DKTE Society's

TEXTILE & ENGINEERING INSTITUTE

(An Autonomous Institute)

Rajwada , Ichalkaranji 416115

DEPARTMENT: ELECTRONICS AND TELECOM ENGG.

CURRICULUM

Third Year

With Effect From

2018-19

DKTE

Promoting Excellence in Teaching
Learning & Research

DKTE Society's Textile and Engineering Institute, Ichalkaranji

(An Autonomous Institute)

THIRD Year B. Tech. Electronics and Telecommunication Engineering

Semester - V

Sr. No.	Course Code	Name of the Course	Group	Teaching Scheme										
				Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	SE I	SE II	SEE	Practical CIE	Practical SEE	Total	Credit
1	ETL301	Microcontrollers	D	4	-	-	4	25	25	50	-	-	100	4
2	ETL302	Control Systems	D	3	-	-	3	25	25	50	-	-	100	3
3	ETL303	Signals & Systems	D	3	-	-	3	25	25	50	-	-	100	3
4	ETL304	Antenna and Wave Propagation	D	3	-	-	3	25	25	50	-	-	100	3
5	ETL305	Digital Communication	D	3	-	-	3	25	25	50	-	-	100	3
6	ETP306	Microcontrollers Lab	D	-	-	2	2	-	-	-	50	50	100	1
7	ETP307	Antenna and Wave Propagation lab	D	-	-	2	2	-	-	-	50	50	100	1
8	ETP308	Digital Communication Lab	D	-	-	2	2	-	-	-	50	50	100	1
9	ETP309	C++ Programming Lab	D	2	-	2	4	-	-	-	50	50	100	3
10	ETD310	Mini Project III	F	-	-	2	2	-	-	-	50	-	50	2
Total				18	0	10	28	125	125	250	250	200	950	24
11	ETI311	Entrepreneurship Development (Audit Course)	C	2	0	-	2	-	-	-	-	-	-	Grade
Total				20	0	10	30	125	125	250	250	200	950	24

Abbreviations:

CIE: Continuous Internal Evaluation

SEE: Semester End Examination

SE-I: Semester Examination-I

SE-II: Semester Examination-II

Group Details

A: Basic Sciences

B: Engineering Sciences

C: Humanities, Social Sciences & Management

D: Professional Subjects - Core and Electives

E: Open Electives

F: Project/ Seminar/ Training

DKTE Society's Textile and Engineering Institute, Ichalkaranji

(An Autonomous Institute)

Teaching and Evaluation Scheme for

THIRD Year B. Tech. Electronics and Telecommunication Engineering

Semester - VI

Sr. No.	Course Code	Name of the Course	Group	Teaching Scheme										Credit
				Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	SE I	SE II	SEE	Practical CIE	Practical SEE	Total	
1	ETL312	Computer Networks and Protocols	D	3	-	-	3	25	25	50	-	-	100	3
2	ETL313	VLSI Design	D	3	-	-	3	25	25	50	-	-	100	3
3	ETL314	Digital Signal Processing	D	3	-	-	3	25	25	50	-	-	100	3
4	ETL315	Industrial And Financial management	C	3	-	-	3	25	25	50	-	-	100	3
5	OE	OPEN ELECTIVE	E	3	-	-	3	25	25	50	-	-	100	3
6	ETP316	Computer Networks and Protocols Lab	D	-	-	2	2	-	-	-	50	-	50	1
7	ETP317	VLSI Design Lab	D	-	-	2	2	-	-	-	50	50	100	1
8	ETP318	Digital Signal Processing Lab	D	-	-	2	2	-	-	-	50	50	100	1
9	ETP319	Electronic System Design Lab	D	-	-	2	2	-	-	-	50	50	100	1
10	ETD320	Mini Project-IV	F	-	-	2	2	-	-	-	50	-	50	2
11	ETT321	Industrial Training	F	-	-	2	2	-	-	-	50	-	50	2
Total				15	0	12	27	125	125	250	300	150	950	23

Abbreviations:

CIE: Continuous Internal Evaluation

SEE: Semester End Examination

SE-I: Semester Examination-I

SE-II: Semester Examination-II

Group Details

A: Basic Sciences

B: Engineering Sciences

C: Humanities, Social Sciences & Management

D: Professional Subjects - Core and Electives

E: Open Electives

F: Project/ Seminar/ Training

Open elective

TTLOE1 Technical Textiles

CSLOE2 Fundamentals of Java Programming

MELOE2 Fundamentals of Mechatronics

Third Year UG Program in Electronics and Telecommunication Engineering
Semester-V

Sr. No.	Course Code	Name of the Course	Group	Teaching Scheme				Credits
				Theory Hrs/ Week	Tutorial Hrs/ Week	Practical Hrs/ Week	Total	
1	ETL301	Microcontrollers	D	4	-	-	4	4
2	ETL302	Control Systems	D	3	-	-	3	3
3	ETL303	Signals & Systems	D	3	-	-	3	3
4	ETL304	Antenna and Wave Propagation	D	3	-	-	3	3
5	ETL305	Digital Communication	D	3	-	-	3	3
6	ETP306	Microcontrollers Lab	D	-	-	2	2	1
7	ETP307	Antenna and Wave Propagation lab	D	-	-	2	2	1
8	ETP308	Digital Communication Lab	D	-	-	2	2	1
9	ETP309	C++ Programming Lab	D	2	-	2	4	3
10	ETD310	Mini Project III	F	-	-	2	2	2
11	ETI311	Entrepreneurship Development (Mandatory Audit Course)	C	2	0	-	2	Grade
Total				20	0	10	30	24

Third Year UG Program in Electronics Engineering
Semester-VI

Sr. No.	Course Code	Name of the Course	Group	Teaching Scheme				Credits
				Theory Hrs/ Week	Tutorial Hrs/ Week	Practical Hrs/ Week	Total	
1	ETL312	Computer Networks and Protocols	D	3	-	-	3	3
2	ETL313	VLSI Design	D	3	-	-	3	3
3	ETL314	Digital Signal Processing	D	3	-	-	3	3
4	ETL315	Industrial And Financial management	C	3	-	-	3	3
5	OE	OPEN ELECTIVE*	E	3	-	-	3	3
6	ETP316	Computer Networks and Protocols Lab	D	-	-	2	2	1
7	ETP317	VLSI Design Lab	D	-	-	2	2	1
8	ETP318	Digital Signal Processing Lab	D	-	-	2	2	1
9	ETP319	Electronic System Design Lab	D	-	-	2	2	1
10	ETD320	Mini Project-IV	F	-	-	2	2	2
11	ETT321	Industrial Training	F	-	-	2	2	2
				15	0	12	27	**23**

* List of Open Electives

1. TTLOE1 Technical Textiles
2. CSLOE2 Fundamentals of Java Programming
3. MELOE2 Fundamentals of Mechatronics

Third Year B. Tech.

ETL301: Microcontrollers

Teaching Scheme	
Lectures	4 Hrs. /Week
Total Credits	4

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

Course Objectives:

Student should be able to,

1. Understand and gain knowledge of architecture of 8051 microcontrollers and MSP 430.
2. Demonstrate experiments for 8051 microcontroller using scientific tools in assembly and embedded 'C' programming Language.
3. Understand external memory interfacings like DROM,DRAM,PROM to Microcontroller.
4. Summarize different on chip resources such as interrupt, timer/counter, serial communication with different baud rates for microcontrollers.
5. Understand port programming to interface various external I/O peripherals to design different systems.
6. Develop the programing skills for 8051 Microcontrollerrequired to accomplish a desired application.

Course Outcomes:

Upon completion of this course, learners will be able to……

C301.1	**Compare and Contrast** basicarchitecture of 8051 Microcontrollers and MSP 430.
C301.2	**List** the registers of the 8051 microcontroller and data manipulation using the registers.
C301.3	**Describe** various Microcontroller on chip resources like I/O ports, Timer, Serial Communication and Interrupt structure.
C301.4	**Compose** well-structured and understandable programs for Microcontroller on chip resources using assembly language instructions and embedded C in KEIL IDE.
C301.5	**Demonstrate** PORT programming skills for interfacing external hardware's with 8051

	Microcontroller.
C301.6	**Apply** knowledge of designing, developing and prototyping the applications of microcontrollers for minisystem design.

Course Contents		
UNIT-I	**Introduction to MCS51 Microcontroller family** Introduction to MCS51Family, microcontroller and embedded processors,Architecture, Functional Pin out diagram, Programming Model, Memory Organization, data types, directives, comparison between different MCS51 families, Reset Circuit, Machine Cycle, Oscillator Circuit.	**7 Hrs**
UNIT-II	**8051 Assembly Language Programming** Assembling and running 8051 program, addressing modes, and arithmetic, logical and branching instructions with programs.	**11 Hrs**
UNIT-III	**8051 ON Chip Resources, Programming and Interfacing** Input / Output Ports, Counters & Timers, Serial Communication, Interrupt programming, external memory –PROM,DROM,DRAM interfacing with 8051.[Structure of Above, Related S.F.R, Instruction, Associated Programs]	**8 Hrs.**
UNIT-IV	**Introduction to Embedded C programming for 8051** Data types and time delay, I/O programming, Logic operations, data conversion, accessing code ROM space, data serialization in 8051 using embedded C programming	**11 Hrs.**
UNIT-V	**Hardware Interfacing & Application** Interfacing: LED, Switch, Relay, LCD, Analog to Digital Converter, Digital to Analog Converter, Keyboard, L293D motor driver IC, stepper motor, serial communication with RS232.[Note: Above hardware interfacing can be done by using Embedded C programming model]	**11 Hrs**
UNIT-VI	**Introduction to MSP 430 CPU Architecture**	**8 Hrs**

	Introduction, MSP 430 ISC CPU Architecture-Arithmetic and Logic Unit[ALU],Registers, Compiler Friendly Features, Clock System, Memory System, Differentiating factor between different MSP 430 Families.	

Reference Books:

1. The 8051 Microcontroller & Embedded Systems using Assembly and CBy Muhammad Ali Mazidi, Janice GillispieMazidi&RolinD.McKinlay, Pearson Edition L. P .E.
2. The 8051 Microcontroller By Ayala 3rd Edition
3. 8051 Microcontroller-Internals,Instructions,Programming& Interfacing by SubrataGhoshal,,Pearson
4. "MSP 430 Microcontroller Basic", John Davies,Elsevier,2008.
5. A comprehensive approach to Microcontrollers by A.P.Godse,D.A.Godse,Technical Publications

Third Year B. Tech.

ETP306: Microcontrollers Lab

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
SEE	50
Total	**100**

Experiment List

1. Experiment on assembly language programming for Arithmetic & Logical operations using 8051 using different addressing modes.
2. Experiment on assembly language programming for data conversion.
3. Experiment on assembly language programming for Data transfer & Exchange using 8051
4. Experiment on assembly language programming for accessing array element in ascending and descending order using 8051
5. Experiment on assembly language programming for 8051 Port handling
6. Experiment on embedded C programming for Timer operation in 8051
7. Experiment on embedded C programming for interrupt handling operation in 8051
8. Experiment on embedded C programming for Serial Communication with 8051
9. Experiment on embedded C programming to interface Liquid Crystal Display to 8051
10. Experiment on embedded C programming to interface Analog to Digital Converter to 8051
11. Experiment on embedded C programming to interface L293D to 8051
12. Minisystem design using 8051 Microcontroller.

Third Year B. Tech.

ETL 302: Control Systems

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

Course Objectives

1. To provide an introduction and basic understanding of Mathematical Modelling and Control Systems
2. To develop time & frequency domain analysis
3. To analyze & compare different control systems from the perspective of Stability
4. To understand the concept of state space variables

Course Outcomes

At the end of the course students will be able to.

1. Apply knowledge of mathematics, science, and engineering to design, analyze and control the different systems.
2. Explain time & frequency domain analysis for different control systems.
3. Demonstrate & compare different control systems.
4. Describe State space modelling and its variables.

UNIT-I Basic Concepts:

Notion of feedback, open- and closed-loop systems.

UNIT-II Modeling and representations of control systems:

Ordinary differential equations, Transfer functions, Block diagrams, Signal flow graphs, State-space representations

UNIT-IIIPerformance and stability:

Time-domain analysis, Second-order systems, Characteristic-equation and roots, Routh-Hurwitz criteria

UNIT-IV Frequency-domain techniques:

Root-locus methods, Frequency responses, Bode-plots, Gain-margin and phase-margin, Nyquist plots

UNIT-V: Compensator design:

Proportional, PI and PID controllers, Lead-lag compensators.

UNIT-V State-space concepts:

Controlability, Observability, pole placement result, Minimal representations.

Reference Books

- **Control System Engineering by I.J.Nagrath&M.Gopal,** New Age International Publishers Ltd.-New Delhi
- **Control System Engineering by Norman S. Nise,** Wiley; Fifth edition (2009)

Third Year B. Tech.

ETL303: Signals and Systems

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

Course Objectives

1. Analyze the response of linear, time-invariant dynamic systems to random input signals or noise, and understand how the resulting outputs reflect input and system characteristics
2. Understand the notion of state for a causal system, the relation of state to system input and output signals, and the use of state in inference and feedback control for the system.
3. Analyze systems – commonly found in communication, control and signal processing –that combine discrete-time and continuous-time components
4. Develop reasonably-accurate mathematical models for physical systems, find LTI approximations to the models, produce block-diagram implementations of the mathematical models, and analyze the block diagram realizations

Course Outcomes

At the end of the course

1 Students will be able to understand basic concepts of linear systems and how they interact with continuous-time and discrete time signals.

2 Students will be able to understand Z-domain descriptions of signals and systems, for use in solving difference equations.

3 Students will be able to design a sampling and reconstruction system to meet specific requirements

4 Students will be able to analyze continuous-time and discrete time signals and systems.

5 Determine Fourier transforms for continuous-time and discrete-time signals (or impulse-response functions), and understand how to interpret and plot Fourier transform magnitude and phase functions.

Course Contents

Unit 1. Introduction to signals And Systems **7 Hrs.**

A) **Signals and Classification of Signals:** Continuous time signals & discrete time, analog & digital, even &odd signals, periodic &non-periodic, deterministic &non-deterministic, energy &power, Basic CT & DT signals: unit impulse, unit step, unit ramp, complex exponential &sinusoidal, Basic operations on signals.

B) **System and Classification of Systems:** System Representation, continuous time Systems & discrete Systems, system with and without memory, causal and noncausal system, linear and nonlinear system, Time invariant and time variant system, Stable system, properties of systems.

Unit 2. Linear Time Invariant System **7 Hrs.**

The representation of signals in term of impulses, discrete time LTI systems, continuous time-LTI systems, properties of CT- LTI and DT-LTI systems, System Transfer function & Impulse response, Differential Equations Convolution: Convolution integral & its properties, convolution sum & its properties, Systems described by differential, difference equations, block diagram representation of LTI systems described by differential difference equations, Singularity functions.

Unit 3. Sampling **6 Hrs.**

Representation of continuous time signals by its samples, The sampling theorem, Reconstruction of signals from its sample s using interpolation, The effect of under sampling, aliasing, Discrete time processing of continuous time signals, Sampling in the frequency domain.

Unit 4. Z Transform **7 Hrs.**

Introduction of Z-transform, ROC, properties of ROC, Unilateral Z-transform, properties of Z transform: linearity, time shifting, time reversal, time scaling, convolution, differentiation, multiplication, Parsevals theorem, initial value & final value theorem. Inverse Z-transform: long division method, PFE method, residue method. Transfer function (Poles &Zeros),stabilityand causality. Representation of system via difference equation and solutions.

Unit 5. Fourier Series for continuous time and discrete time signals **7 Hrs.**

Dirichlet's conditions, General Fourier series, Parseval's identity, Harmonic Analysis, Continuous time Fourier series: Trigonometric and exponential Fourier series, Relation between trigonometric and exponential Fourier series. Discrete time Fourier Series, properties of Fourier series

Unit 6. Continuous Time Fourier Transform: **8 Hrs**

From Fourier series to Fourier Transform, Fourier Transform pair, Fourier Spectra, Convergence of FT, plotting of amplitude & phase spectra, Energy Spectral Density, Power Spectral Density concepts

Properties of Fourier transform: linearity, time shifting, frequency scaling, time scaling, time reversal, duality, differentiation in time domain and frequency domain, Integral in time domain, multiplication, and convolution and Parsevals relation,types of Fourier analysis(CTFS, CTFT, DTFS, DTFT& DFT)

Reference Books

1. Simon Haykin, Signals and Systems, John Wiley

2. Simon Haykin, Analog and Digital Communications, John Wiley
3. Oppenheim &Wilsky, Signals & Systems, PHI
4. S. Haykin, Signals and Systems , Wiley Eastern Publication
5. J.G. Proakis, D. G. Manolakis, Digital Signal Processing: Principles, Algorithms and applications, Prentice Hall of India.
6. Ashok Ambardar, Analog and Digital Signal Processing, Thomson Learning, second edition
7. Oppenheim and Schafer with Buck, Discrete- Time Signal Processing, Prentice Hall of India

Third Year B. Tech.

ETL304: Antenna and Wave Propagation

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

Course Objectives

1. To make students aware of the fundamentals of antenna system
2. To introduce the students about various antenna types and their applications in various domains.

Course Outcomes

At the end of the course students will be able to-

1. Understand antenna parameters in order to differentiate the applicability of each type of antenna.
2. Analyze the different types of antenna arrays and make use of them in wide areas of wireless communication.
3. Solve various problems on design of communication system.

UNIT-I

Antenna Basics:

Introduction, types of Antenna, Radiation Pattern, Radiation Power Density, Beamwidth, Beam Area, Radiation Intensity,Directivity & Gain, Antenna Efficiency, Beam Efficiency, Bandwidth,Polarization, Antenna Temperature, Radio Communication Link &Friis Transmission Equation.

UNIT-II

Antenna Array:

Array- Introduction, Array of two isotropic point sources (Different Cases), non-isotropic but similar point source and the principle of pattern multiplication.

UNIT-III

Antenna Overview:

Monopole and Dipole Antenna, Short Dipole, Loop Antenna, Yagi-Uda Antenna, Helical Antenna, Biconical Microstrip Antenna, Concept of Smart Antenna.

UNIT-IV

Ground Wave Propagation:

Plane earth reflection, space wave and the surface wave, elevated dipole antennas above a plane earth, wave tilt of the surface wave, spherical earth propagation, troposphere wave

UNIT-V

Ionospheric Propagation:

The ionosphere, reflection and refraction of the waves by the ionosphere, regular and irregular variations of ionosphere, sky wave transmission calculations, wave propagation in ionosphere, other ionosphere phenomena.

UNIT-VI

Radar System:

Fundamentals, RADAR performance factors, basic pulsed radar system, antennas and scanning, display methods, pulsed radar systems, moving target indication, radar beacons, CW Doppler radar, frequency modulated CW radar

Reference Books:

1. Antenna for all Application-John D Kraus, third edition-TMH publication
2. Antenna Theory-Constantine A. Balanis -Third edition-Wiley Publication
3. Electromagnetic Waves and Radiation Systems- Jordan and Balmain PHI publication
4. Electronics Communication System – Kennedy Davis- 4thedition TMH publication
5. Antennas and Wave Propagation–G. S. N. Raju (Pearson)
6. Foundations of Antenna Theory and Techniques – Vincent F. Fusco(Pearson)

Third Year B. Tech.

ETP307: Antenna and Wave Propagation Lab

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CEE	50
SEE	50
Total	**100**

List of Experiments: (Minimum 10 experiments should be conducted)

1. To study the variation of radiated field with distance from transmitting antenna

2. To study the reflection coefficient, VSWR, frequency measurement, polarization using wave propagation set-up.

3. To study Phenomena of Circular, Linear and Elliptical Polarization of antennas

4. To study and plot the radiation pattern of the simple dipole and Folded dipole antennas in Azimuth & Elevation planes

5. To study and plot the radiation pattern of the Yagi-Uda antenna

6. To study and plot the radiation pattern of the helical antenna

7. To study and plot the radiation pattern of the parabolic reflector

8. To study and plot the radiation pattern of the Log-Periodic antenna

9. To study and plot the radiation pattern of the Broadside antennas and Measure its Gain,

Bandwidth and Beam width

10. To plot radiation pattern of $\lambda/2$ dipole antenna and compare with $3\lambda/2$ dipole antenna

11. To plot the radiation pattern of a Slot antenna

12. To plot radiation pattern of $\lambda/2$ phase array antenna

13. To study Doppler radar and measure parameters like speed of CPU fan, frequency of tuning fork, frequency of piezoelectric buzzer and frequency of pendulum.

14. Design and simulate micro strip patch antenna using Simulation software

Third Year B. Tech.

ETL305: Digital Communication

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

Course Objectives

1. To understand the building blocks of digital communication system.
2. To prepare mathematical background for communication signal analysis.
3. To understand and analyze the signal flow in a digital communication system.
4. To analyze error performance of a digital communication system in presence of noise and other interferences.
5. To understand concept of spread spectrum communication system.

Course Outcomes

At the end of the course students will be able to

1 understand the process of converting the baseband signal into a passband signal using digital modulation techniques
2 understand the spread spectrum modulation principles
3 understand various performance parameters of practical communication systems like satellite and mobile communication
4 understand the principles of information theory and error control coding
5 analyze and evaluate the actual digital communication system

Course Contents

Unit 1. **Unit I Digital Modulation Systems** **7 Hrs.**

Sampling Process-Aliasing-Natural Sampling-Flat Sampling Quantization of Signals, Quantization error-PCM Systems, Noise Considerations in PCM system, Over all Signal-to-noise ratio for PCM system, Channel Capacity-Virtues, Limitations & Modification of PCM system, PCM Signal Multiplexing, Differential PCM, Delta Modulation Noise Considerations in Delta Modulation, SNR Calculations-Comparison of PCM, DPCM, ADPCM, DM, ADM, CVSD

Unit 2. **Information Theory** **6 Hrs.**

Uncertainty, Information and Entropy, Source Coding Theorem, Data Compression, Channel Capacity, Channel Coding Theorem, Channel Capacity of various channel, Shannon's vision of Error-free communication, Shannon–Hartley theorem, Huffman's coding &

Shannon-FannoCoding techniques.

Unit 3. **Signal Representation and Baseband Pulse transmission** **7 Hrs.**

Orthogonality, Representation of Signals, Noise Response of Linear System to Random Processes, Maximum Likelihood Detection and Correlation Receiver Structure, Matched Filter receiver: Probability error of the Matched filter, Inter symbol interference-Nyquist criterion for distortion less base band transmission (Nyquist Filtering), Correlative coding, Base band M-ary PAM transmission-Eye pattern, Inter Symbol Interference, Synchronization, Carrier recovery and symbol timing recovery

Unit 4. **Passband Digital Data Transmission** **7 Hrs.**

Pass Band Transmission Model-Generation, Detection, Signal Space Diagram, Probability of Error of BFSK, BPSK, QPSK Schemes-Comparison of BFSK, BPSK & QPSK, QAM, Multichannel modulation and OFDM

Unit 5. **Introduction To Spread Spectrum Techniques** **7Hrs**

Introduction-Discrete Sequence Spread Spectrum technique-Use of Spread Spectrum with CDMA-Ranging Using Discrete Sequence Spread Spectrum-Frequency Hopping Spread Spectrum-Generation & Characteristics of PN Sequence-Acquisition of FH a Signal-Tracking of FH a signal-Acquisition of a DS Signal-Tracking of a DS signal

Unit 6. **Error Control Coding** **8 Hrs.**

Linear block codes: – Cyclic codes, BCH Codes, RS codes, Golay codes, Burst error correcting codes, Interleaved codes, **Convolutional codes :** Convolutional encoder, code tree, state diagram, trellis diagram – Turbo codes, Decoding of codes: maximum likelihood decoding, sequential decoding, feedback decoding, Applications of Viterbi decoding.

Reference Books

1. Simon Haykin, "*Communication Systems*" (3/e) John Wiley & Sons, 1998.
2. Taub& Schilling, "*Principle of Communication Systems*" (2/e)
3. B.P. Lathi, "Analog and Digital Communication", TMH, New Delhi, 1997, 2nd edition
4. S.D. Sapre, R. P. Singh, "Communication Systems- Analog and Digital", TMH, New Delhi, 1995, 2nd edition
5. Hsu, Shaum Series, "Analog and Digital Communication", McGraw Hill
6. John G. Proakis, "*Digital Communication*", McGraw Hill Inc 2001.
7. Bernard Sklar, "*Digital Communication, Fundamentals and Application*", Pearson Education Asia, 2nd Edition, 2001.

Third Year B. Tech.

ETP308: Digital Communication Lab

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
SEE	50
Total	**100**

List of Experiments(Any 10 experiments out of below mentioned)

1. Study of PCM–TDM.
2. Study of Compander.
3. Study of DPCM.
4. Study of ADPCM.
5. Study of DM
6. Study of ADM.
7. Study of CVSD.
8. Study of ASK, FSK &PSK.
9. Study of QPSK.
10. Study of Spread Spectrum techniques.
11. Measurement of bit error rate.
12. Study of Hamming Code.
13. Study of generation of cyclic codes.
14. Study of Eye Diagram using oscilloscope
15. Study of any digital modulation scheme using Matlab communication tool
16. Experiments on digital modulation techniques using Matlab/Simulink Software.
17. **Case Study(compulsory) on typical Digital Communication System:** Analysis and design of a practical digital communication system in the fields of mobile, wireless and/or satellite communication

Third Year B.Tech.

ETP309: C++ Programming

Teaching Scheme	
Lectures	2 Hrs. /Week
Practical	2 Hrs. /Week
Total Credits	3

Evaluation Scheme	
CIE	50
SEE	50
Total	**100**

Course Objectives

1. Provide knowledge of Basic Object Oriented Programming concept
2. Provide knowledge of basic data types and control statements
3. Provide knowledge of Classes and Objects concepts
4. Provide knowledge of Inheritance, Data Hiding, Polymorphism, Encapsulation.
5. Provide Information of file handling using C++ Programming

Course Outcomes

At the end of the course students will be able to

1. Understand the basic Object Oriented Programming concepts.
2. Understand the use of different data types and Control statements available in C++.
3. Understand and use of Classes and Objects from C++.
4. Apply C++ programming features, Inheritance and Data Hiding.
5. Apply C++ programming features like Polymorphism, Encapsulation.

Course Contents

Unit 1. **Introduction to C++ and OOP:** Introduction to C++ programming Language, Structure of a program, Variables and types, Constants, Operators, Basic Input/Output, Basic Object Oriented Programming concept. **5 Hrs.**

Unit 2. **Classes and Objects:** Introduction to Classes and Objects, Class Member Functions, Class Access Modifiers, Constructor & Destructor, Copy Constructor, Friend Functions, Inline Functions, this Pointer, Pointer to C++ Classes, Static Members of a Class **5 Hrs.**

Unit 3. **Inheritance:** Introduction to Inheritance, Base and Derived Classes, Access control and inheritance, Types of inheritance: Private, Protected and Public, Multiple Inheritance. **4 Hrs.**

Unit 4. **Polymorphism:** Overloading: Function Overloading and Operator Overloading, Basic Polymorphism concept, Virtual Function. **4 Hrs.**

Unit 5. **Encapsulation:** Data abstraction, Data Encapsulation abstract classes. **3 Hrs.**

Unit 6. **C++ File handling:** Opening and Closing files, Reading and Writing of file using streams in c++, File position pointers, seekg function. **3 Hrs**

Reference Books

1. "Object Oriented Programming with C++", by E Balgurusamy, McGraw Hill Education
2. "C++ Primer", by Stanley B. Lippman , Pearson Education India
3. "The C++ Programming Language" by Bjarne Stroustrup, Pearson Education India
4. "Let Us C++" by Yashavant P. Kanetkar, BPB Publications

List of Experiments

1. Simple C++ Programs to Implement Various Control Structures.
    a. If statement
    b. Switch case statement and do while loop
    c. For loop
    d. While loop
2. Programs to Understand Structure
3. Programs to Understand Pointer Arithmetic.
4. Program to understand Constructors & Destructors.
5. Program to understand Use of "this" Pointer.
6. Programs to Implement Inheritance.
7. Program for Multiple inheritance –Access Specifiers
8. Programs to Operator Overloading
9. Programs to Function Overloading
10. Programs to Understand Friend Function
11. Program to understand Encapsulation
12. Program to understand File handling in c++

Third Year B.Tech.
ETD310: Mini Project -III

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	2

Evaluation Scheme	
CIE	50
Total	**50**

Course Objectives	
1	To understand basic concepts of microcontroller based electronics system design.
2	To understand concepts of interfacing different electronics peripherals such as LED, LCD, Seven segment and different analog and digital sesnsors.
3	To understand different serial protocols.

Course Outcomes At the end of the course students will be able to	
1	Explain Arduino based hardware.
2	Design Arduino based system with different peripherals.
3	Describe various serial protocols used in embedded system.
4	Work in team to develop Arduino based mini project.

Instruction:

Students have to carry out one mini project in a group of maximum two to three students.

Third Year B.Tech.

ETI311: Entrepreneurship Development

Teaching Scheme			Evaluation Scheme	
Lecture	2 Hrs. /Week		-	-
Total Credits	Nil		-	-

Instruction:

1. This is compulsory audit course and requires Pass grade for qualifying.

2. Evaluation scheme will be informed by course coordinator.

Third Year B. Tech.

ETL312: Computer Networks and Protocols

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

Course Objective:	
1	To understand the concepts of computer networks associated with the layered architecture.
2	To describe different techniques used for flow and error control at data link layer.
3	To define network layer for different routing algorithm and congestion control mechanism
4	To expose students to both class full and classless IP addressing methods calculations.
5	To summarize protocols of IP layer such as ARP, RARP, ICMP and IGMP.
6	To describe the structure of the TCP and UDP Protocol suite and its functions.

Course Outcomes:	
ETL312.1	Understand fundamentals of OSI and TCP/IP reference model
ETL312.2	Illustrate different design issues of HDLC framing and flow control for protocol design
ETL312.3	Apply knowledge of different routing algorithms and congestion control mechanism for new simulator tool such as CISCO, NS2 etc.
ETL312.4	Generalize the protocols of network and transport layer to trace the packet.
ETL312.5	Extend confidence and preliminary skill set to allow them to carry out further study in multidisciplinary fields of computer networking.
ETL312.6	Participate in group and show efficient communication to relate tasks/projects to verify theoretical concepts of computer networking.

Unit-I

Introduction to computer networks

Networks definition & requirements, Networks topologies, Types of networks, network software issues, reference models-Layer details of OSI and TCP/IP.

(6 Hrs.)

Unit-II

Physical layer- Transmission media

Guided media-twisted pair, coaxial cable, optical fiber, unguided media-RF allocation, terrestrial microwave, satellite communication, cellular telephone, EIA 232 D interface

standard, Network device: Network connectors, Hubs, Switches, Routers, Bridges, NIC, Fast Ethernet, Gigabit Ethernet.

(8 Hrs.)

Unit-III

Data Link Layer

Design issues, error detection and correction, elementary data link protocols, sliding window protocols, HDLC-types of stations, modes of operation, HLDC frame formats. **(8 Hrs.)**

Unit-IV

Networks Layer

Design issues, Routing algorithms: Shortest path, Distance vector routing, Link state routing. Routing protocols - RIP, OSPF, IP Addressing, Subnetting/ Supernetting, IPv4, IPv6 header format and basic address mode, DHCP, Congestion control, traffic shaping algorithms. **(7 Hrs.)**

Unit-V

Transport Layer

Transport layer-Process to process delivery, UDP, TCP, TCP services, TCP Segment, TCP Timers, Flow control, congestion control and Quality of Service.

(7 Hrs.)

Unit-VI

Application Layer

DNS, HTTP, E-mail, SMTP, Telnet, FTP **(6 Hrs.)**

Text Books:

1. Computer Networks Andrew S. Tanenbaum, Fourth Edition, PEARSON
2. Data Communication and Networking, Fifth Edition, Behrouz A. Forouzan, TMH

Reference Books:

1. Computer Networking with Internet Protocols and Technology, William Stallings
2. TCP/IP Protocol Suite, Fourth Edition, Behrouz A. Forouzan, MGH
3. Computer Networking A top down approach, James F. Kurose, Person, Fifth Edition

Third Year B. Tech.

ETP316: Computer Networks and Protocols

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

	Evaluation Scheme
CIE	50
Total	**50**

Lab Experiments:

1. Minimum Ten experiments based on syllabus.
2. Fifty percent experiments should be based on Simulation software's like CISCO Packet Tracer, NS2, OMneT++ etc.

Third Year B. Tech.

ETL313: VLSI Design

Teaching Scheme	
Lectures	3 Hrs/Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

Course Objectives:

1. To introduce HDL programming techniques using VHDL language elements
2. To discuss combinational logic circuit coding using VHDL statements
3. To discuss sequential logic circuit coding using VHDL statements
4. To introduce HDL programming techniques using Verilog language elements and statements
5. To discuss target device architectures (CPLD & FPGA) and logic circuit testing
6. To discuss CMOS transistor theory and Processing Technology

Course Outcomes:

Upon completion of this course, learners will be able to……

C313.1 **Explain** HDL programming design flow (Understand)

C313.2 **Compose** combinational logic circuit codes using VHDL language statements and also **compare** various VHDL coding techniques (Apply)

C313.3 **Compose** sequential logic circuit codes using VHDL language statements (Apply)

C313.4 **Compose** combinational and sequential logic circuit codes using Verilog language elements and statements (Apply)

C313.5 **Select** suitable target device for downloading synthesized VHDL/Verilog codes (Analyze & Evaluate)

C313.6 **Discuss** CMOS transistor theory and Processing Technology (Discuss & Apply)

Course Contents

Unit 1. Introduction to HDL programming (VHDL) 9 Hrs.

Need of HDL, Features and capabilities of HDL, Design Flow,

Abstraction levels, VHDL code structure (Library, Entity, Architecture), VHDL coding techniques like Data flow, Behavioral, and Structural type of modeling with suitable sample examples. VHDL language elements (Identifiers, Data Objects, Data Types, Data Operators, Attributes, Package, Configuration)

Unit 2. Combinational logic circuit coding using VHDL **6 Hrs.**

Combinational logic circuit designing using concurrent statements like with_select, when_else. Cover examples like adders, decoders, encoders, multiplexers, buffers, parity generators & checkers, comparators etc.
Delays in VHDL.

Unit 3. Sequential logic circuit coding using VHDL **6 Hrs.**

Sequential logic circuit designing using sequential statements like process, wait, if_then_else, case, loop, for_loop, while_loop. Cover examples like flip-flops, counters, shift registers, state machines (using user-defined data type), sequence detectors (using user-defined data type), ALU, memory elements (using array) etc.

Unit 4. Introduction to Verilog HDL **9 Hrs.**

Introduction, Lexical tokens, Data types, Operators, Operands, Modules, Behavioral modeling, Timing controls, Procedures: always, initial block, Finite state machines, Combinational and Sequential logic circuit coding using Verilog: cover examples like adders, multiplexers, decoders, buffers, flip-flops, counters, shift registers etc.

Unit 5. Target device architectures and logic circuit testing **6 Hrs.**

Xilinx CPLD (95xx family) architecture, Xilinx FPGA (Spartan family) architecture, Implementing functions in FPGA (cover example of 4:1 mux), Testing combinational logic, Testing sequential logic, Boundary scan testing, Built-In-Self-Test.

Unit 6. CMOS transistor theory and Processing Technology **6 Hrs**

MOS Transistors, CMOS logic (Implementation of CMOS Inverter, NAND gate, Combinational logic, NOR gate, Compound gates, Pass transistors and Transmission gates, Multiplexers, Latches and Flip-flops) Introduction, Ideal I-V characteristics, C-V characteristics, Non-ideal I-V effects, DC transfer characteristics, CMOS technologies.

Reference Books:

8. Circuit Design with VHDL by Volnei Pedroni, PHI publication
9. Fundamentals of Digital Logic Design with VHDL by Stephen Brown & Zvonko Vranesic, McGraw Hill Publication
10. Principles of Digital Systems Design using VHDL by Roth John, Cengage Learning
11. VHDL: Programming by Example by Douglas Perry, McGraw-Hill Professional
12. Design through Verilog HDL by T. R. Padmanabhan, Wiley Publication
13. Xilinx CPLD, FPGA Data sheets**,** www.xilinx.com
14. CMOS VLSI Design: A Circuits and Systems Perspective by Neil Weste, David Harris, Ayan Banerjee, Pearson publication

Third Year B. Tech.

ETP317: VLSI Design Lab

Teaching Scheme	
Practical	2 Hrs/Week
Total Credits	1

Evaluation Scheme	
CIE	50
SEE	50
Total	**100**

List of Experiment

1. Introduction to the Xilinx ISE WebPack EDA tool. Implementation of basic gates, combinational logic circuits, adders using data flow type of VHDL modelling
2. Realization of decoders, multiplexers, comparators using behavioural type of VHDL modelling (use with_select, when_else ststements)
3. Implementation of flip-flops, counters, shift registers, ALU using VHDL sequential statements (use process, wait, if_then_else, case, for_loop stsements)
4. Realization of ripple adder, ripple counter using structural type of VHDL modeling
5. Implementation of Moore or Melay machine and sequence detector using user defined data types
6. Realization of memory element using user defined data type
7. Implementation of decoder, comparator, counter using Verilog HDL language statements
8. Fabricate and test mini project based on the coding techniques learned so far

Note: At least 50% of the above mentioned lab session codes should be downloaded and using suitable CPLD/FPGA target board

Third Year B. Tech.

ETL314: Digital Signal Processing

Teaching Scheme	
Lectures	3Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

Course Objectives

1.	To develop the knowledge on signals used in digital signal processing.
2.	To introduce signals, systems, time and frequency domain concepts and the associated mathematical tools those are fundamental to all DSP techniques.
3.	To provide a thorough understanding and working knowledge of design, implementation, analysis and comparison of digital filters for processing of discrete time signals
4.	To design linear digital filters both FIR and IIR using different techniques and their associated structures.

Course Outcomes

At the end of the course students will be able to

1	Encode information into signals, recover information from signals and analyze digital and analog signals and systems.
2	Design and compare the performances of digital filters
3	Design and test DSP algorithms
4	Implement DFTs using Fast Fourier Transforms.
5	Analyze and compare different signal processing strategies.

Course Contents

Unit 1. Discrete Time Fourier Transform **6 Hrs.**

Introduction to DSP Systems: sampling techniques, quantization, quantization error, Nyquist rate, aliasing effect. Digital signal representation and analog to digital conversion, DTFT, Properties and symmetrical properties of DTFT, Convergence of DTFT.

Unit 2. Discrete Fourier Transform **8 Hrs.**

Frequency Domain Sampling and Reconstruction of Discrete Time Signal. DFT, Properties of DFT, Circular Convolution and Circular Co-relation using DFT and IDFT ,Analysis of LTI System using Circular Convolution, Linear Convolution using Circular Convolution, Fast Convolution. Overlap Save and Overlap add algorithm. Relationship between DTFT, DFT and ZT. FFT Algorithms – Radix 2: DIT-FFT and

Radix 2: DIF.

Unit 3. FIR Filter Design **8 Hrs.**

Characteristics of FIR Filters Properties of FIR Filters., Linear phase response, design techniques for FIR filters:-Fourier series method, Frequency Sampling Technique, Gibb's Phenomenon, FIR Design using Windowing Technique [Rectangular Window, Hamming Window and Hamming Window, Kaiser window], Performance comparison of FIR filters using mentioned windowing techniques. Basic realization block diagram, FIR realization- Direct Form , Cascade and Parallel realization.

Unit 4. IIR Filter Design **8 Hrs.**

Introduction to IIR Filters, Butterworth Filter approximation, IIR Filter Design using Impulse Invariant method and Bilinear Transformation method, comparison between FIR & IIR filter, Frequency Transformation IIR realization- Direct form I and II, Cascade and parallel realization, Analysis of digital filters using pole zero plot..

Unit 5. DSP Processors **7 Hrs.**

Introduction, Comparison between general purpose and DSP Processors, Architecture of DSP Processor, Multiply and Accumulate (MAC), Fixed point Vs floating point DSP processor, TMS320C67XX, Specifications, Addressing modes, Quantization error, Finite word length effects in designing digital filters

Unit 6. Multirate Digital Signal Processing **5 Hrs**

Introduction, Concepts Of Multirate Digital Signal Processing, Design Of Practical Sampling Rate Converters, Application Examples.

Reference Books

1. Proakis.J.G. and Manolakis.D.G, "*Digital Signal Processing Principles, Algorithms and Applications*", Pearson Education, New Delhi, 2009 / PHI
2. Digital Signal Processing P. Ramesh Babu, Scitechpublication
3. Mitra.S.K, "*Digital Signal Processing – A Computer Based Approach*", Tata McGraw Hill, New Delhi, 2001.
4. Venkataramani.B, Bhaskar.M, "*Digital Signal Processors, Architecture, Programming and Applications*", Tata McGraw Hill, New Delhi, 2003.
5. Salivahanan.S, Vallavaraj.A, Gnanapriya.C, "*Digital Signal Processing*", Tata McGraw Hill, New Delhi, 2005.
6. Ifeachor, Jervis, "Digital Signal Processing ", edition II, Pearson Education
7. Johny R. Johnson, "*Introduction to Digital Signal Processing"*, PHI, 2006.

Third Year B. Tech.

ETP318: Digital Signal Processing Lab

Teaching Scheme	
Practical	2 Hrs /Week
Total Credits	1

Evaluation Scheme	
CIE	50
SEE	50
Total	**100**

List of Experiments(Any 10 including compulsory FIR and IIR filter design experiments)

1. Sampling of the CT signal and demonstrating the aliasing effect.
2. Computation of DFT & IDFT using standard formula
3. Computation of DFT using FFT algorithms
4. Computation of Linear convolution by using
   i) Direct Method
   ii) DFT
5. Computation of circular convolution using DFT and IDFT
6. Computation of linear convolution using circular convolution.
7. Computation of correlation of two signals.
8. Design of FIR LPF, HPF, BPF, BRF filter using frequency sampling method
9. Design of FIR filter using window method and comparing their performances.
10. Design of IIR LPF, HPF ,BPF, BRF filter using impulse invariance method
11. Design of IIR LPF, HPF, BPF, BRF filter using bilinear transformation method
12. Design of IIR filter using placement of poles &zeros.
13. Comparative study of linear phase and non linear phase filters.
14. Hardware Implementation of DSP system for echo cancellation on TMS320C67XX platform.

Third Year B.Tech.

ETL315: Industrial and Financial Management

Teaching Scheme	
Lecture	3 Hrs /Week
Total Credits	**3**

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

Course Objectives

1. To understand the Basics of Project Planning
2. To understand the Financial Estimates and projections in projects
3. To understand the Management of Cash
4. To understand the Receivables Management
5. To understand the Inventory Management

Course Outcomes

At the end of the course students will be able to

1. Understand Generation and screening of project ideas, Market , Demand & Technical Analysis
2. Identify the different sources of finance and Appraisal of Loan
3. Understand Techniques of Cash Management and know the different cash management models.
4. Understand the Receivables management
5. Know the different inventory management techniques

Course Contents

Unit 1. **Project Planning:** Generation and screening of project ideas, Market and Demand Analysis, Technical Analysis, Project Risk Analysis-sensitivity analysis – scenario analysis – Break even Analysis **6 Hrs.**

Unit 2. **Financial Estimates and projections:** Project Financing Long Term Financing, Appraisal of Term Loans by Financial Institutions short Term Sources of Finance, other Sources. **6 Hrs.**

Unit 3. **Motive for holding Cash:** Objective of cash Management, Factors determine the cash needs, Determining cash Need **6 Hrs.**

Unit 4 **Techniques of Cash Management**, Marketable Securities- Treasury Bills, Commercial papers, Certificates of deposit Bankers acceptance, Inter-Corporate deposits **6 Hrs.**

Unit 5. **Receivables Management:** Objective, Credit policy, Credit Standards & Credit Analysis, Credit terms; Cash Discount; Collection Policies. **6 Hrs.**

Unit 6. **Inventory Management:** Objectives; Benefits of holding inventory, Techniques of inventory control EOQ, stock Levels, Role of Central Government and State Government in promoting Entrepreneurship with various incentives, subsidies, grants etc. **6 Hrs.**

Reference Books

1. Prasanna Chandra (2014),"Projects: Planning, Analysis, Selection, Financing, Implementation, and Review", 8th Edition, McGraw Hill Education
2. P.V.Kulkarni & B.G.Satyaprasad (2000), "Financial Management", Himalaya Publishing House.
3. Dr. R.P.Rustagi (2011), "Financial Management - Theory, Concepts and Problems", 5th Edition
4. I.M.Pandey (2009), "Financial Management", 9th Edition, Vikas Publishing House Pvt Limited.

Third Year B.Tech.

ETP319: Electronics System Design Lab

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
SEE	50
Total	**100**

Prerequisites-

Course Objectives	
1.	To introduce steps involved in discrete and IC based system design with due concern for safety.
2.	To discuss DVM, PLL and amplifier circuits with their design aspects.
3.	To discuss different sensors and signal conditioning circuits.
4.	To discuss linear and switched mode power supply.
5.	To understand analog and digital controllers along with its applications.

Course Outcomes At the end of the course students will be able to	
1.	**Interpret** different steps for discrete & IC based system design.
2.	**Design** DVM, PLL and amplifier circuits.
3.	**Design** signal conditioning circuits using various sensors.
4.	**Design** SMPS and Linear power supply.
5.	**Explain** analog and digital controllers and its applications.

	List of Experiments
1.	Design of regulated power supply for variable supply using IC LM317.
2.	Design of regulated power supply for fixed supply.

3.	Design of step up/step down SMPS using IC3524.
4.	Design of V to I & I to V converter.
5.	Design of Instrumentation amplifier.
6.	Design of variable gain Audio amplifier using IC LM 386.
7.	Design of decade counter using IC7190.
8.	Design of digital voltmeter using IC7107.
9.	Design of digital ammeter using IC7107 in proteus software.
10.	Study of signal conditioning circuit using different sensors.
11.	Design of frequency synthesizer using PLL.
12.	Study of analog and digital controller.

Third Year B.Tech.

ETD320: Mini Project -IV

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	2

Evaluation Scheme	
CIE	50
Total	**50**

Course Objectives	
1	To understand and implement any one of: VLSI design, antenna design, DSP system design
2	To understand concepts of interfacing different electronics peripherals such as GSM, GPS, accelerometer etc to antenna

Course Outcomes At the end of the course students will be able to	
1	Explain VLSI hardware/ DSP hardware/antenna design
2	Work on various communication protocols used in embedded system.
3	Work in team to develop circuit based on VLSI/ DSP/ Microcontroller

Instruction:

Students have to carry out one mini project in a group of maximum two to three students.

Third Year B.Tech.

ETT321: Industrial Training

Teaching Scheme			Evaluation Scheme	
Practical	2 Hrs. /Week		CIE	50
Total Credits	2		**Total**	**50**

Course Objective

1. To expose the students to actual working environment of industry
2. To enhance the knowledge and skill of the students in the practical field
3. To expose students to modern technology used in the industry
4. To enhance employability of the students

Course Outcome

Students will be able to-

1. Apply fundamental concepts of electronics and telecommunication engineering
2. Cope up with the latest changes in technological world
3. Identify, formulate and model the problems and find engineering solution based on system approach
4. Solve the problems of Socio-economical, Cultural, and Global and Environmental field as an engineer

Instruction:

1. Students should undergo minimum 2 week industrial training

2. Training has to be completed during winter vacation after fifth semester exam and evaluation will be done in semester VI.

2. Evaluation will be based on viva-voce/ presentation or any other form as decided and informed by course coordinator

Targeted Training Areas

1. Embedded System Design
2. VLSI System Design and Verification
3. Computer Networking
4. PLC/SCADA
5. Mobile Application Design
6. Web designing with real time hardware interfacing

Third Year B.Tech.
OE: Open Elective

Teaching Scheme	
Lecture	3 Hrs. /Week
Total Credits	**3**

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

The electives available for our department are as mentioned below.

TTLOE1	Technical Textiles
CSLOE2	Fundamentals of Java Programming
MELOE2	Fundamentals of Mechatronics

There will be equal no. of students in all three open elective courses; i.e.

$$\text{Maximum number of students for particular electives} = \frac{\text{Studetns On roll for each group}}{\text{Number of Electives}}$$

Third Year B.Tech.
TTLOE1: TECHNICAL TEXTILES

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	**3**

Examination Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

Course Objectives:

1. To explain the concept and classification of Technical Textiles
2. To explain the importance of electronics and Information Technology (IT) in textiles
3. To illustrate the various applications of Textiles in electronics and information Technology industries
4. To explain the concept of nonwovens, composites and protective textiles

Course Outcome

Student will be able to,

1. Understand the significance of product development in Technical Textiles
2. Explain the technical details of Technical textile products including the coated and laminated textiles with classification
3. Compile the fibres used, technology applied in manufacturing of technical textiles based on end use like filtration, Medical use, composites, defence and other industrial applications
4. Evaluate the performance of technical textiles with different test methods of Indian and International standards

Course Contents

UNIT I

Introduction to fibre, yarn and fabrics. Outline of processes involved in manufacturing of woven, knitted & nonwoven textiles. Introduction to composites, scope of Technical Textiles – Differences in traditional textiles and technical textiles

UNIT II

Classification & Advantages of Technical textiles, Fibres for technical textiles and their important characteristics.

UNIT III

Electronics in Textiles: Introduction – Fibre, yarns for smart textiles, Manufacturing of Electronic Textiles, Uses of electronics in textiles, advantages, disadvantages, applications & properties of E-textiles.

UNIT IV

Information Technology and Textile Industry - Need IT Support, Textile Supply Chain, Logistics, E-retailing, E-commerce. Use of information technology in technical textiles such as Defence, medical, sports, space.

UNIT V

Protective clothing:

Clothing requirements for thermal protection, ballistic protection, UV-protection, protection from electro-magnetic radiation and static hazards, protection against micro-organisms, chemicals and pesticides. High visibility and electromagnetic shielding fabrics.

UNIT VI

Textile Reinforced Composite Materials – Introduction- Fibres and Matrix for composites & their properties- Applications of composites in brief.

Industrial Textiles: commonly used textiles in industries, Nonwovens

Text Books:

1. Hand book of Technical Textiles Edited by A.R. Horrocks & S.C. Anand., Wood head Publication. Ltd. England.
2. Wellington Seass Handbook of Industrial Textiles by Sabit Adanur, Technomic Publication Co. Lancaster.

Reference Books

1. Electrostatic Charging of Textiles, Textile Progress Vol.28, No.1 BY I. Holme, Textile Institute Publication.

2. High Performance Fibres, Textile Progress, Vol.25, No.3/4, By S.K. Mukhopadhyay, Textile Institute Publication.

3. Protective Clothing, Textile Progress, Vol.22, No.2/3/4, By P.W. Harrison, The Textile Institute Publication.

4. Automotive Textiles, Textile Progress, Vol.29, No.1/2 by S.K. Mukhopadhyay & J.F. Partridge, Textile Inst. Publication.

5. The Thermal Insulation Properties of Fabrics Textile Progress, Vol.24, No.4, J.O. Ukponmwan, Textile Inst. Publication.

6. Thermal Bonding of Non woven fabrics, Textile Progress, Vol.26, No.2, The Textile Inst. Publication

7.Industrial Application of Textile : Textiles for Filtration and Coated fabrics Textile Progress, Vol.14, No.1, By Pushpa Bajaj & A.K. Sengupta, The Textile Inst. Publication.

8. Developments in Non-woven fabrics Textile Progress Vol.12by A.T. Purdy, Textile Institute Publication.

9. Progress in Textiles: Science and Technology, Vol 3, Technical Textiles: Technology, Development & Applications By Dr. V K Kothari, IAFL Publications, New Delhi.

10. Textiles in Automobile Engineering: Fung & Warner.

Third Year B.Tech.

CSLOE2: Introduction to Java Programming

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	**3**

Examination Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

Course Objectives	
1	To expose students to object oriented programming concepts.
2	To expose students to Fundamental concepts of Java.
3	To expose students to application of inheritance and Interface.
4	To expose students to application of inheritance Interface.

Course Outcomes	
1	Students will be able to explain Object Oriented programming concepts.
2	Students will be able to explain Fundamental concepts of Java.
3	Students will be able to demonstrate basic application of inheritance and interface.
4	Students will be able to demonstrate basic application of exception handling and package.

Course Contents

1. JAVA – BASICS: Overview, Bytecodes Java Environment Setup, Java – Basic Syntax, First Java Program Java Identifiers, Modifiers, Variables, Keywords, Comments in Java Java – Objects & Classes: Objects in Java, Classes in Java, Constructors, Creating an Object, Accessing Instance Variables and Methods, Source File Declaration Rules (6)
2. Java – Basic Datatypes: Primitive Datatypes, Reference Datatypes, Java Literals,Java Variable Types, Local Variables, Instance Variables, Class/static Variables Java Modifier Types, Java Access Modifiers, Static Modifier, Final Modifier Abstract Modifier, Access Control Modifiers. Java – Basic Operators: Arithmetic Operators, Relational Operators, Bitwise Operators, Logical Operators, Assignment Operators, Precedence of Java Operators (6)
3. Java – Loop Control: While Loop, for Loop, Do While Loop, Loop Control Statements, Break Statement , Continue Statement. Java – Decision Making: If Statement, If-else Statement, if...else if...else Statement, Nested if Statement, Switch Statement.Java – Arrays: Declaring Array Variables, Creating Arrays, Processing Arrays, Passing Arrays to Methods, Returning an Array from a Method, The Arrays Class. Java – Methods: Creating Method, Method Calling, The void Keyword, Passing Parameters by Value, Method Overloading, Using Command-Line Arguments, The Constructors, Parameterized Constructor, The this keyword, finalize( ) Method (7)
4. Java – Files and I/O Stream:Standard Streams, Reading and Writing Files, ByteArrayInputStream, DataInputStream, FileOutputStream, ByteArrayOutputStream, DataOutputStream, File Navigation and I/O File Class, Directories in Java, Listing Directories, Java – Exceptions: Exception Hierarchy, Built-in Exceptions, Exceptions

Methods, Catching Exceptions, Multiple Catch Blocks, Catching Multiple Type of Exceptions, The Throws/Throw Keywords, The Finally Block, The try-with-resources, User-defined Exceptions, Common Exceptions. Java – Inner Classes, Nested Classes, Inner Classes (Non-static Nested Classes), Accessing the Private Members, Method-local Inner Class, Static Nested Class.. (7)
5. Java – Inheritance: extends Keyword, Sample Code, The super keyword, Invoking Superclass Constructor, IS-A Relationship, The instanceof Keyword, HAS-A relationship,Types of Inheritance. Java – Overriding: Rules for Method Overriding Using the super Keyword Java – Polymorphism, Virtual Methods. Java – Abstraction:Abstract Class,Inheriting the Abstract Class, Abstract Methods. Java – Encapsulation: Benefits of Encapsulation (7)
6. Java – Interfaces: Declaring Interfaces, Implementing Interfaces, Extending Interfaces, Extending Multiple Interfaces. Java – Packages: Creating a Package, The import Keyword, The Directory Structure of Packages, Set CLASSPATH System Variable. (6)

Text Books :

1. Core Java Fundamentals Vol -I (The Sun Microsystems Press Java Series) Cay S. Horstmann, Gary Cornell

References:

1. Java 2 Complete Reference – 5th Edition – Herbert Schildt (TMGH).
2. Object oriented programming with JAVA – E. Balguruswamy

Third Year B.Tech.

MELOE2: Fundamentals of Mechatronics

Teaching Scheme	
Lectures	3 Hrs/Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

PREREQUISITES- Basic Mechanical Engineering, Basic Electrical Engineering

COURSE OBJECTIVES:

1. To introduce students to various concepts of automation, Mechatronics and PLC and the integration of different branches of engineering in Mechatronics.
2. To make students aware of the recent trends and practices in Mechatronics in manufacturing and service sector for productivity improvement and cost, time and human intervention reduction.
3. To analyze the real life industrial problems in traditional systems and convert them into highly effective Mechatronics systems.
4. To design, analyze, modify, if required, and implement ladder programs using PLC for various industrial, home and office automation problems along with necessary fault finding.

COURSE OUTCOMES:

At the end of the course the students will be able to:

1. Describe and discuss sensors, PLC, digital circuits and signal conditioning.
2. Distinguish between traditional and mechatronics system and justify the given system is mechatronics system.
3. Design solutions for industrial automation problems using timers, counters, internal relays and other programming instructions.
4. Construct and communicate automated solutions for economic, relevant applications in respective industries and environmental problems.

Course Contents

Unit 1. Introduction to Mechatronics: 5 Hrs.

Introduction to Mechatronics: What is Mechatronics, Mechatronics systems, Measurement systems, Control systems, Multidisciplinary scenario

Traditional Vs Mechatronics Design, Case studies of mechatronics system designs like piece counting system, pick and place manipulator, part loading, unloading and handling system and similar systems.

Unit 2. Transducers & Sensors: 7 Hrs.

Performance Terminology, Position Sensors: Limit switch, photoelectric switches, proximity sensors, pneumatic limit valves and backpressure sensors, pressure switches, resolvers, incremental & absolute encoders, decoders & relays. Displacement: Potentiometer sensors, LVDT,

capacitive displacement sensors. Velocity sensors: Tachogenerator, use of encoders, Temperature sensors, Selection of sensors.

Unit 3. Signal Conditioning: 6 Hrs.

Signal conditioning process, Operational amplifier (inverting amplifier, non-inverting amplifier, summing, integrating amplifier), protection, filtering, data acquisition, multiplexer, analog to digital converter (ADC), digital to analog converter (DAC).

Sample and hold, Interfacing input output ports, interfacing requirements, buffer, handshaking, polling and interrupts.

Unit 4. Introduction to Fluid Power: 7 Hrs.

Introduction to Hydraulic and Pneumatic Systems. Basic Components. Symbols - (Including fundamentals of fluid flow, fluids etc.), Hydraulic pumps/motors/actuators, Development of hydraulic circuit, Basic design, Meter In and Meter Out Circuits, Basic Pneumatic system and components, Pneumatic valves, Pneumatic Circuits & Systems, Fluid Logic, Application of Hydraulics & Pneumatics in industrial Automation.

Unit 5. Programmable Logic Controller (PLC): 7 Hrs.

Introduction, Definition of PLC, PLC system and components of PLC input output module, PLC advantages and disadvantages, RS-232 serial interface, Block diagram for interfacing of PLC, computer and system to be controlled

Machine control terminology, update – solve ladder – update, physical components Vs. program components, light control example, disagreement circuit, majority circuit, oscillator, holding (sealed or latches) contacts, always ON always OFF contacts, fail safe circuit, AND-OR and OR-AND circuits. Introduction to Supervisory Control and Data Acquisition System (SCADA) and applications.

Unit 6. Ladder diagram & PLC programming fundamentals: 7 Hrs

Basic components and other symbols, Fundamentals of ladder diagram, PLC input instructions, outputs, coils, indicators, operational procedures, contact and coil input output, programming example, simple industrial applications, Nesting of ladders.

PLC timer functions – Introduction, timer functions, industrial applications, industrial process timing applications, PLC control functions – PLC counters and its industrial applications, Internal Relays

PLC system fault finding – Program testing, testing inputs and outputs, Fault detection techniques, common hardware faults.

Text Books:

1. Mechatronics – W. Bolton, Pearson education
2. Mechatronics – Mahalik, TATA McGraw Hill
3. Programmable logical controller, Reis Webb, Prentice Hall

Reference Books

1. Microprocessor 8085 – Gaonkar
2. Mechatronics – Appu Kuttam, Oxford publications
3. Automated Manufacturing systems, S. Brain Morris, McGRaw Hill
4. Introduction to PLC programming, NIIT, P
5. Programmable logical controller, Hackworth & Hackworth, Pearson Education
6. Programmable logical controller,3e Gary Dunning Cengage Learning