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

OBJECTIVES
At the end of the course, the students would be acquainted with the basic concepts in numerical methods,

- The roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigenvalue problem of a matrix can be obtained numerically where analytical methods fail to give solution.
- When huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial to represent the data and to find the intermediate values.
- The numerical differentiation and integration find application when the function in the analytical form is too complicated or the huge amounts of data are given such as series of measurements, observations or some other empirical information.
- Since many physical laws are couched in terms of rate of change of one/two or more independent variables, most of the engineering problems are characterized in the form of either nonlinear ordinary differential equations or partial differential equations. The methods introduced in the solution of ordinary differential equations and partial differential equations will be useful in attempting any engineering problem.

UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9+3

UNIT II INTERPOLATION AND APPROXIMATION 9+ 3
Lagrangian Polynomials – Divided differences – Interpolating with a cubic spline – Newton’s forward and backward difference formulas.

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9+ 3

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9+ 3

UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 9+ 3
Finite difference solution of second order ordinary differential equation – Finite difference solution of one dimensional heat equation by explicit and implicit methods – One dimensional wave equation and two dimensional Laplace and Poisson equations.

TOTAL : 60

TEXT BOOKS
REFERENCES


EC1301 COMMUNICATION THEORY 3 1 0 100

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

**OBJECTIVE**

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

**UNIT I AMPLITUDE MODULATIONS**

Generation and demodulation of AM, DSB-SC, SSB-SC, VSB Signals, Filtering of sidebands, Comparison of Amplitude modulation systems, Frequency translation, Frequency Division multiplexing, AM transmitters – Superhetrodyne receiver, AM receiver.

**UNIT II ANGLE MODULATION**


**UNIT III NOISE PERFORMANCE OF DSB, SSB RECEIVERS**

Noise – Shot noise, thermal noise, White noise, Noise equivalent Bandwidth, Narrowband noise, Representation of Narrowband noise in terms of envelope and phase components, Sinewave plus Narrowband Noise, Receiver model, Noise in DSB-SC receiver, Noise in SSB receiver

**UNIT IV NOISE PERFORMANCE OF AM AND FM RECEIVERS**


Noise in AM receivers threshold effect, Noise in FM receivers capture effect, FM threshold effect, FM threshold reduction, Pre-emphasis and de-emphasis in FM, Comparison of performance of AM and FM systems.

UNIT V INFORMATION THEORY

Uncertainty, Information and entropy, Source coding theorem, Data compaction, Discrete memory less channels, mutual information, channel capacity, channel coding theorem, Differential entropy, and mutual information for continuous ensembles, information capacity theorem, implication of the information capacity theorem, rate distortion theory, Compression of information.

TUTORIAL 15
TOTAL: 60

TEXT BOOK

REFERENCES

EC1302 DIGITAL SIGNAL PROCESSING 3 1 0 100

AIM
To study the signal processing methods and processors.

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

UNIT I

FFT


UNIT II

DIGITAL FILTERS DESIGN


UNIT III

FINITE WORD LENGTH EFFECTS

Quantization noise – derivation for quantization noise power – Fixed point and binary floating point number representation – comparison – over flow error – truncation error – co-efficient quantization error - limit cycle oscillation – signal scaling – analytical model of sample and hold operations.

UNIT IV

POWER SPECTRUM ESTIMATION


UNIT V

DIGITAL SIGNAL PROCESSORS

Introduction to DSP architecture – Harvard architecture - Dedicated MAC unit - Multiple ALUs, Advanced addressing modes, Pipelining, Overview of instruction set of TMS320C5X and C54X.
EC1303 MICROPROCESSORS AND MICROCONTROLLERS 3 0 0 100

AIM

To learn the architecture programming and interfacing of microprocessors and microcontrollers.

OBJECTIVES

- To introduce the architecture and programming of 8085 microprocessor.
- To introduce the interfacing of peripheral devices with 8085 microprocessor.
- To introduce the architecture and programming of 8086 microprocessor.
- To introduce the architecture, programming and interfacing of 8051 microcontroller.

UNIT I 8085 CPU

UNIT II PERIPHERALS INTERFACING 9

UNIT III 8086 CPU 9

UNIT IV 8051 MICROCONTROLLER 9
8051 Microcontroller hardware- I/O pins, ports and circuits- External memory – Counters and Timers-Serial Data I/O- Interrupts-Interfacing to external memory and 8255.

UNIT V 8051 PROGRAMMING AND APPLICATIONS 9
8051 instruction set – Addressing modes – Assembly language programming – I/O port programming -Timer and counter programming – Serial Communication – Interrupt programming –8051 Interfacing: LCD, ADC, Sensors, Stepper Motors, Keyboard and DAC.

TOTAL : 45

TEXT BOOKS
REFERENCES

EC1304 ELECTRONIC CIRCUITS II 3 1 0 100

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

OBJECTIVES
On completion of this course the student will understand
• The advantages and method of analysis of feed back amplifiers
• Analysis and design of RC and LC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, blocking oscillators and time based generators.

UNIT 1 FEEDBACK AMPLIFIERS 9
Block diagram. Loop gain. Gain with feedback. Desensitivity of gain. Distortion and cut off frequencies with feedback. The four basic feedback topologies and the type of gain stabilized by each type of feedback. Input and Output resistances with feedback. Method of identifying feedback topology, feedback factor and basic amplifier configuration with loading effect of feedback network taken into account.

UNIT II OSCILLATORS

UNIT III TUNED AMPLIFIERS

UNIT IV WAVE SHAPING AND MULTIVIBRATOR CIRCUITS

UNIT V BLOCKING OSCILLATORS AND TIMEBASE GENERATORS

TUTORIAL 15

TOTAL : 60

TEXT BOOKS

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

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

UNIT I  TRANSMISSION LINE THEORY

Different types of transmission lines – Definition of Characteristic impedance – The transmission line as a cascade of T-Sections - Definition of Propagation Constant.
General Solution of the transmission line – The two standard forms for voltage and current of a line terminated by an impedance – physical significance of the equation and the infinite line – The two standard forms for the input impedance of a transmission line terminated by an impedance – meaning of reflection coefficient – wavelength and velocity of propagation.
Waveform distortion – distortion less transmission line – The telephone cable – Inductance loading of telephone cables.
Input impedance of lossless lines – reflection on a line not terminated by Zo - Transfer impedance – reflection factor and reflection loss – T and Π Section equivalent to lines.

UNIT II  THE LINE AT RADIO FREQUENCIES

Standing waves and standing wave ratio on a line – One eighth wave line – The quarter wave line and impedance matching – the half wave line.
The circle diagram for the dissipationless line – The Smith Chart – Application of the Smith Chart – Conversion from impedance to reflection coefficient and vice-versa.
Impedance to Admittance conversion and viceversa – Input impedance of a lossless line terminated by an impedance – single stub matching and double stub matching.

UNIT III  GUIDED WAVES

UNIT IV  RECTANGULAR WAVEGUIDES

UNIT V  CIRCULAR WAVE GUIDES AND RESONATORS
Bessel functions – Solution of field equations in cylindrical co-ordinates – TM and TE waves in circular guides – wave impedances and characteristic impedance – Dominant mode in circular waveguide – excitation of modes – Microwave cavities, Rectangular cavity resonators, circular cavity resonator, semicircular cavity resonator, Q factor of a cavity resonator for TE101 mode.

TUTORIAL  15
TOTAL : 60
TEXT BOOKS
1. J.D.Ryder “Networks, Lines and Fields”, PHI, New Delhi, 2003. (Unit I & II)

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

SIMULATION USING PSPICE:
1. Differentiate amplifier
2. Active filter : Butterworth II\textsuperscript{nd} order LPF
3. Astable, Monostable and Bistable multivibrator - Transistor bias
4. D/A and A/D converter (Successive approximation)
5. Analog multiplier
6. CMOS Inventor, NAND and NOR
To introduce the student to various digital Signal Processing techniques using TMS 320c5x family processors and MATLAB.

OBJECTIVES:
- To implement the processing techniques using the instructions of TMS320c5x.
- To implement the IIR and FIR filter using MATLAB.

LIST OF EXPERIMENTS

USING TMS320C5X
1. Study of various addressing modes of DSP using simple programming examples
2. Sampling of input signal and display
3. Implementation of FIR filter
4. Calculation of FFT

USING MATLAB
1. Generation of Signals
2. Linear and circular convolution of two sequences
3. Sampling and effect of aliasing
4. Design of FIR filters
5. Design of IIR filters
6. Calculation of FFT of a signal

EC1307 MICROPROCESSOR AND APPLICATIONS LAB 0 0 3 100
1. Programs for 8/16 bit Arithmetic operations (Using 8085).
2. Programs for Sorting and Searching (Using 8085, 8086).
3. Programs for String manipulation operations (Using 8086).
4. Programs for Digital clock and Stop watch (Using 8086).
5. Interfacing ADC and DAC.
6. Parallel Communication between two MP Kits using Mode 1 and Mode 2 of 8255.
7. Interfacing and Programming 8279, 8259, and 8253.
8. Serial Communication between two MP Kits using 8251.
9. Interfacing and Programming of Stepper Motor and DC Motor Speed control.
11. Programming and verifying Timer, Interrupts and UART operations in 8031 microcontroller.
12. Communication between 8051 Microcontroller kit and PC.