
6) QPSK modulator.
7) Measurement of guide wavelength ($\lambda_g$), frequency and VSWR with using microwave test bench Reflex Klystron as source
8) Measurement of antenna parameters.
9) Determination of coupling coefficient and isolation characteristics of microstripline Directional coupler.
10) Study of optical fibers
11) a) Measurement of resonant characteristics of microstrip ring resonator
    b) Measurement power division & Isolation characteristics of microstrip 3dB power divider.

**REFERENCE BOOKS:**


EMPLOYABILITY SKILL DEVELOPMENT

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>13IL001/002</th>
<th>Credits</th>
<th>Nil (MLC)</th>
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<tbody>
<tr>
<td>Hrs/Week</td>
<td>1+0+0+0+0</td>
<td>Total Hours</td>
<td>12</td>
</tr>
</tbody>
</table>

UNIT - I
Analytical Aptitude Skill: concept of analytical skill, definition-logical thinking and testing of Analytical Aptitude

UNIT - II
Quantitative Aptitude skill-Concept-definition-Preliminary requirement for development of quantitative skill- testing of quantitative skill.

UNIT - III
Verbal and ability skill – Knowledge and Vocabulary and grammar-comprehension-Verbal Reasoning skill

REFERENCE BOOKS:

**Examination pattern:**
This course is a mandatory learning course without credit. Continuous internal examination (CIE) consists of 2 internal exams (20 marks each) and tasks (10 marks). There is no semester end examination (SEE). The student will be awarded PP or NP grade as per autonomous regulations.