M. Tech. (Electronics & Communication Engineering)
Specialization: Embedded Systems

I M. Tech -I Sem

S.No	Course Code	Course Name	L	T	P	Credits
1	18EC4101	Embedded System Design	3	--	--	3
2	18EC4102	Sensors and Actuators	3	--	--	3
Program Elective I						
3	18EC4103	Structural Digital System Design	3	--	--	3
	18EC4209	FPGA Architectures & Applications				
	18EC4104	Real Time Operating Systems				
Program Elective II						
4	18EC4105	Embedded Networking	3	--	--	3
	18EC4011	Wireless Communications				
	18EC4106	Internet Protocols				
5	18EC4107	Embedded System Design Lab	--	--	4	2
6	18EC4108	Structural Digital System Design Lab	--	--	4	2
7	18HS0823	Research Methodology and IPR	2		--	2
Audit Course -I						
8	18HS0818	English for Research Paper Writing	2	-	-	-
	18CE1029	Disaster Management				
	18HS0825	Sanskrit for Technical Knowledge				
	18HS0826	Value Education				
Contact Periods / Week			16	-	8	18
			Total/Week: 24			

I M. Tech -II Sem

S.No	Course Code	Course Name	L	T	P	Credits
1	18EC4109	Introduction to IoT	3	--	--	3
2	18EC4110	Advanced Microcontrollers	3	--	--	3
Program Elective III						
3	18EC4111	Hardware Software Co-Design	3	--	--	3
	18EC4213	Testing & Testability				
	18EC4112	Micro Electromechanical Systems				
Program Elective IV						
4	18EC4201	VLSI Technology	3	--	--	3
	18EC4202	Digital IC Design				
	18EC4008	Wireless Sensor Networks				
5	18EC4113	Internet of Things Lab	--	--	4	2
6	18EC4114	Microcontrollers & Interfacing Lab	--	--	4	2
7	18EC4115	Mini Project	--	--	4	2
Audit Course - II						
8	18HS0829	Constitution of India	2	-	-	-
	18HS0827	Pedagogy Studies				
	18HS0828	Stress Management by Yoga				
	18HS0819	Personality Development Through Life Enlightenment Skills.				
Contact periods / Week			14	-	12	18
			Total/Week:26			

II M. Tech -I Sem

S.No	Course Code	Course Name	L	T	P	Credits
Program Elective V						
1	18EC4002	Advanced Digital Signal Processing	3	--	--	3
	18EC4116	Radio Frequency Identification				
	18EC4117	System on Chip Architecture				
Open Elective						
2	18HS0824	Business Analytics	3	-	-	3
	18ME3121	Industrial Safety				
	18ME3122	Advanced Operations Research				
	18CE1028	Cost Management of Engineering Projects				
	18ME3123	Composite Materials				
	18EE2128	Waste to Energy				
3	18EC4118	Dissertation-I	-	-	20	10
Contact periods / Week			6	-	20	16
			Total/Week:26			

II M. Tech -II Sem

S.No	Course Code	Course Name	L	T	P	Credits
1	18EC4119	Dissertation -II	-	-	32	16
Contact periods / Week			Total/Week:32			16

List of Subjects

S. No	Course Code	Course Title
1.	18EC4101	Embedded System Design
2.	18EC4102	Sensors and Actuators
3.	18EC4103	Structural Digital System Design
4.	18EC4209	FPGA Architectures & Applications
5.	18EC4104	Real Time Operating Systems
6.	18EC4105	Embedded Networking
7.	18EC4011	Wireless Communications
8.	18EC4106	Internet Protocols
9.	18EC4107	Embedded System Design Lab
10.	18EC4108	Structural Digital System Design Lab
11.	18HS0823	Research Methodology and IPR
12.	18HS0818	English for Research Paper Writing
13.	18HS0818	English for Research Paper Writing
14.	18CE1029	Disaster Management
15.	18HS0825	Sanskrit for Technical Knowledge
16.	18HS0826	Value Education
17.	18EC4109	Introduction to IoT
18.	18EC4110	Advanced Microcontrollers
19.	18EC4111	Hardware Software Co-Design
20.	18EC4213	Testing & Testability
21.	18EC4112	Micro Electromechanical Systems
22.	18EC4201	VLSI Technology
23.	18EC4202	Digital IC Design
24.	18EC4008	Wireless Sensor Networks
25.	18EC4113	Internet of Things Lab
26.	18EC4114	Microcontrollers & Interfacing Lab
27.	18EC4115	Mini Project
28.	18HS0829	Constitution of India
29.	18HS0827	Pedagogy Studies
30.	18HS0828	Stress Management by Yoga
31.	18HS0819	Personality Development Through Life Enlightenment Skills.
32.	18EC4002	Advanced Digital Signal Processing
33.	18EC4116	Radio Frequency Identification
34.	18EC4117	System on Chip Architecture
35.	18HS0824	Business Analytics
36.	18ME3121	Industrial Safety
37.	18ME3122	Advanced Operations Research
38.	18CE1028	Cost Management of Engineering Projects
39.	18ME3123	Composite Materials
40.	18EE2128	Waste to Energy
41.	18EC4118	Dissertation-I
42.	18EC4119	Dissertation -II

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4101) EMBEDDED SYSTEM DESIGN
(Common to ES & VLSI)

I M. Tech -I Sem. (E.C.E) (ES)	**L**	**T**	**C**
	3	**-**	**3**

UNIT I

Introduction: Embedded System Overview, Embedded Hardware Units, Embedded Software in A System, Embedded System on Chip (SoC), Design Process, Classification of Embedded Systems.

UNIT II

Embedded Computing Platform: CPU Bus, Memory Devices, Component Interfacing, Networks for Embedded Systems, Communication Interfacings: RS232/UART, RS422/RS485, IEEE 488 Bus.

Survey of Software Architecture: Round Robin, Round Robin with Interrupts, Function Queue Scheduling Architecture, Selecting an Architecture Saving Memory Space.

UNIT III

Embedded Software Development Tools: Host and Target Machines, Linkers, Locations for Embedded Software, Getting Embedded Software into Target System, Debugging Technique.

RTOS Concepts: Architecture of the kernel, Interrupt Service Routines, Semaphores, Message Queues, Pipes.

UNIT IV

Instruction Sets: Introduction, Preliminaries, ARM Processor, SHARC Processor.

System Design Techniques: Design Methodologies, Requirement Analysis, Specifications, System Analysis and Architecture Design.

UNIT V

Design Examples: Telephone PBX, Ink Jet Printer, Water Tank Monitoring System, GPRS, Personal Digital Assistants, Set Top Boxes.

TEXT BOOKS:

1. *Computers as a component: principles of embedded computing system design*, Wayne wolf
2. *An embedded software premier*, David E. Simon
3. *Embedded / real time systems*, KVKK Prasad, Dreamtech press, 2005.

REFERENCES:

1. *Embedded real time systems programming*, Sri ram V Iyer, Pankaj gupta, TMH, 2004.
2. *Embedded system design a unified hardware/software introduction*, Frank Vahid, Ton D. Givargis, John Willey, 2002.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4102) SENSORS AND ACTUATORS

I M. Tech -I Sem. (E.C.E) (ES)	**L**	**T**	**C**
	3	**-**	**3**

UNIT I

Sensors/Transducers: Principles – Classification – Parameters – Characteristics - Environmental Parameters (EP) Characterization Mechanical and Electromechanical Sensors: Introduction – Resistive Potentiometer – Strain Gauge Resistance Strain Gauge – Semiconductor Strain Gauges.

UNIT II

Thermal Sensors: Introduction – Gas Thermometric Sensors – Thermal Expansion Type Thermometric Sensors – Acoustic Temperature Sensor – Dielectric Constant and Refractive Index Thermo sensors – Helium Low Temperature Thermometer – Nuclear Thermometer – Magnetic Thermometer – Resistance Change Type Thermometric Sensors –Thermo EMF Sensors– Junction Semiconductor Types– Thermal Radiation Sensors –Quartz Crystal Thermoelectric Sensors – NQR Thermometry – Spectroscopic Thermometry – Noise Thermometry.

UNIT III

Radiation Sensors: Introduction, Basic Characteristics – Types of Photo sensistors/Photo detectors– X-ray and Nuclear Radiation Sensors– Fiber Optic Sensors Electro Analytical Sensors: Introduction – The Electrochemical Cell – The Cell Potential - Standard Hydrogen Electrode (SHE) – Liquid Junction and Other Potentials – Polarization – Concentration Polarization-– Reference Electrodes - Sensor Electrodes – Electro ceramics in Gas media.

UNIT IV

Smart Sensors: Introduction – Primary Sensors – Excitation – Amplification – Filters – Converters – Compensation– Information Coding/Processing - Data Communication – Standards for Smart Sensor Interface – The Automation Sensors –Applications: Introduction – On-board Automobile Sensors (Automotive Sensors)– Home Appliance Sensors – Aerospace Sensors — Sensors for Manufacturing –Sensors for environmental Monitoring.

UNIT V

Actuators: Pneumatic and Hydraulic Actuation Systems- Actuation systems – Pneumatic and Hydraulic systems - Directional Control valves – Pressure control valves – Cylinders - Servo and Proportional control valves – Process control valves – Rotary actuators Mechanical actuation Systems- Types of Motion – Kinematic chains – Cams – Gears – Ratchet and Pawl – Belt and Chain drives – Bearings.

TEXT BOOKS:

1. *Sensors and Transducers –PHI Learning Private Limited*, D. Patranabis.
2. *Mechatronics –Pearson Education Limited*, W. Bolton.

REFERENCES:

1. *Sensors and Actuators, D. Patranabis* – 2nd Ed., PHI, 2013.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4103) STRUCTURAL DIGITAL SYSTEM DESIGN
(Program Elective-I)

I M. Tech -I Sem. (E.C.E) (ES)	**L**	**T**	**C**
	3	**-**	**3**

UNIT I

Building Blocks for Digital Design: Multiplexer, De-Multiplexer, Decoder, Encoder, Comparator, Adder, ALU, Carry-Look-Ahead Adder.

Building Blocks with Memory: Clocked Building Blocks, Register Building Blocks, RAM, ROM, PLA, PAL, Timing Devices.

UNIT II

Design Methods: Elements of Design Style, Top-Down Design, Separation of Controller and Architecture, Refining Architecture, And Control Algorithm, Algorithmic State Machines, ASM Chart Notations.

UNIT III

Realizing ASMS: Traditional Synthesis from ASM Chart, Multiplexer Controller Method, One-Shot Method, ROM Based Method.

Asynchronous Inputs and Races: Asynchronous ASMs, Design for Testability, Test Vectors, Fault Analysis Tools.

UNIT IV

Micro programed Design: Classical Microprogramming with Modem Technology, Enhancing the Control Unit, the 2910 Micro program Sequencer, Choosing a Micro Program Memory, A Development System for Microprogramming, Designing a Micro Programmed Minicomputer.

UNIT V

Modeling with VHDL: CAD Tools, Simulators, Schematic Entry, Synthesis from VHDL.

Design Case Studies: Single Pulse, System Clock, Serial to Parallel Data Conversion, Traffic Light Controller.

TEXT BOOKS:

1. *The Art of Digital Design, Prentice Hall,* Franklin P. Prosser and David E. Winkel.
2. *Digital System Design using VHDL*, Mc. Graw Hill, 2000, Roth.

REFERENCES:

1. *An Engineering Approach to Digital Design,* William Fletcher 1st Edition, Prentice, Hall India 1997.
2. *Digital Systems Engineering, Cambridge University Press, 2008*- William J Dally and John W Poulton.
3. *A VHDL Primer,* 3rd edition, Prentice, Jayaram Bhasker, Hall India, 2009.
4. *VHDL for Programmable Logic*, Kevin Skahill, Cypress Semiconductors.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4209) FPGA ARCHITECTURES & APPLICATIONS
(Common to ES & VLSI)
(Program Elective-I)

I M. Tech -I Sem. (E.C.E) (ES)	**L**	**T**	**C**
	3	**-**	**3**

UNIT I

Programmable Logic: ROM, PLA, PAL, PLD, PGA – Features, Programming and Applications using Complex Programmable Logic Devices Altera Series – Max 5000/7000 Series and Altera FLEX Logic – 10000 Series CPLD, AMD's – CPLD (Mach 1 To 5), Cypress FLASH 370 Device Technology, Lattice PLSI's Architectures – 3000 Series – Speed Performance and in System Programmability.

UNIT II

FPGA: Field Programmable Gate Arrays – Programming technologies, Logic Blocks, Routing Architecture, Design Flow, Technology Mapping for FPGAs.

Case Studies: Xilinx XC4000 & ALTERA's FLEX 8000/10000 FPGAs: AT & T – ORCA's (Optimized Reconfigurable Cell Array): ACTEL's – ACT-1,2,3 and Their Speed Performance.

UNIT III

Finite State Machines (FSM): Top Down Design – State Transition Table, State Assignments for FPGAs, Problem of Initial State Assignment for One Hot Encoding, Derivations of State Machine Charges.

Realization of State Machine: Charts with a PAL, Alternative Realization for State Machine Chart using Microprogramming, Linked State Machines. One – Hot State Machine, Petrinets for State Machines – Basic Concepts, Properties, Extended Petrinets for Parallel Controllers. Finite State Machine Case study, Meta stability, Synchronization

UNIT IV

FSM Architectures and Systems Level Design: Architectures Centered around Non-Registered PLDs. State Machine Designs Centered Around Shift Registers, One – Hot Design Method, Use of ASMs in One – Hot Design, Application of One – Hot Method, System Level Design – Controller, Data Path and Functional Partition.

UNIT V

Case Studies: Combinational Logic Circuits - Parallel Adder Cell, Parallel Adder Sequential Circuits - Decade Counters, Multipliers, Parallel Controller design.

TEXT BOOKS/ REFERENCES:

1. *Digital Design Using Field Programmable Gate Array*, P.K.Chan & S. Mourad, j Prentice Hall (Pte), 1994.
2. *Field Programmable Gate Array Technology*, S.Trimberger, Edr., Kluwer Academic Publicatgions,1994.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4104) REAL TIME OPERATING SYSTEMS
(Common to ES & VLSI)
(Program Elective-I)

I M. Tech -I Sem. (E.C.E) (ES)	L	T	C
	3	-	3

UNIT I

Operating Systems: Overview, Time Services and Scheduling Mechanisms, Other Basic Operating System Function, Processor Reserves and Resource Kernel. Capabilities of Commercial Real Time Operating Systems.

UNIT II

Introduction to UNIX: Overview of Commands, File I/O. (Open, Create, Close, Lseek, Read, Write), Process Control (Fork, Vfork, Exit, Wait, Waitpid, Exec), Signals, Inter Process Communication (Pipes, FIFOs, Message Queues, Semaphores, Shared Memory).

UNIT III

Real Time Systems: Typical Real Time Application, Hard Vs Soft Real Time Systems, A Reference Model of Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency Functional Parameters, Resource Parameters of Jobs and Parameters of Resources

UNIT IV

Approaches to Real Time Scheduling: Clock Driven, Weighted Round Robin, Priority Driven, Dynamic Vs State Systems, Effective Release Times and Dead Lines, Offline Vs Online Scheduling.

Fault Tolerance Techniques: Introduction, Fault Causes, Types, Detection, Fault and Error Containment, Redundancy: Hardware, Software, Time. Integrated Failure Handling.

UNIT V

Case Studies-Vx Works: Memory Managements Task State Transition Diagram, Pre-Emptive Priority, Scheduling, Context Switches – Semaphore – Binary Mutex, Counting: Watch Dugs, I/O System.

RT Linux: Process Management, Scheduling, Interrupt Management, and Synchronization.

TEXT BOOKS:

1. *Advanced Unix Programming*, Richard Stevens.
2. *Real Time Systems, Pearson Education,* Jane W.S. Liu.
3. *Real Time Systems, McGraw-Hill,* C.M. Krishna, KANG G. Shin.

REFERENCES:

1. VxWorks Programmers Guide
2. www.tidp.org
3. www.kernel.org

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4105) EMBEDDED NETWORKING
(Program Elective-II)

I M. Tech -I Sem. (E.C.E) (ES)	**L**	**T**	**C**
	3	**-**	**3**

UNIT I

Embedded Communication Protocols: Embedded Networking: Introduction – Serial/Parallel Communication – Serial Communication Protocols - RS232 Standard – RS485 – Synchronous Serial Protocols -Serial Peripheral Interface (SPI) – Inter Integrated Circuits (I2C) – PC Parallel Port Programming - ISA/PCI Bus Protocols – Fire wire.

UNIT II

USB and CAN Bus: USB bus – Introduction – Speed Identification on the bus – USB States – USB bus communication: Packets –Data flow types –Enumeration –Descriptors –PIC 18 Microcontroller USB Interface – C Programs –CAN Bus – Introduction - Frames –Bit stuffing – Types of errors –Nominal Bit Timing – PIC microcontroller CAN Interface –A simple application with CAN.

UNIT III

Ethernet Basics: Elements of a network – Inside Ethernet – Building a Network: Hardware options – Cables, Connections and network speed – Design choices: Selecting components – Ethernet Controllers – Using the internet in local and internet communications – Inside the Internet protocol.

UNIT IV

Embedded Ethernet: Exchanging messages using UDP and TCP – Serving web pages with Dynamic Data – Serving web pages that respond to user Input – Email for Embedded Systems – Using FTP – Keeping Devices and Network Secure.

UNIT V

Wireless Embedded Networking: Wireless Sensor Networks – Introduction – Applications – Network Topology – Localization –Time Synchronization - Energy Efficient MAC Protocols – SMAC – Energy Efficient and Robust Routing – Data Centric Routing.

TEXT BOOKS

1. *Embedded Systems Design: A Unified Hardware/Software Introduction* - Frank Vahid, Tony Givargis, John & Wiley Publications, 2002
2. *Parallel Port Complete: Programming, interfacing and using the PCs parallel printer port* - Jan Axelson, Penram Publications, 1996.

REFERENCE BOOKS:

1. *Advanced PIC microcontroller projects in C: from USB to RTOS with the PIC18F series* - Dogan Ibrahim, Elsevier 2008.
2. *Embedded Ethernet and Internet Complete* - Jan Axelson, Penram publications, 2003.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4011) WIRELESS COMMUNICATIONS
(Common to ES & DECS)
(Program Elective-II)

I M. Tech -I Sem. (E.C.E) (ES)	**L**	**T**	**C**
	3	**-**	**3**

UNIT I

Introduction to Wireless Communications Systems: Evolution, Examples of Wireless Communication Systems, Comparison, Second Generation Cellular Networks, WLL, Bluetooth and Personal Area Networks.

UNIT II

Mobile Radio Propagation: Large-Scale Path Loss, Introduction to Radio Wave Propagation, Free Space Propagation Model, Propagation Mechanisms, Reflection, Ground Reflection (Two-Ray) Model, Diffraction, Scattering. Small-Scale Fading and Multipath, Impulse Response Model of a Multipath Channel, Small- Scale Multipath Measurements, Parameters of Mobile Multipath Channels, Types of Small-Scale Fading, Rayleigh and Ricean Distributions, Statistical Models for Multipath Fading Channels, Theory of Multipath Shape Factors for Small-Scale Fading Wireless Channels.

UNIT III

Diversity Techniques: Repetition coding and Time Diversity- Frequency and Space Diversity, Receive Diversity- Concept of diversity branches and Signal Paths- Combining Methods- Selective Diversity Combining - Switched Combining- Maximal Ratio Combining- Equal Gain Combining- Performance Analysis for Rayleigh Fading Channels.

Cellular Communication: Cellular Networks, Multiple Access: FDM/TDM/FDMA/TDMA, Spatial Reuse, Co-channel Interference Analysis, Hand over Analysis, Erlang Capacity Analysis, Spectral efficiency and Grade of Service- Improving capacity – Cell Splitting and Sectorization.

UNIT IV

Spread Spectrum and CDMA: Motivation- Direct sequence spread spectrum- Frequency Hopping systems, Time Hopping., Anti-jamming- Pseudo Random (PN) sequence, Maximal length sequences, Gold sequences, and Generation of PN sequences.

Diversity in DS-SS Systems: Rake Receiver- Performance analysis. Spread Spectrum Multiple Access, CDMA Systems- Interference Analysis for Broadcast and Multiple Access Channels, Capacity of Cellular CDMA networks- Reverse link power control, Hard and Soft hand off strategies.

UNIT V

Fading Channel Capacity: Capacity of Wireless Channels- Capacity of Flat and frequency Selective Fading channels, Multiple Input Multiple Output (MIMO) Systems- Narrow Band

Multiple Antenna System Model, Parallel Decomposition of MIMO Channels- Capacity of MIMO Channels.

Cellular Wireless Communication Standards: GSM specifications and Air Interface, Specifications, IS 95 CDMA- 3G Systems: UMTS & CDMA 2000 Standards and Specification.

TEXT BOOKS:

1. *Wireless Communications,* Andrea Goldsmith, Cambridge University press.
2. *Modern Wireless Communications*, Simon Haykin and Michael Moher, Person Education.
3. *Wireless Communication, principles & practice*, T.S. Rappaport, PHI, 2001.

REFERENCES:

1. *Principles of Mobile Communications*, G.L Stuber, 2ndedition, Kluwer Academic Publishers.
2. *Wireless digital communication*, Kamilo Feher, PHI, 1995.
3. *Introduction to Spread Spectrum Communication*, R.L Peterson, R.E. Ziemer and David E. Borth, Pearson Education.
4. *CDMA- Principles of Spread Spectrum,* A.J.Viterbi, Addison Wesley, 1995.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4106) INTERNET PROTOCOLS
(Program Elective-II)

I M. Tech -I Sem. (E.C.E) (ES)	**L**	**T**	**C**
	3	**-**	**3**

UNIT I

Internetworking Concepts: Principles of Internetworking, Connectionless Internetworking, Application level Interconnections, Network level Interconnection, Properties of the Internet, Internet Architecture, Wired LANS, Wireless LANs, Point-to-Point WANs, Switched WANs, Connecting Devices, TCP/IP Protocol Suite.

IP Address: Classful Addressing: Introduction, Classful Addressing, Other Issues, Sub-netting and Super-netting

Classless Addressing: Variable length Blocks, Sub-Netting, Address Allocation. Delivery, Forwarding, and Routing of IP Packets: Delivery, Forwarding, Routing, Structure of Router.

ARP and RARP: ARP, ARP Package, RARP.

UNIT II

Internet Protocol (IP): Datagram, Fragmentation, Options, Checksum, IP V.6.

Transmission Control Protocol (TCP): TCP Services, TCP Features, Segment, A TCP Connection, State Transition Diagram, Flow Control, Error Control, Congestion Control, TCP Times.

Stream Control Transmission Protocol (SCTP): SCTP Services, SCTP Features, Packet Format, Flow Control, Error Control, Congestion Control.

Mobile IP: Addressing, Agents, Three Phases, Inefficiency in Mobile IP.

Classical TCP Improvements: Indirect TCP, Snooping TCP, Mobile TCP, Fast Retransmit/ Fast Recovery, Transmission/ Time out Freezing, Selective Retransmission, Transaction Oriented TCP.

UNIT III

Unicast Routing Protocols (RIP, OSPF, and BGP): Intra and Inter Domain Routing, Distance Vector Routing, RIP, Link State Routing, OSPF, Path Vector Routing, BGP.

Multicasting and Multicast Routing Protocols: Unicast - Multicast- Broadcast, Multicast Applications, Multicast Routing, Multicast Link State Routing: MOSPF, Multicast Distance Vector: DVMRP.

UNIT IV

Domain Name System (DNS): Name Space, Domain Name Space, Distribution of Name Space, and DNS in the internet.

Remote Login TELNET: Concept, Network Virtual Terminal (NVT).

File Transfer FTP and TFTP: File Transfer Protocol (FTP).

Electronic Mail: SMTP and POP.

Network Management-SNMP: Concept, Management Components, World Wide Web- HTTP Architecture.

UNIT V

Multimedia: Digitizing Audio and Video, Network Security, Security in The Internet Firewalls. Audio and Video Compression, Streaming Stored Audio/Video, Streaming Live Audio/Video, Real-Time Interactive Audio/ Video, RTP, RTCP, Voice Over IP. Network Security, Security in The Internet, Firewalls.

TEXT BOOKS:

1. *TCP/IP Protocol Suite*, Behrouz A. Forouzan, Third Edition, TMH.
2. *Internetworking with TCP/IP*, Comer 3 rd edition PHI.

REFERENCE BOOKS:

1. *High performance TCP/IP Networking*, Mahbub Hassan, Raj Jain, PHI, 2005.
2. *Data Communications & Networking*, B.A. Forouzan – 2nd Edition – TMH.
3. *High Speed Networks and Internets*, William Stallings, Pearson Education, 2002.
4. *Data and Computer Communications*, William Stallings, 7th Edition., PEI.
5. *The Internet and Its Protocols*, AdrinFarrel, Elsevier, 2005.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4107) EMBEDDED SYSTEM DESIGN LAB

I M. Tech -I Sem. (E.C.E) (ES)	**P**	**C**
	4	**2**

List of Experiments

Part-I
Experiments using ARM-926 with RTOS

1. Register a new command in CLI.
2. Create a new Task.
3. Interrupt handling.
4. Allocate resource using semaphores.
5. Share resource using MUTEX.
6. Avoid deadlock using BANKER'S algorithm.
7. Synchronize two identical threads using MONITOR.
8. Reader's Writer's Problem for concurrent Tasks.

Part-II
Experiments on ARM-CORTEX processor using any open source RTOS. (Coo-Cox-Software-Platform)

1. Implement the interfacing of display with the ARM- CORTEX processor.
2. Interface ADC and DAC ports with the Input and Output sensitive devices.
3. Simulate the temperature DATA Logger with the SERIAL communication with PC.
4. Implement the developer board as a modem for data communication using serial port Communication between two PC's.

Lab Requirements:

Software:

1. Eclipse IDE for C and C++ (YAGARTO Eclipse IDE), Perfect RTOS Library, COO-COX Software Platform, YAGARTO TOOLS, and TFTP SERVER.
2. LINUX Environment for the compilation using Eclipse IDE & Java with latest version.

Hardware:

1. The development kits of ARM-926 Developer Kits and ARM-Cortex Boards.
2. Serial Cables, Network Cables and recommended power supply for the board

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4108) STRUCTURAL DIGITAL SYSTEM DESIGN LAB

I M. Tech -I Sem. (E.C.E) (ES)	**P**	**C**
	4	**2**

List of Experiments

Using VHDL or VERILOG do the following experiments

1. Design of 4-bit adder / subtractor
2. Design of Booth Multiplier
3. Design of 4-bit ALU
4. Design SISO, SIPO, PISO, PIPO Registers
5. Design of Ripple, Johnson and Ring counters
6. Design of MIPS processor
7. Design of Washing machine controller
8. Design of Traffic Light Controller
9. Design “1010” pattern detector using Mealy State Machine
10. Design “1100” recursive pattern detector using Moore state Machine
11. Design simple Security System Using FSM/ASM
12. Mini Project

Tools Required:

VHDL or VERILOG

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0823) RESEARCH METHODOLOGY AND IPR

I M.Tech -I Sem. (E.C.E) (ES)

L	T	C
2	-	2

Course outcomes:

At the end of this course, students will be able to

- Understand research problem formulation. Analyze research related information
- Follow research ethics
- Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
- Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
- Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

UNIT I

Meaning of Research Problem, Sources of Research Problem, Criteria Characteristics of a Good Research Problem, Errors in Selecting a Research Problem, Scope and Objectives of Research Problem.

Approaches of Investigation of Solutions for Research Problem, Data Collection, Analysis, Interpretation, Necessary Instrumentations

UNIT II

Effective Literature Studies Approaches, Analysis Plagiarism, Research Ethics,

UNIT III

Effective Technical Writing, How to Write Report, Paper Developing a Research Proposal, Format of Research Proposal, a Presentation and Assessment by a Review Committee

UNIT IV

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: Technological Research, Innovation, Patenting, Development. International Scenario: International Cooperation on Intellectual Property. Procedure for Grants of Patents, Patenting Under PCT.

UNIT V

Patent Rights: Scope of Patent Rights. Licensing and Transfer of Technology. Patent Information and Databases. Geographical Indications. New Developments in IPR: Administration of Patent System. New Developments in IPR, IPR of Biological Systems, Computer Software Etc. Traditional Knowledge Case Studies, IPR and IITS.

TEXT BOOKS:

1. *Research methodology: an introduction for science & engineering students,* Stuart Melville and Wayne Goddard.
2. *Research Methodology: An Introduction,* Wayne Goddard and Stuart Melville.
3. *Resisting Intellectual Property,* Ranjit Kumar, 2nd Edition, Research Methodology: A Step by Step Guide for beginners, Halbert,, Taylor & Francis Ltd ,2007.
4. *Industrial Design*, Mayall , McGraw Hill, 1992. Niebel ,"*Product Design*", McGraw Hill, 1974.
5. *Introduction to Design,* Asimov , Prentice Hall, 1962.
6. *Intellectual Property in New Technological Age,* Robert P. Merges, Peter S. Menell, Mark A. Lemley, 2016.
7. *Intellectual Property Rights Under WTO,* T. Ramappa, S. Chand, 2008

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0818) ENGLISH FOR RESEARCH PAPER WRITING

I M.Tech -I Sem. (E.C.E) (ES)

L	T	C
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Course objectives:

Students will be able to:

1. Understand that how to improve your writing skills and level of readability.
2. Learn about what to write in each section.
3. Understand the skills needed when writing a Title.
4. Ensure the good quality of paper at very first-time submission.

UNIT I

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness.

UNIT II

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts and Introduction.

UNIT III

Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

UNIT IV

Key Skills Needed When Writing a Title, Key Skills Needed When Writing Abstract, Key Skills Needed When Writing an Introduction, Skills When Writing a Review of the Literature.

UNIT V

Skills Needed When Writing the Methods, Skills Needed When Writing the Results, Skills Needed When Writing the Discussion, Skills Needed When Writing the Conclusions.

TEXT BOOKS:

1. *Writing for Science*, Goldbort R (2006), Yale University Press.
2. Day R (2006) *How to Write and Publish a Scientific Paper*, Cambridge University Press.
3. *Handbook of Writing for the Mathematical Sciences*, SIAM, Highman's Books, HighmanN (1998).
4. *English for Writing Research Papers*, Springer New York Dordrecht Heidelberg London, Adrian Wallwork, 2011.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18CE1029) DISASTER MANAGEMENT

I M.TECH - I SEM. (E.C.E) (ES)

L	T	C
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Course *Objective:*
The objective of this subject is to give the basic knowledge of Environmental Hazards and disasters. The syllabus includes the basics of Endogenous and Exogenous hazards and gives a suitable picture on the different types of hazard and disaster mitigation methods.

Course Outcomes:
On completion of the course the students will have knowledge on
1. Types of disasters and their effects on environment
2. Causes of disasters
3. Disaster management through engineering applications

UNIT I
Environmental Hazards & Disasters: Meaning of Environmental Hazards, Environmental Disasters and Environmental Stress. Concept of Environmental Hazards, Environmental Stress & Environmental Disasters. Different Approaches & Relation With Human Ecology - Landscape Approach - Ecosystem Approach - Perception Approach - Human Ecology & its Application in Geographical Researches.

UNIT II
Types of Environmental Hazards & Disasters: Natural Hazards and Disasters – Man Induced Hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters – Extra Planetary Hazards/ Disasters - Planetary Hazards- Endogenous Hazards – Exogenous Hazards

UNIT III
Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides – Volcanic Hazards/ Disasters - Causes and Distribution of Volcanoes - Hazardous Effects of Volcanic Eruptions - Environmental Impacts of Volcanic Eruptions – Earthquake Hazards/ Disasters - Causes of Earthquakes - Distribution of Earthquakes – Hazardous Effects of - Earthquakes - Earthquake Hazards in India - - Human Adjustment, Perception & Mitigation of Earthquake.

UNIT IV
Exogenous Hazards/ Disasters - Infrequent Events- Cumulative Atmospheric Hazards/ Disasters Infrequent Events: Cyclones – Lightning – Hailstorms Cyclones: Tropical Cyclones & Local Storms - Destruction by Tropical Cyclones & Local Storms (Causes, Distribution Human Adjustment, Perception & Mitigation) Cumulative Atmospheric Hazards/ Disasters: - Floods- Droughts- Cold Waves- Heat Waves. Floods:- Causes of Floods- Flood Hazards India- Flood Control Measures (Human Adjustment, Perception & Mitigation).Droughts:- Impacts of Droughts- Drought Hazards in India- Drought Control Measures- Extra Planetary Hazards/ Disasters- Man Induced Hazards /Disasters- Physical Hazards/ Disasters-Soil Erosion Soil Erosion:-- Mechanics & Forms of Soil Erosion- Factors & Causes of Soil Erosion- Conservation Measures of Soil Erosion. Chemical Hazards/ Disasters: Release of Toxic Chemicals, Nuclear Explosion- Sedimentation Processes. Sedimentation Processes: - Global Sedimentation Problems- Regional Sedimentation Problems- Sedimentation & Environmental

Problems- Corrective Measures of Erosion & Sedimentation. Biological Hazards/ Disasters: - Population Explosion.

UNIT V

Emerging Approaches In Disaster Management- Three Stages

1. Pre- Disaster Stage (Preparedness)
2. Emergency Stage
3. Post Disaster Stage-Rehabilitation

TEXT BOOKS:

1. *Disaster Management,* Rajib Shah, Universities Press, India, 2003.
2. *Disaster Science and Management,* Tushar Bhattacharya, TMH Publications.
3. *Disaster Mitigation: Experiences and Reflections*, Pardeep Sahni.
4. *Natural Hazards & Disasters,* Donald Hyndman & David Hyndman – Cengage Learning

REFERENCES:

1. *The Environment as Hazards*, Kates, B.I & White, G.F, Oxford Publishers, New York, 1978
2. *Disaster Management,* R.B. Singh (Ed), Rawat Publication, New Delhi, 2000
3. *Disaster Management*, H.K. Gupta (Ed), Universiters Press, India, 2003
4. *Space Technology for Disaster Mitigation in India (INCED),* R.B. Singh, University of Tokyo, 1994.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0825) SANSKRIT FOR TECHNICAL KNOWLEDGE

I M.Tech -I Sem. (E.C.E) (ES)	**L**	**T**	**C**
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Course Objectives:

- To get a working knowledge in illustrious Sanskrit, the scientific language in the world.
- Learning of Sanskrit to improve brain functioning.
- Learning of Sanskrit to develop the logic in mathematics, science & other subjects
- Enhancing the memory power.
- The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature.

Course Outcomes:

- Students will be able to
- Understanding basic Sanskrit language
- Ancient Sanskrit literature about science & technology can be understood
- Being a logical language will help to develop logic in students

UNIT-I

Alphabets in Sanskrit, Past/Present/Future Tenses, Simple Sentences

UNIT-II

Order, Introduction of Roots, Technical Information about Sanskrit Literature

UNIT-III

Technical Concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics

TEXT BOOKS:

1. *Abhyaspustaka*, Dr.Vishwas, Samskrita-Bharti Publication, New Delhi
2. *Teach Yourself Sanskrit*, Prathama Deeksha-Vempati Kutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication
3. *India's Glorious Scientific Tradition*, Suresh Soni, Ocean books (P) Ltd., New Delhi.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0826) VALUE EDUCATION

I M. Tech. - I Sem. (E.C.E) (ES)	**L**	**T**	**C**
	2	**-**	**-**

Course Objectives:

Students will be able to

- Understand value of education and self- development
- Imbibe good values in students
- Let the should know about the importance of character

Course outcomes:

Students will be able to

- Knowledge of self-development.
- Learn the importance of Human values.
- Developing the overall personality.

UNIT I

Values and Self-Development – Social Values and Individual Attitudes. Work Ethics and Indian Vision of Humanism. Moral and Non-Moral Valuation. Standards and Principles. Value Judgements.

UNIT II

Importance of Cultivation of Values; Sense of Duty. Devotion, Self-Reliance; Confidence, Concentration. Truthfulness, Cleanliness. Honesty, Humanity. Power of Faith, National Unity. Patriotism. Love for Nature and Discipline.

UNIT III

- Personality and Behaviour Development - Soul and Scientific Attitude. Positive Thinking. Integrity and Discipline
- Punctuality, Love and Kindness.
- Avoid Fault Thinking.
- Free From Anger, Dignity of Labour.
- Universal Brotherhood and Religious Tolerance.
- True Friendship.
- Happiness Vs Suffering, Love for Truth.
- Aware of Self-Destructive Habits.
- Association and Cooperation.
- Doing Best for Saving Nature

UNIT IV

- Character and Competence –Holy Books Vs. Blind Faith.
- Self-Management and Good Health.
- Science of Reincarnation.
- Equality, Nonviolence, Humility, Role of Women.
- All Religions and Same Message.
- Mind Your Mind, Self-Control.

- Honesty, Studying Effectively.

TEXT BOOKS:

1. *Values and Ethics for organizations Theory and practice*, Chakroborty, S.K, Oxford University Press, New Delhi.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4109) INTRODUCTION TO IoT
(Common to ES & DECS)

I M. Tech -II Sem. (E.C.E) (ES)	**L**	**T**	**C**
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UNIT I

Introduction & Concepts: Introduction to Internet of Things, Physical Design of IOT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels.

UNIT II

Domain Specific IoTs: Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Life Style.

UNIT III

M2M & System Management with NETCONF-YANG: M2M, Difference between IoT and M2M, SDN and NFV for IoT, Software defined Networking, Network Function Virtualization, Need for IOT Systems Management, Simple Network Management Protocol, Limitations of SNMP, Network Operator Requirements, NETCONF, YANG, IOT Systems management with NETCONF-YANG.

UNIT IV

Developing Internet of Things & Logical Design using Python: Introduction, IoT Design Methodology, Installing Python, Python Data Types & Data Structures, Control Flow, Functions, Modules, Packages, File Handling, Date/ Time Operations, Classes, Python Packages.

UNIT V

IoT Physical Devices & Endpoints: What is an IoT Device, Exemplary Device, Board, Linux on Raspberry Pi, Interfaces, and Programming& IoT Devices.

TEXT BOOKS:

1. *Internet of Things a Hands-on Approach*, VijayMadisetti, Arshdeep Bahga, 2014.

REFERENCES:

1. *Designing the Internet of Things*, Adrian McEwen, Wiley Publishers, 2013.
2. *The Silent Intelligence: The Internet of Things*, Daniel Kell mereit. 2013.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4110) ADVANCED MICROCONTROLLERS
(Common to ES & PE)

I M. Tech -II Sem. (E.C.E) (ES)	**L**	**T**	**C**
	3	**-**	**3**

UNIT I

ARM Embedded Systems: An Embedded System-Definition, Embedded System Design and Development, Life Cycle, Embedded System Architecture, Embedded Systems Classification, The RISC Design Philosophy, The ARM Design Philosophy, Embedded System Hardware, Embedded System Software, ARM Processor Families, Core Extensions, Architecture Revisions.

UNIT II

ARM Processor Fundamentals: Registers, Current Program Status Register, Pipeline, Exceptions, Interrupts and Interrupt Vector Table, ARM Instruction Set, Thumb Instruction Set, Single Register and Multiple Register Load / Store Instructions. Stack, Software Interrupt Instructions.

UNIT III

ARM Programming using C and Assembly: Simple C Programs Using Function Calls, Pointers, Structures, Integer and Floating-Point Arithmetic, Assembly Code Using Instruction Scheduling, Register Allocation, Conditional Execution and Loops.

UNIT IV

Architecture of MSP430 Processor: Central Processing Unit, Registers, Instruction Formats, Addressing Modes, Constant Generator and Emulated Instructions, Instruction Set, Resets, Clock System, Memory Organization, Interrupts and Interrupt Vector Table, Low-Power Modes, Parallel Ports, Digital Inputs, Switch Debounce, Digital Outputs, Pull Up / Down Resistors, Timers - Watchdog Timer, Timer A, Timer A Modes, Timer B, Timer B Modes, Real-Time Clock.

UNIT V

MSP430 Communication: Communication Peripherals in The MSP430, Serial Peripheral Interface, SPI with The USI, SPI with The USCI, A Thermometer Using SPI Modes, Inter-Integrated Circuit Bus(I^2C) And Its Operations, State Machines for I^2C Communication, A Thermometer Using I^2C, Asynchronous Serial Communication, Asynchronous Communication with The USCI_A, A Software UART Using Timer A, Programming Examples with MSP 430.

TEXT BOOKS:

1. *ARM Systems Developer's Guide- Designing & Optimizing System Software*, Andrew N. Sloss, Dominic Symes, Chris Wright, 2008, Elsevier.
2. *MSP430 Microcontroller Basics*, John H. Davies, Elsevier Ltd Publications, Copyright 2008.

REFERENCES:

1. *Embedded Systems Architecture: A Comprehensive Guide for Engineers and Programmers* Tammy Noergaard, Elsevier(Singapore) Pvt.Ltd.Publications, 2005.
2. *Embedded system Design: A Unified Hardware/Software Introduction*, Frank Vahid, Tony D. Givargis John Wily & Sons Inc.2002.
3. *Embedded System Design*, Peter Marwedel Science Publishers, 2007.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4111) HARDWARE SOFTWARE CO-DESIGN

(Program Elective-III)

I M. Tech -II Sem. (E.C.E) (ES)	**L**	**T**	**C**
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UNIT I

Co-Design Issues: Co- Design Models, Architectures, Languages, A Generic Co- Design Methodology.

Co-Synthesis Algorithms: Hardware Software Synthesis Algorithms: Hardware – Software Partitioning Distributed System Co-Synthesis.

UNIT II

Prototyping and Emulation: Prototyping and Emulation Techniques, Prototyping and Emulation Environments, Future Developments in Emulation and Prototyping Architecture Specialization Techniques, System Communication Infrastructure

UNIT III

Target Architectures: Architecture Specialization Techniques, System Communication Infrastructure, Target Architecture and Application System Classes, Architecture for Control Dominated Systems (8051-Architectures for High Performance Control), Architecture for Data Dominated Systems (Adsp21060, Tms320c60), Mixed Systems.

UNIT IV

Compilation Techniques and Tools for Embedded Processor Architectures: Modern Embedded Architectures, Embedded Software Development Needs, Compilation Technologies Practical Consideration in A Compiler Development Environment.

Design Specification and Verification: Design, Co-Design, The Co-Design Computational Model, Concurrency Coordinating Concurrent Computations, Interfacing Components, Design Verification, Implementation Verification, Verification Tools, Interface Verification

UNIT V

Languages for System – Level Specification and Design-I: System – Level Specification, Design Representation for System Level Synthesis, System Level Specification Languages**.**

Design-II: Heterogeneous Specifications and Multi-Language Co-Simulation the Cosyma System and Lycos System.

TEXT BOOKS:

1. *Hardware / software co- design Principles and Practice*, Jorgen Staunstrup, Wayne Wolf, Springer, 2009.
2. *Hardware / software co- design Principles and Practice*, Kluwer, Academic publishers,2002.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(18EC4213) TESTING & TESTABILITY
(Common to ES, VLSI & DECS)
(Program Elective -III)

I M. Tech -II Sem. (E.C.E) (ES)	**L**	**T**	**C**
	3	**-**	**3**

UNIT I

Introduction to Test and Design for Testability (DFT) Fundamentals: Modeling: Modeling Digital Circuits at Logic Level, Register Level and Structural Models, Levels of Modeling, Logic Simulation: Types of Simulation, Delay Models, Element Evaluation, Hazard Detection, Gate Level Event Driven Simulation.

UNIT II

Fault Modeling: Logic Fault Models, Fault Detection and Redundancy, Fault Equivalence and Fault Location. Single Stuck and Multiple Stuck – Fault Models. Fault Simulation Applications, General Techniques for Combinational Circuits.

Testing for Single Stuck Faults (SSF): Automated Test Pattern Generation (ATPG/ATG) For SSFs in Combinational and Sequential Circuits, Functional Testing with Specific Fault Models.

UNIT III

Design for Testability: Testability Trade-Offs, Techniques, Scan Architectures and Testing – Controllability and Absorbability, Generic Boundary Scan, Full Integrated Scan, Storage Cells for Scan Design, Board Level and System Level DFT Approaches, Boundary Scans Standards, Compression Techniques – Different Techniques, Syndrome Test and Signature Analysis.

UNIT IV

Built-In Self-Test (BIST): BIST Concepts and Test Pattern Generation. Specific BIST Architectures – CSBL, BEST, RTS, LOCST, STUMPS, CBIST, CEBS, RTD, SST, CATS, CSTP, BILBO, Brief Ideas on Some Advanced BIST Concepts and Design for Self-Test at Board Level.

UNIT V

Memory BIST (MBIST): Memory Test Architectures and Techniques – Introduction to Memory Test, Types of Memories and Integration, Embedded Memory Testing Model, Memory Test Requirements for MBIST.

Brief Ideas on Embedded Core Testing: Introduction to Automatic in Circuit Testing (ICT), JTAG Testing Features.

TEXT BOOKS:

1. *Digital Systems Testing and Testable Design*, Miron Abramovici, Melvin A. Breur, Arthur D. Friedman, Jaico Publishing House, 2001.

REFERENCES:

1. *Design for Test for Digital ICs & Embedded Core Systems*, Alfred Crouch, Prentice Hall.
2. *Introduction to VLSI Testing, Prentice Hall*, Englehood Cliffs, 1998. Robert J.Feugate, Jr., Steven M.Mentyn,

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4112) MICRO ELECTROMECHANICAL SYSTEMS
(Program Elective-III)

I M. Tech -II Sem. (E.C.E) (ES)	**L**	**T**	**C**
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UNIT I

Introduction Basic structures of MEM devices – (Canti-Levers, Fixed Beams diaphragms), Broad Response of Micro electromechanical systems (MEMS) to Mechanical (Force, pressure etc.) Thermal, Electrical, Optical and Magnetic Stimuli, Compatibility of MEMS from the Point of Power Dissipation, Leakage Etc.

UNIT II

Review of Mechanical Concepts Like Stress, Strain, Bending Moment, Deflection Curve. Differential Equations Describing the Deflection Under Concentrated Force, Distributed Force, Distributed Force, Deflection Curves for Canti-Levers- Fixed Beam. Electrostatic Excitation – Columbic Force Between the Fixed and Moving Electrodes. Deflection with Voltage in C.L, Deflection Vs Voltage Curve, Critical Fringe Field – Field Calculations Using Laplace Equation. Discussion On the Approximate Solutions – Transient Response of the MEMS.

UNIT III

Types Two Terminal MEMS - Capacitance Vs Voltage Curve – Variable Capacitor. Applications of Variable Capacitors. Two Terminal MEM Structures. Three Terminal MEM Structures – Controlled Variable Capacitors – MEM as A Switch and Possible Applications.

UNIT-IV

MEM Circuits & Structures MEM Circuits & Structures for Simple GATES- AND, OR, NAND, NOR, Exclusive OR, Simple MEM Configurations for Flip -Flops Triggering Applications to Counters, Converters. Applications for Analog Circuits Like Frequency Converters, Wave Shaping. RF Switches for Modulation. MEM Transducers for Pressure, Force Temperature. Optical MEMS.

UNIT V

MEM Technologies Silicon Based MEMS- Process Flow – Brief Account of Various Processes and Layers Like Fixed Layer, Moving Layers, Spacers Etc., And Etching Technologies. Metal Based MEMS: Thin and Thick Film Technologies for MEMS. Process Flow and Description of the Processes, Status of MEMS in the Current Electronics Scenario.

TEXT BOOKS:

1. *MEMS Theory, Design and Technology*, GABRIEL. M.Review, R.F,2003, John wiley & Sons.
2. *Strength of Materials*, ThimoShenko, 2000, CBS publishers & Distributors.
3. *MEMS and NEMS, Systems Devices and Structures*, ServeyE.Lyshevski, 2002, CRC Press.

REFERENCES:

1. *Sensor Technology and Devices*, Ristic L. (Ed), 1994, Artech House, London.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4201) VLSI TECHNOLOGY
(Common to ES & VLSI)
(Program Elective-IV)

I M. Tech -II Sem. (E.C.E) (ES)	**L**	**T**	**C**
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UNIT I

Review of Microelectronics and Introduction to MOS Technologies: (MOS, CMOS, Bi-CMOS) Technology Trends and Projections.

Basic Electrical Properties of MOS, CMOS & Bi-CMOS CIRCUITS: I_{ds} -V_{ds} Relationships, Threshold Voltage V_t, gm, g_{ds} and ω_o, Pass Transistor, MOS, CMOS & Bi-CMOS Inverters, $Z_{p.u}/Z_{p.d}$, MOS Transistor Circuit Model, Latch-Up in CMOS Circuits.

UNIT II

Layout Design and Tools: Transistor Structures, Wires and Vias, Scalable Design Rules, Layout Design Tools.

Logic Gates & Layouts: Static Complementary Gates, Switch Logic, Alternative Gate Circuits, Low Power Gates, Resistive and Inductive Interconnect Delays.

UNIT III

Combinational Logic Networks: Layouts, Simulation, Network Delay, Interconnect Design, Power Optimization, Switch Logic Networks, Gate and Network Testing.

Sequential Systems: Memory Cells and Arrays, Clocking Disciplines, Design, Power Optimization, Design Validation and Testing.

UNIT IV

Floor Planning & Architecture Design: Floor Planning Methods, Off-Chip Connections, High Level Synthesis, Architecture for Low Power, SOCs and Embedded CPUs, Architecture Testing.

UNIT V

Introduction to CAD Systems (Algorithms) And Chip Design: Layout Synthesis and Analysis, Scheduling and Printing, Hardware-Software Co-design, Chip Design Methodologies- A Simple Design Example.

TEXT BOOKS:

1. *Essentials of VLSI Circuits and Systems*, K. Eshraghian et.al (3 authors) PHI of India Ltd.,2005.
2. *Modern VLSI Design*, Wayne Wolf, Pearson Education, fifth Indian Reprint, 3rd Edition, 2005.

REFERENCES:

1. *Principals of CMOS Design*, N.H. E Weste, K.Eshraghian, Adison Wesley, 2nd Edition.
2. *Introduction to VLSI Design*, Fabricius, MGH International Edition, 1990.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4202) DIGITAL IC DESIGN
(Common to ES & VLSI)
(Program Elective-IV)

I M. Tech -II Sem. (E.C.E) (ES)	**L**	**T**	**C**
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UNIT I

CMOS Inverters -Static and Dynamic Characteristics, Static and Dynamic CMOS Design-Domino and NOR Logic - Combinational and Sequential Circuits.

UNIT II

Method of Logical Effort for Transistor Sizing -Power Consumption in CMOS Gates- Low Power CMOS Design, Arithmetic Circuits in CMOS VLSI - Adders- Multipliers- Shifter - CMOS Memory Design - SRAM and DRAM.

UNIT III

Bipolar Gate Design- Bi-CMOS Logic - Static and Dynamic Behavior -Delay and Power Consumption in Bi-CMOS Logic.

UNIT IV

Layout Design Rules: Need for Design Rules, Mead Conway Design Rules for The Silicon Gate NMOS Process, CMOS Based Design Rules, Simple Layout Examples, Sheet Resistance, Area Capacitance, Wire Capacitance, Drive Large Capacitive Load**.**

UNIT V

Subsystem Design Process: General Arrangement of 4-Bit Arithmetic Processor, Design of 4-Bit Shifter, Design of ALU Sub-System, Implementing ALU Functions with an Adder, Carry-Look-Ahead Adders, Multipliers, Serial Parallel Multipliers, Pipeline Multiplier Array, Modified Booth's Algorithm.

TEXT BOOKS:

1. *CMOS Digital Integrated Circuits - Analysis & Design*-Sung-Mo Kang & Yusuf Leblebici, MGH, Second Ed., 1999.
2. *Digital Integrated Circuits - A Design Perspective*, Jan M Rabaey, Prentice Hall, 1997.
3. *Introduction to VLSI Design*, Eugene D Fabricus, McGraw Hill International Edition.1990.

REFERENCES:

1. *Digital Integrated Circuit Design*, Ken Martin, Oxford University Press, 2000.
2. *Principles of CMOS VLSI Design - A System Perspective*, Neil H E West and Kamran Eshranghian, Addision-Wesley 2nd Edition,2002.
3. *CMOS circuit design, layout, and simulation*, R. J. Baker, H. W. Li, and D. E. Boyce, New York: IEEE Press, 1998.
4. *Analysis and Design of Digital Integrated Circuits*, David A. Hodges, Horace G. Jackson, and Resve A. Saleh, Third Edition, McGraw-Hill, 2004.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4008) WIRELESS SENSOR NETWORKS
(Common to ES, VLSI & DECS)
(Program Elective-IV)

I M. Tech -II Sem. (E.C.E) (ES)	**L**	**T**	**C**
	3	**-**	**3**

UNIT I

Introduction and Overview of Sensor Network: Architecture and its Applications, Sensor Network Comparison with Ad Hoc Networks, Sensor Node Architecture with Hardware and Software Details.

UNIT II

Hardware: Examples Like Mica2, Micaz, Telosb, Cricket, Imote2, Tmote, Btnode, And Sun SPOT, Software (Operating Systems): Tinyos, MANTIS, Contiki, And Retos. Programming Tools: C, Nesc. Performance Comparison of Wireless Sensor Networks Simulation and Experimental Platforms Like Open Source (Ns-2) And Commercial (Qualnet, Opnet).

UNIT III

Overview of Sensor Network Protocols (Details of Atleast 2 Important Protocol Per Layer): Physical, MAC and Routing/ Network Layer Protocols, Node Discovery Protocols, Multi-Hop and Cluster Based Protocols, Fundamentals of 802.15.4, Bluetooth, BLE (Bluetooth Low Energy), UWB.

UNIT IV

Data Dissemination and Processing; Differences Compared with Other Database Management Systems, Data Storage, Query Processing.

UNIT V

Specialized Features: Energy Preservation and Efficiency, Security Challenges, Fault Tolerance, Issues Related to Localization, Connectivity and Topology, Sensor Deployment Mechanisms, Coverage Issues; Sensor Web, Sensor Grid, Open Issues for Future Research, and Enabling Technologies in Wireless Sensor Network.

TEXT BOOKS / REFERENCE BOOKS:

1. *Protocols and Architectures for Wireless Sensor Networks*, H. Karl and A. Willig, John Wiley & Sons, India, 2012.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4113) INTERNET OF THINGS LAB

I M. Tech -II Sem. (E.C.E) (ES)	**P**	**C**
	4	**2**

List of Experiments

Using Python script:

1. Interfacing light sensor/ LDR sensor –light dependent
2. Interfacing air quality sensor
3. Interfacing proximity sensor
4. Create an account in www.way2sms.com to your mobile number and sending an SMS
5. Give an alert to owner and cyber security cell through e-mail, when thief entered into the house.
6. Email based home automation electrical appliances should be controlled by sending an email from your account.
7. Interfacing temperature humidity sensor.
8. Reading data from cloud.
9. Running webserver on raspberry pi
10. Communicate multiple devices over socket.

Equipment's Required:

1. Raspberry pi 2 model B

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4114) MICROCONTROLLERS & INTERFACING LAB

I M. Tech -II Sem. (E.C.E) (ES)	**P**	**C**
	4	**2**

List of Experiments

CYCLE-I

Using Embedded C

1. Write a simple program to print "hello world"
2. Write a simple program to Flash a light by a software delay.
3. Write a loop application to copy values from P1 to P2
4. Write a c program for counting the no of times that a switch is pressed & released.
5. Illustrate the use of port header file (port M) using an interface consisting of a keypad and liquid crystal display.
6. Develop a simple EOS showing traffic light sequencing.
7. Write a program to display elapsed time over RS-232 Link.

CYCLE-II

INTERFACING

1. Displaying Characters on LCD.
2. Serial Communication using UART.
3. Basic Input and Output using MSP430 UART.
4. Interrupt Handling using MSP430.
5. Analog to Digital Conversion using MSP430.
6. Interfacing external Devices to GPIO Ports.

Equipment's Required:

1. Computer with latest configurations
2. Code Composer Studio v6.1 (Preferably Latest version)
3. MSP430/ARM based Hardware kits and add-on boards.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0829) CONSTITUTION OF INDIA

I M.Tech -II Sem. (E.C.E) (ES)	**L**	**T**	**C**
	2	**-**	**-**

Course Objectives:

Students will be able to

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals 'constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

UNIT I

History of Making of the Indian Constitution:

History, Drafting Committee, (Composition & Working)

UNIT II

Philosophy of the Indian Constitution: Preamble, Salient Features.

UNIT III

Contours of Constitutional Rights & Duties:

- Fundamental Rights
- Right to Equality
- Right to Freedom
- Right Against Exploitation
- Right to Freedom of Religion
- Cultural and Educational Rights
- Right to Constitutional Remedies
- Directive Principles of State Policy
- Fundamental Duties.

UNIT IV

Organs of Governance:

- Parliament
- Composition
- Qualifications And Disqualifications
- Powers And Functions
- Executive
- President
- Governor
- Council of Ministers
- Judiciary, Appointment and Transfer of Judges, Qualifications

- Powers and Functions

UNIT V

Local Administration:

- District's Administration Head: Role and Importance,
- Municipalities: Introduction, Mayor and Role of Elected Representative, CEO of Municipal Corporation.
- Pachayati Raj: Introduction, PRI: Zila Pachayat.
- Elected Officials and Their Roles, CEO Zilapachayat: Position and Role.
- Block Level: Organizational Hierarchy (Different Departments),
- Village Level: Role of Elected and Appointed Officials,
- Importance of Grass Root Democracy.

Election Commission:

- Election Commission: Role and Functioning.
- Chief Election Commissioner and Election Commissioners.
- State Election Commission: Role and Functioning.
- Institute and Bodies for the Welfare of SC/ST/OBC and Women.

TEXT BOOKS:

1. *The Constitution of India*, 1950 (Bare Act), Government Publication.
2. F*raming of Indian Constitution*, Dr. S. N. Busi, Dr. B. R. Ambedkar, 1st Edition, 2015.
3. *Indian Constitution Law*, M. P. Jain, 7th Edn., Lexis Nexis, 2014.
4. *Introduction to the Constitution of India,* D.D. Basu, Lexis Nexis, 2015.

(AUTONOMOUS)

(18HS0827) PEDAGOGY STUDIES

I M.Tech -II Sem. (E.C.E) (ES)	**L**	**T**	**C**
	2	**-**	**-**

Course Objectives:

Students Will Be Able To

- Review Existing Evidence On The Review Topic To Inform Programme Design And Policy
  Making Undertaken By the Dfid, Other Agencies and Researchers.
- Identify Critical Evidence Gaps To Guide The Development.

Course Outcomes

Students Will Be Able To Understand

- What Pedagogical Practices Are Being Used By Teachers In Formal And Informal Classrooms In Developing Countries?
- What Is The Evidence On The Effectiveness Of These Pedagogical Practices, In What Conditions, And With What Population Of Learners?
- How Can Teacher Education (Curriculum And Practicum) And The School Curriculum And Guidance Materials Best Support Effective Pedagogy?

UNIT I

Introduction and Methodology:

- Aims and Rationale, Policy Background, Conceptual Framework and Terminology.
- Theories of Learning, Curriculum, Teacher Education.
- Conceptual Framework, Research Questions**.**
- Overview of Methodology and Searching.

UNIT II

- Thematic Overview: Pedagogical Practices are Being Used by Teachers in Formal and Informal Classrooms in Developing Countries.
- Curriculum, Teacher Education.

UNIT III

- Evidence on the Effectiveness of Pedagogical Practices.
- Methodology for the in Depth Stage: Quality Assessment of Included Studies.
- How Can Teacher Education (Curriculum and Practicum) and the School Curriculum and Guidance Materials Best Support Effective Pedagogy?
- Theory of Change.
- Strength and Nature of the Body of Evidence for Effective Pedagogical Practices.
- Pedagogic Theory and Pedagogical Approaches.
- Teachers' Attitudes and Beliefs and Pedagogic Strategies.

UNIT IV

- Professional Development: Alignment with Classroom Practices and Follow-Up Support.

- Peer Support
- Support from the Head Teacher and the Community.
- Curriculum and Assessment
- Barriers to Learning: Limited Resources and Large Class Sizes

UNIT V

Research Gaps and Future Directions

- Research Design
- Contexts
- Pedagogy
- Teacher Education
- Curriculum and Assessment
- Dissemination and Research Impact.

TEXT BOOKS:

1. *Classroom Interaction In Kenyan Primary Schools,* Ackers J, Hardman F (2001) Compare, 31 (2): 245-261.
2. *The Importance Of Evaluation,* Agrawal M (2004) Curricular Reform In Schools: Journal Of Curriculum Studies, 36 (3): 361-379.
3. *Teacher Training In Ghana - Does It Count? Multi-Site Teacher Education Research Project (Muster) Country Report 1,* Akyeampong K (2003). London: Dfid.
4. *Improving Teaching And Learning Of Basic Maths And Reading In Africa: Does Teacher Preparation Count?,* Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) International Journal Educational Development, 33 (3): 272–282.
5. *International Comparisons In Primary Education. Oxford And Boston,* Alexander Rj (2001) Culture And Pedagogy, Blackwell.
6. *Learning To Read,* Chavan M (2003) Read India: A Mass Scale, Rapid, Campaign.
7. Www.Pratham.Org/Images/Resource%20working%20paper%202.Pdf.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0828) STRESS MANAGEMENT BY YOGA

I M.Tech -II Sem. (E.C.E) (ES)

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Course Objectives:

- To Achieve Overall Health Of Body And Mind
- To Overcome Stress

Course Outcomes:

Students Will Be Able To

- Develop Healthy Mind In A Healthy Body Thus Improving Social Health Also
- Improve Efficiency.

UNIT I

Definitions of Eight Parts of Yoga (Ashtanga)

UNIT II

Yam and Niyam. Do`S and Don'ts in Life:
Ahinsa, Satya, Astheya, Bramhacharya and Aparigraha.
Shaucha, Santosh, Tapa, Swadhyay, Ishwarpranidhan.

UNIT III

Asan and Pranayam:
Various Yog Poses and Their Benefits for Mind & Body.
Regularization of Breathing Techniques and its Effects-Type of Pranayam.

TEXT BOOKS:

1. *Yogic Asanas For Group Tarining-Part-I*", Janardan Swami Yogabhyasi Mandal, Nagpur Model Curriculum Of Engineering & Technology Pg Courses [Volume-I] [47].
2. *Rajayoga Or Conquering The Internal Nature*, Swami Vivekananda, Advaitaashrama (Publication Department) Kolkata.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR
(AUTONOMOUS)

(18HS0819) PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

I M.Tech -II Sem. (E.C.E) (ES)

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Course Objectives:

- To Learn To Achieve The Highest Goal Happily.
- To Become A Person With Stable Mind, Pleasing Personality And Determination.
- To Awaken Wisdom In Students.

Course Outcomes

Students Will Be Able To

- Study Of Shrimad-Bhagwad-Geeta Will Help The Student In Developing His Personality And Achieve The Highest Goal In Life.
- The Person Who Has Studied Geeta Will Lead The Nation And Mankind To Peace And Prosperity.
- Study Of Neetishatakam Will Help In Developing Versatile Personality Of Students.

UNIT I

Neetisatakam-Holistic Development of Personality

- Verses- 19,20,21,22 (Wisdom)
- Verses- 29,31,32 (Pride & Heroism)
- Verses- 26,28,63,65 (Virtue)
- Verses- 52,53,59 (Dont's)
- Verses- 71,73,75,78 (Do's)
-

UNIT II

- Approach to Day to Day Work and Duties.
- Shrimad Bhagwadgeeta : Chapter 2-Verses 41, 47,48,
- Chapter 3-Verses 13, 21, 27, 35, Chapter 6-Verses 5,13,17, 23, 35,
- Chapter 18-Verses 45, 46, 48.

UNIT III

- Statements of Basic Knowledge.
- Shrimad Bhagwadgeeta: Chapter2-Verses 56, 62, 68
- Chapter 12 -Verses 13, 14, 15, 16,17, 18
- Personality Of Role Model. Shrimad Bhagwadgeeta: Chapter2-Verses 17, Chapter 3-Verses 36,37,42,
- Chapter 4-Verses 18, 38,39
- Chapter18 – Verses 37,38,63

TEXT BOOKS:

1. *Srimad Bhagavad Gita*, Swami Swarupanandaadvaita Ashram (Publication Department), Kolkata.
2. *Bhartrihari's Three Satakam (Niti-Sringar-Vairagya),* P.Gopinath, 4. Rashtriya Sanskrit Sansthanam, New Delhi.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4002) ADVANCED DIGITAL SIGNAL PROCESSING
(Common to ES, & DECS)
(Program Elective-V)

II M. Tech -I Sem. (E.C.E) (ES)	**L**	**T**	**C**
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UNIT I

Overview: Discrete-Time Signals, Sequences and sequence Representation, Discrete-Time Systems, Time-Domain Characterization and Classification of LTI Discrete-Time Systems. The Continuous-Time Fourier Transform, The Discrete-Time Fourier Transform, Energy Density Spectrum of a Discrete-Time Sequence, Band-Limited Discrete-Time signals, The Frequency Response of LTI Discrete-Time System.

LTI Systems: Types of Linear-Phase transfer functions, Simple Digital Filters, Complementary Transfer Function, Inverse Systems, System Identification, Digital Two-Pairs, Algebraic Stability Test.

UNIT II

Digital Filter Structure and Design: All Pass Filters, Tunable IIR Digital Filter, IIR Tapped Cascade Lattice Structures, FIR Cascaded Lattice Structures, Parallel All Pass Realization of IIR Transfer Functions, State Space Structures, Polyphase Structures, Digital Sine-Cosine Generator, Computational Complexity of Digital Filter Structures, Design of IIR Filter using pade approximation, Least Square Design Methods, Design of Computationally Efficient FIR Filters.

UNIT III

FFT Algorithms: Fast DFT algorithms based on Index mapping, Sliding Discrete Fourier Transform, DFT Computation Over a narrow Frequency Band, Split Radix FFT, Linear filtering approach to Computation of DFT using Chirp Z-Transform.

Multi Rate Signal Processing: Decimation by a factor D, Interpolation by a factor I, Sampling rate conversion by a rational factor I/D, Filter design & Implementation for Sampling rate conversion.

UNIT IV

Power Spectral Estimation: Estimation of Spectra from Finite duration observation of Signals, Non-parametric methods: Bartlett, Welch & Blackmann & Tukey methods.

Parametric Methods for Power Spectrum Estimation: Relation between auto correlation & Model parameters, Yule-Waker & Burg Methods, MA & ARMA models for Power spectrum estimation.

UNIT V

Analysis of Finite Word length Effects in Fixed-Point DSP Systems: Fixed, Floating Point Arithmetic – ADC quantization, Noise & Signal Quality-Finite word length effect in IIR digital Filters – Finite word-length effects in FFT algorithms.

Applications of Digital Signal Processing: Dual Tone Multi-Frequency Signal Detection, Spectral Analysis of Sinusoidal Signals, Spectral Analysis of Non-Stationary Signals, Musial Sound Processing, Over Sampling A/D Converter, Over Sampling D/A Converter, Discrete-Time Analytic Signal Generation.

TEXTBOOKS:

1. *Digital Signal Processing*, Sanjit K Mitra, Tata MCgraw Hill Publications.
2. *Digital Signal Processing Principles*, Algorithms, Applications by J G Proakis, D G Manolokis, PHI.

REFERENCES:

1. *Discrete-Time Signal Processing*, A V Oppenhiem, R W Schafer, Pearson Education.
2. *DSP- A Practical Approach*, Emmanuel C Ifeacher Barrie. W. Jervis, Pearson Education.
3. *Modern spectral Estimation techniques*, S. M. Kay, PHI, 1997.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4116) RADIO FREQUENCY IDENTIFICATION
(Program Elective-V)

II M. Tech -I Sem. (E.C.E) (ES)	**L**	**T**	**C**
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UNIT I

Understanding RFID Technology: Introduction, RFID Technology, The Elements of an RFID system, Coupling, Range, and Penetration, RFID Applications, Veri Chip and Mark of the Beast.

UNIT II

A History of the EPC: Introduction, The Distributed Intelligent Systems Center, Meanwhile, at Procter & Gamble, "Low-Cost" RFID Protocols, "Low-cost" Manufacturing, The Software and the Network, Privacy, Harnessing the Juggernaut, The Six Auto-ID Labs, The Evolution of the Industry, The Creation of EPC global.

UNIT III

RFID and Global Privacy Policy: Introduction, Definitions of Privacy, Definitions of Personal Information, History of Current Privacy Paradigm, Mapping the RFID Discovery process, Functions and Responsibilities for chips, Readers, and Owners, Privacy as a Fundamental Human Right, Constitutional Rights.

UNIT IV

RFID, Privacy and Regulation: Introduction, Understanding RFID's Privacy Threats. RFID and the United States Regulatory Landscape: Introduction, Current State of RFID Policy, Individuals, Business, Government, Miscellaneous, Integrity and Security of the System, Government Access, Health Impact, Labor Impact

UNIT V

Applications: RFID Payments at ExxonMobil, Exxon Mobil Corporation, Transforming the Battlefield with RFID, Logistics and the Military, RFID in the Pharmacy, CVS and Auto-ID, Project Jump Start, RFID in the Store.

TEXT BOOKS:

1. *RFID Applications, Security and privacy*, Simson Garfinkel and Beth Rosenberg, Pearson Education.
2. *Radio Frequency Identification*, Steven Shepard, First edition, McGraw-Hill Professional.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC4117) SYSTEM ON CHIP ARCHITECTURE
(Program Elective-V)

II M. Tech -I Sem. (E.C.E) (ES)

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UNIT I

Introduction to the System Approach: System Architecture, Components of the System, Hardware & Software, Processor Architectures, Memory and Addressing. System level interconnection, An approach for SOC Design, System Architecture and Complexity.

UNIT II

Processors: Introduction, Processor Selection for SOC, Basic concepts in Processor Architecture, Basic concepts in Processor Micro Architecture, Basic elements in Instruction handling. Buffers: Minimizing Pipeline Delays, Branches, More Robust Processors, Vector Processors and Vector Instructions extensions, VLIW Processors, Superscalar Processors.

UNIT III

Memory Design for SOC: Overview of SOC External Memory, Internal Memory, Size, Scratchpads and Cache memory, Cache Organization, Cache data, Write Policies, Strategies for line replacement at Miss time, Types of Cache, Split – I, and D – Caches, Multilevel Caches, Virtual to real translation, SOC Memory System, Models of Simple Processor – memory Interaction.

UNIT IV

Interconnect Customization and Configuration: Inter Connect Architectures, Bus: Basic Architectures, SOC Standard Buses, Analytic Bus Models, Using the Bus model, Effects of Bus transactions and contention time. SOC Customization: An overview, Customizing Instruction Processor, Reconfiguration Technologies, Mapping design onto Reconfigurable devices, Instance- Specific design, Customizable Soft Processor, Reconfiguration - overhead analysis and trade-off analysis on reconfigurable Parallelism.

UNIT V

Application Studies / Case Studies: SOC Design approach, AES algorithms, Design and Evaluation, Image compression – JPEG compression.

TEXT BOOKS:

1. *Computer System Design System-On-Chip*, Michael J. Flynn and Wayne Luk, Wiely India Pvt. Ltd.
2. *ARM System on Chip Architecture*, Steve Furber –2nd Ed., 2000, Addison Wesley Professional.

REFERENCES:

1. *Design of System on a Chip: Devices and Components*, Ricardo Reis, 1st Ed., 2004, Springer.
2. *Co-Verification of Hardware and Software for ARM System on Chip Design (Embedded Technology)*, Jason Andrews – Newnes, BK and CDROM.
3. *System on Chip Verification – Methodologies and Techniques*, Prakash Rashinkar, Peter Paterson and Leena Singh L, 2001, Kluwer Academic Publishers.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0824) BUSINESS ANALYTICS
(Open Elective)

II M. Tech. - I Sem. (E.C.E) (ES)	**L**	**T**	**C**
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***Course Objective*:**

The course is to understand the management and administration, functions of management, formal and informal organization, staffing, creativity and innovation, process of communication.

Course Outcomes:

CO -1: Design, device, and query relational databases for operative data.
CO - 2: Design, implement, populate and query data warehouses for informational data.
CO - 3: To integrate very large data sets to make business decisions.
CO - 4: Evaluate the use of data from acquisition through cleansing, warehousing, analytics, and visualization to the ultimate business decision.
CO - 5: Evaluate the key concepts of business analytics.
CO - 6: Determine when to implement relational versus document oriented database structures.
CO -7: Outline the relationship of the business analytics process within the organization's decision-making process.
CO - 8: Examine and apply appropriate business analytic techniques and methods.
CO–9: Execute real-time analytical methods on streaming datasets to react quickly to customer needs.
CO -10: To critically analyze the predictive analysis methods.

UNIT I

Introduction to Descriptive analytics, Descriptive Statistics, Probability Distributions, Inferential Statistics through hypothesis tests, Permutation & Randomization Test

UNIT II

Regression, ANOVA (Analysis of Variance), Machine Learning Introduction and Concepts Differentiating, algorithmic and model based frameworks, Regression: Ordinary Least Squares, Ridge Regression, Lasso Regression, K Nearest Neighbors', Regression &Classification

UNIT III

Supervised Learning with Regression and Classification techniques- Bias-Variance Dichotomy, Model Validation Approaches, Logistic Regression, Linear Discriminant Analysis, Quadratic Discriminant Analysis, Regression and Classification Trees, Support Vector Machines, Ensemble Methods: Random Forest, Neural Networks, Deep learning

UNIT IV

Unsupervised Learning and Challenges for Big Data Analytics- Clustering, Associative Rule Mining, Challenges for big data analytics

UNIT V

Prescriptive analytics Creating data for analytics through designed experiments, creating data for analytics through Active learning, creating data for analytics through Reinforcement learning, Graph Visualization, Data Summaries, Model Checking & Comparison

TEXT BOOKS:

1. *The elements of statistical learning.Vol.2.No.1,* Hastie, Trevor, et al. New York: springer, 2009.
2. *Applied statistics and probability for engineers,* Montgomery, Douglas C., and George C. Runger. John Wiley & Sons, 2010
3. *Scaling up Machine Learning,* Bekkerman et al.
4. *Hadoop: The Definitive Guide,* Tom White Third Edition, O"reilly Media, 2012.
5. *Mining of Massive Datasets,* Anand Rajaraman and Jeffrey David Ullman, Cambridge University Press, 2012.
6. *Developing Analytic Talent: Becoming a Data Scientist,* Vincent Granville, wiley, 2014.
7. *Introduction to Data Science, Version 2.0,* Jeffrey Stanton & Robert De Graaf, 2013

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18ME3121) INDUSTRIAL SAFETY
(Open Elective)

II M.Tech -I Sem. (E.C.E) (ES)	**L**	**T**	**C**
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Course Objectives:

- *To learn about mechanical and electrical hazards.*
- *To learn about P mechanical and electrical hazards.*
- *To learn about Wear and Corrosion and their prevention.*
- *To learn about Periodic and preventive maintenance*

Course Outcomes:

Students undergoing this course are able to

- *Understand the points of factories act 1948 for health and safety.*
- *Understand the cost & its relation with replacement economy.*
- *Understand the concepts of sequence of fault finding activities*
- *Understand the Program and schedule of preventive maintenance of mechanical and electrical equipment.*

UNIT I

Industrial Safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc., Safety color codes. Fire prevention and firefighting, equipment and methods.

UNIT II

Fundamentals of Maintenance Engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.

UNIT III

Wear and Corrosion and their Prevention: Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.

UNIT IV

Fault Tracing: Fault tracing-concept and importance, decision tree concept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipment's like, Any one machine tool, Pump, Air compressor, Internal combustion engine, Boiler, Electrical motors, Types of faults in machine tools and their general causes.

UNIT-V

Periodic and Preventive Maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: Machine tools, Pumps, Air compressors, Diesel generating (DG) sets Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance.

TEXT BOOKS:

1. *Maintenance Engineering Handbook,* Higgins & Morrow, Da Information Services, 2002
2. *Maintenance Engineering*, H. P. Garg, S. Chand and Company, 2008

REFERENCE BOOKS:

1. *Pump-hydraulic Compressors,* Audels, Mcgrew Hill Publication, 2009
2. *Foundation Engineering Handbook,* Winterkorn, Hans, Chapman & Hall London, 2010

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18ME3122) ADVANCED OPERATIONS RESEARCH
(Open Elective)

II M.Tech -I Sem. (E.C.E) (ES)

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Course Objectives:

- *To learn about Optimization Techniques.*
- *To learn about Graphical solution revised simplex method*
- *To learn about Nonlinear programming problem.*
- *To learn about Scheduling and sequencing and Competitive Models*

Course Outcomes:

Students undergoing this course are able to

- *Understand the Inventory Control Models*
- *Understand the Graphical solution revised simplex method*
- *Understand the concepts of Kuhn-Tucker conditions min cost flow.*
- *Understand the Probabilistic inventory control models and Dynamic Programming*

UNIT I

Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models.

UNIT II

Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming.

UNIT III

Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem - CPM/PERT.

UNIT IV

Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models - Geometric Programming.

UNIT V

Competitive Models, Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation.

TEXT BOOKS:

1. *Operations Research, An Introduction*, H.A. Taha, PHI, 2008
2. *Principles of Operations Research*, H.M. Wagner, PHI, Delhi, 1982.
3. *Introduction to Optimization: Operations Research*, J.C. Pant, Jain Brothers, Delhi, 2008

REFERENCE BOOKS:

1. *Operations Research*: Hitler Liebermann McGraw Hill Pub. 2009
2. *Operations Research*: Pannerselvam, Prentice Hall of India 2010

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS
(Open Elective)

II M.TECH - I SEM. (E.C.E) (ES)	**L**	**T**	**C**
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***Course Objectives*:**

- To study fundamentals of engineering project economics
- To understand dynamics of money over time
- To understand the significance of Benefit & Cost Analysis
- To get familiarised with depreciation, inflation and taxes
- To know the procedures of equipment costing
- To understand the basic concepts of Financial Management

Course Outcomes:

- Student can access the present value and future value for money
- Student can apply the principals of Benefit & Cost Analysis and
- Break-Even comparison
- Student can calculate the depreciation cost for construction equipment and can estimate the cost for construction equipment
- Can prepare profit and loss, balance sheets etc.

UNIT I

Engineering economics : Basic principles – Time value of money, Quantifying alternatives for decision making, Cash flow diagrams, Equivalence- Single payment in the future (P/F, F/P), Present payment compared to uniform series payments (P/A, A/P), Future payment compared to uniform series payments (F/A, A/F), Arithmetic gradient, Geometric gradient.

UNIT II

Comparison of alternatives: Present, future and annual worth method of comparing alternatives, Rate of return, Incremental rate of return, Break-even comparisons, Capitalized cost analysis, Benefit-cost analysis.

UNIT III

Depreciation, Inflation and Taxes: Depreciation, Inflation, Taxes.
Equipment economics: Equipment costs, Ownership and operating costs, Buy/Rent/Lease options, Replacement analysis.

UNIT IV

Cost Estimating: Types of Estimates, Approximate estimates – Unit estimate, Factor estimate, Cost indexes, parametric estimate, and Life cycle cost.

UNIT V

Financial management: Construction accounting, Chart of Accounts, Financial statements – Profit and loss, Balance sheets, Financial ratios, Working capital management.

TEXT BOOKS / REFERENCES:

1. *Engineering Economy by* Blank, L. T. and Tarquin, A. Fourth Edition, WCB/McGraw-Hill, 1998.
2. *Fundamentals of Financial management by* Bose, D. C. 2nd ed., PHI, New Delhi, 2010.
3. *Fundamentals of Financial management by* Boyer, C. B. and Merzbach, U. C., 2nd ed., John Wiley & Sons, New York, 1989.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18ME3123) COMPOSITE MATERIALS
(Open Elective)

II M.Tech -I Sem. (E.C.E) (ES)	**L**	**T**	**C**
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Course Objectives:

- *To learn about Classification and characteristics of Composite materials*
- *To learn about layup method and Mechanical Behavior of composites*
- *To learn about Manufacturing of Metal Matrix Composites and Manufacturing of Polymer Matrix Composites*
- *To learn about Laminar Failure Criteria and Laminate strength-ply discount truncated maximum strain criterion*

Course Outcomes:

Students undergoing this course are able to

- *Understand the need of composite materials.*
- *Understand the Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites.*
- *Understand the concepts of Manufacturing of Ceramic Matrix Composite and Metal Matrix Composite.*
- *Understand the various manufacturing method of composites.*

UNIT I

Introduction: Definition – Classification and characteristics of Composite materials. Advantages and application of composites. Functional requirements of reinforcement and matrix. Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite performance.

UNIT II

Reinforcements: Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures. Isostrain and Isostress conditions.

UNIT III

Manufacturing Of Metal Matrix Composites: Casting – Solid State diffusion technique, Cladding – Hot isostatic pressing. Properties and applications. Manufacturing of Ceramic Matrix Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.

UNIT IV

Manufacturing Of Polymer Matrix Composites: Preparation of Moulding compounds and prepress – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection moulding. Properties and applications.

UNIT V

Strength: Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hydro thermal failure. Laminate first play failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using caplet plots; stress concentrations.

TEXT BOOKS:

1. *Material Science and Technology* – Vol 13 – Composites by R.W.Cahn – VCH, West Germany, 2003
2. *Materials Science and Engineering*, An introduction. WD Callister, Jr., Adapted by R. Bala Subramanian, John Wiley & Sons, NY, Indian edition, 2007.

REFERENCES:

1. *Hand Book of Composite Materials*-ed-Lubin. 2010
2. *Composite Materials* – K.K.Chawla. 2009
3. *Composite Materials Science and Applications* – Deborah D.L. Chung, 2012
4. *Composite Materials Design and Applications* – Danial Gay, Suong V. Hoa, and Stephen W. Tasi, 2012

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EE2128) WASTE TO ENERGY
(Open Elective)

II M.TECH - I SEM. (E.C.E) (ES)	**L**	**T**	**C**
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UNIT I

INTRODUCTION TO ENERGY FROM WASTE: Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digestors.

UNIT II

BIOMASS PYROLYSIS: Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods - Yields and application – Manufacture of pyrolytic oils and gases, yields and applications.

UNIT III

BIOMASS GASIFICATION: Gasifiers – Fixed bed system – Downdraft and updraft gasifiers –Fluidized bed gasifiers – Design, construction and operation – Gasifier burner arrangement for thermal heating – Gasifier engine arrangement and electrical power – Equilibrium and kinetic consideration in gasifier operation.

UNIT IV

BIOMASS COMBUTION: Biomass stoves – Improved chullahs, types, some exotic designs, fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors.

UNIT V

PROPERTIES OF BIOGAS (CALORIFIC VALUE AND COMPOSITION): Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their classification - Biomass conversion processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion - Types of biogas Plants – Applications - Alcohol production from biomass - Bio diesel production - Urban waste to energy conversion Biomass energy programme in India.

REFERENCES:

1. *Non-Conventional Energy by* Desai, Ashok V., Wiley Eastern Ltd., 1990.
2. *Biogas Technology - A Practical Hand Book by* Khandelwal, K. C. and Mahdi, S. S., Vol. I & II, Tata McGraw Hill Publishing Co. Ltd., 1983.
3. *Food, Feed and Fuel from Biomass by* Challal, D. S., IBH Publishing Co. Pvt. Ltd., 1991.