

DEPARTMENT OF ECM, KL UNIVERSITY
LIST OF COURSES FOR THE AC YEAR 2014-15 SEM-II

B.TECH II YEAR II SEM		
S NO	COURSE CODE	COURSE NAME
1	13 BS 206	DISCRETE MATHEMATICS
2	13-ES 201	THERMODYNAMICS
3	13-EC 203	BASICS OF DIGITAL SYSTEMS
4	13-EC 205	ANALOG ELECTRONIC CIRCUITS
5	13-CS 204	DATA BASE MANAGEMENT SYSTEM
6	13-CS 203	OPERATING SYSTEMS
B.TECH III YEAR II SEM		
S NO	COURSE CODE	COURSE NAME
1	11EC204	LINEAR INTEGRATED CIRCUITS AND POWER SUPPLIES
2	11EM301	INTERNET PROGRAMMING
3	11EC312	DESIGN WITH PLD AND FPGAS
PE-II		
1	13 EM 332	PCB DESIGN
2	13 EM 333	VISUAL PROGRAMMING
PE-III		
1	11 EM 334	MICRO CONTROLLERS INTERFACING & SYSTEM DESIGN
2	13 EM 335	WEB MIDDLEWARE AND WEB SERVICES
B.TECH IV YEAR		
S NO	COURSE CODE	COURSE NAME
1	09-EM401	EMBEDDED SYSTEMS
2	11-EC206	CMOS VLSI DESIGN
PE-IV		
1	11EM430	ADVANCED EMBEDDED PROCESSOR ARCHITECTURE
2	13EM431	ENTERPRISE PROGRAMMING
PE-V		
1	11EM432	HARDWARE SOFTWARE CODESIGN
2	13EM433	SEMANTIC WEB
OE-I		
1	11OE432	DATAWAREHOUSING & MINING
OE-II		
1	11OE433	E-COMMERCE

B.TECH II YEAR II SEM

DISCRETE MATHEMATICS

13-BS 206

L – T – P: 3-0-0

Credits: 3

Pre-requisite: 13BS101, 102

SYLLABUS

Foundations: Basics, Sets and Operations of Sets, Relations and Functions, Some methods of Proofs and Problem Solving Strategies, Fundamentals of Logic, Logical Inferences, Methods of Proof of an Implication, First order logic and Other methods of Proof, Rules of Inference for Quantified Propositions, Mathematical Induction. **Elementary Combinatorics:** Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with repetitions, Enumerating Permutations with constrained repetitions, Binomial Coefficients, The binomial and multinomial theorems, The principle of inclusion - exclusion. **Recurrence Relations:** Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence Relations, Solving Recurrence relations by Substituting and Generating Functions, The Method of Characteristic Roots, Solution of Inhomogeneous Recurrence Relations. **Relations and Digraphs:** Relations and Directed Graphs, Special Properties of Binary Relations, Equivalence Relations, Ordering Relations, Lattices, and Enumerations, Operations on Relations, Paths and Closures, Directed Graphs and Adjacency Matrices. **Applications:** Sorting and Searching, Topological Sorting. **Graphs:** Basic Concepts, Isomorphism's and Sub graphs, trees and their Properties, Spanning Trees, Directed Trees, Binary trees, Planar Graphs, Euler's Formula, Multi graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

TEXT BOOKS:

1. Joe L. Mott, Abraham Kandel, Theodore P. Baker "Discrete mathematics for Computer Scientists and mathematicians" 2007, Second Edition, PHI,.

REFERENCES:

1. Kenneth H Rosen, "Discrete Mathematics and its Applications", 2007, Tata McGrawHill Publishing Company Limited, New Delhi, Sixth Edition,.

2. Tremblay J P and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", 2007, Tata McGraw Hill Publishing Company Limited

B.TECH II YEAR II SEM

THERMODYNAMICS

13-ES 201

L-T-P: 3-0-0

Credits: 3

Pre – requisite: 13-BS103

SYLLABUS

Fundamental Concepts and Definitions: Thermodynamic system and control volume, Macroscopic and Microscopic points of view. Thermodynamic properties, processes, state, path, cycle. Thermodynamic equilibrium and Quasi-static process. Reversible and Irreversible processes, Zeroth law, concept of temperature. Work and Heat: Definition of work, units, work done at the moving boundary of system, work done in various non-flow processes, definition of heat, units, comparison of heat and work. First Law for Non-Flow Systems: First law of thermodynamics for a closed system undergoing a cycle and for a change of state, energy-a property of system, internal energy and enthalpy. Specific heat at constant volume and constant pressure. PMM1 and Converse of PMM1. First Law for Flow Systems: Control mass and control volume, First law of thermodynamics for a control volume, Steady flow energy equation and applications to engineering equipment. Second Law of Thermodynamics: Thermal reservoirs, Kelvin-Planck and Clausius statements of second law of thermodynamics, Equivalence of Kelvin-Planck and Clausius statements, Carnot cycle, Reversed heat engine, Carnot's theorem, Corollary of Carnot's theorem, Absolute thermodynamic temperature scale, problems. Entropy: Definition of entropy, Clausius theorem, entropy change in reversible process Temperature-entropy plot, Inequality of Clausius, entropy change in an irreversible process, principle of increase of entropy, Applications of entropy principle, entropy change of an ideal gas, Availability and Irreversibility. Thermodynamic Relations: Maxwell's equations, TdS equations, Difference in heat capacities, Ratio of heat capacities, energy equation, Clausius - Clapeyron equation Air standard cycles: Otto, Diesel, Dual and Brayton cycles. Performance evaluation and mean effective pressure, Reversed Carnot cycle and Bell Coleman cycle.

TEXT BOOKS:

1. Thermodynamics, An Engineering Approach - Yunus A Cengel & Michael Boles, (6E) Tata McGraw Hill, New Delhi.
2. Engineering Thermodynamics - P.K.Nag, (4E) Tata McGraw Hill, New Delhi.

REFERENCE BOOKS:

1. Fundamentals of Thermodynamics - G.J. Van Wylen., Sonntag (6E), Wiley India publications.
2. Engineering Thermodynamics Coheand Rogers (5 E)-Pearson education India limited. 3. Heat and Thermodynamics - Zemansky, Mc Graw Hill (5E).

B.TECH II YEAR II SEM

BASICS OF DIGITAL SYSTEMS

13-EC203

L – T – P: 3--0—2

Credits : 4

Pre-requisite:13BS101

SYLLABUS

Number Systems & Codes: Review of Number systems, Classification of codes, Binary, BCD, Excess – 3, Gray, Error detection & Correction and Alphanumeric codes. Boolean Algebra: Boolean postulates, theorems, logic gates, implementation of logic gates using universal gates, Boolean functions – standard and canonical forms, simplification of Boolean functions using theorems, K – map simplification (up to 5 variables), Quine Mc-Cluskey method (up to 5 variables). Combinational Logic systems General design procedure for Combinational logic circuits, Design and applications of Binary Adders and Subtractors, Comparators, Encoders, Decoders, Multiplexers and De-multiplexers, Design of BCD to 7 Segment Decoder, Code converters, Parity Generator and Checker, BCD Adder / Subtractor, Carry look ahead adders. Sequential Logic Functions: Flip Flops, excitation Tables, State Table, conversion of flip flops, Analysis of sequential logic functions, state reduction and state assignment techniques, Mealy and Moore models, Design of sequential logic functions. Sequential Logic Circuits: Counters: Modulus of a counter, Asynchronous or ripple counters, synchronous counters, design of counters. Shift registers: Bi-directional Shift register, Universal shift register, Sequence Generator, Sequence Detector. Algorithmic State Machine (ASM) Charts: Salient features of ASM chart, Timing considerations, Control implementation, Design with multiplexers.

TEXT BOOKS

1. M. Morris Mano, “Digital Logic and Computer Design" Pearson,
2. ZviKohavi, “Switching and Finite Automata Theory” 2nd Edition, Pearson

REFERENCE TEXT BOOKS

1. Khan & Khan, “Digital Logic Design”, Scitech
2. RP Jain, “Modern Digital Electronics”, 3rd Edition, PHI,
3. A. Anand Kumar, “Fundamentals of Digital Circuits” PHI

SIMULATION TEXT BOOKS

1. Michael D. Ciletti, “Advanced Digital Design with the Verilog HDL (2nd Edition)”,
2. David R Smith, Paul D Franzon, “Verilog Styles for Synthesis of Digital Systems “,
3. J. Bhasker, “A Verilog HDL Primer”, 3rd Edition, BS Publications
4. Peter J. Ashenden “Digital Design – An Embedded System Approach using Verilog”,
5. Palnitkar S., “Verilog HDL: A Guide to Digital Design & Synthesis”, PHI

B.TECH II YEAR II SEM

ANALOG ELECTRONIC CIRCUITS

13-EC205

L – T – P: 3-0-2

Credits: 4

Pre-requisite: 13-EC201

SYLLABUS

Feedback Amplifiers: Introduction, Feedback, Characteristics of Feedback, feedback topologies, Analysis of Feedback Amplifiers, Series-Shunt feedback, Series-Series Feedback, Shunt-Shunt Feedback, Shunt-Series Feedback, Feedback Circuit Design, Stability Analysis, Compensation Techniques. Operational Amplifiers: Introduction, Internal Structure of Op-Amps, Parameters and Characteristics of Practical Op-Amps, BJT Op-Amps, Analysis of the LM741 Op-Amps, Design of Op-Amps Differential Amplifiers: Introduction, Internal Structure of Differential Amplifiers, MOSFET Current Sources, MOS Differential Amplifiers, Depletion MOS Differential Amplifiers, Frequency Response of Differential Amplifiers, Design of Differential Amplifiers. Power Amplifiers: Introduction, Classification of Power Amplifiers, Power Transistors, Class A Amplifiers, Class B push-pull Amplifiers, Complementary Class AB push-pull Amplifiers, Class C Amplifiers, Class D Amplifiers, Class E Amplifiers, Short-Circuit and Thermal Protection, Power Op-Amps, Thermal Considerations, Design of Power Amplifiers. Oscillators: Introduction, Principles of Oscillators, Audio Frequency Oscillators, Radio Frequency Oscillators, Crystal Oscillators, Active-Filter Tuned Oscillators, Design of Oscillators. Active Filters: Introduction, Active versus Passive Filters, Types of Active Filters, First-Order Filters, The Biquadratic Function, Butterworth Filters, Transfer Function Realizations, Low pass Filters, High-Pass Filters, Band-Pass Filters, Band-Reject Filters, All-Pass Filters, Switched Capacitor Filters, Filter Design Guide Lines. Integrated Analog Circuits and Applications: Introduction, Circuits with Op-Amps and Diodes, Comparators, Zero Crossing Detectors, Schmitt Triggers, Square-Wave Generators, Triangular-Wave Generators, Saw tooth-Wave Generators, Voltage Controlled Oscillators, The 555 Timer, Phase Lock Loops, Voltage-to-Frequency and Frequency-to-Voltage Converters, Sample-and-hold Circuits, Digital-to-Analog Converters, Analog-to-Digital Converters, Circuit Design Using Analog Integrated Circuits.

TEXT BOOK

1. Muhammad H. Rashid “Microelectronics Circuits Analysis and Design” 2nd Edition, Cengage Learning.

REFERENCES

1. Sedra Smith “Micro-electronic circuits theory and applications”, Oxford press,
2. Donald A. Neamen,”Microelectronics: Circuit Analysis and Design”, McGraw Hill.
3. J Millman,” Microelectronics”, McGraw Hill.
4. Richard C. Jaeger, Travis N. Blalock,” Microelectronic Circuit Design”, Mc Graw Hill,
5. J J Cathey,” Electronic Devices and circuits’, Schaum’s Outline.,
6. R Loxton,”Problems and Solutions in Electronics’, Chapman & Hall.

SIMULATION BOOKS

1. David Baez-Lopez ,” Circuit Analysis with Multisim”, Morgan & Claypool Publishers,
2. Paul Tobin ,’**PSpice for Circuit Theory and Electronic Devices**”, Morgan and Claypool Publishers,
3. Steven T. Karris, "Electronic Devices and Amplifier Circuits with Matlab Applications" Orchard Publications,
4. John Okyere Attia , Electronics and Circuit Analysis Using Matlab, Second Edition, CRC Press

B.TECH II YEAR II SEM

DATABASE MANAGEMENT SYSTEM

13-CS-204

L-T-P: 3-0-2

Credits: 4

Pre requisite: 13-ES 204

SYLLABUS

Introduction To Database Systems, The Entity -Relationship Model, The Relational model, Relational Queries, Relational Algebra And Calculus, SQL: Queries, Programming, Triggers, Query -By-Example (QBE), Data Storage And Indexing, Storing Data: Disks And Files, File Organizations And Indexes, Tree - Structured Indexing, Hash-Based Indexing, Query Evaluation, External Sorting, Evaluation Of Relational Operators, Introduction To Query Optimization, A Typical Relational Query Optimizer, Database Design, Schema Refinement And Normal Forms, Transaction Management Overview, Concurrency Control, Crash Recovery.

TEXT BOOK:

1.Raghu Ramakrishnan, Johannes Gehrke, “Database Management Systems”, 3/E, Tata Mcgraw Hill 2004.

REFERENCE BOOK:

- 1..A Silberschatz , Henry F Korth, S. Sudarshan ,“Database System Concepts” , Fifth Edition, Tata Mcgraw-Hill, 2003 .
- 2.Elmasri & Navathe Fundamentals of Data base Systems, 6th edition, Pearson2008.
- 3.Thomas M. Connolly,”Database Systems: A Practical Approach to Design, Implementation and Management” 5th Edition, Pearson (2008).
4. Hector Garcia-Molina Jeffrey D. Ullman, “Database Systems: The Complete Book”, 2/e, pearson2008.
- 5.Jan L. Harrington, “Relational Database Design and Implementation: Clearly Explained”, 3/e, Morgan Kaufmann Publishers, 2009.

Prerequisite: 13 EM201

SYLLABUS

Introduction to Computer-System Organization, Computer-System Architecture, Operating-System Structure, Operating-System Operations, Process Management, Memory Management, Storage Management, Protection and Security, Distributed Systems, Special-Purpose Systems. Operating-System Structures- Operating-System Services , User Operating-System Interface, System Calls , Types of System Calls, System Programs , Operating-System Design and Implementation, Operating-System Structure, Virtual Machines, Operating-System Generation, System Boot. Processes-Concept, Process Scheduling, Operations on Processes, Interprocess Communication, Examples of IPC Systems, Communication in Client-Server Systems Systems Programming: System Calls and library functions, introduction, Error Handling: perror (), Regular File Management, Process Management, Signals, Interprocess Communications. Multithreaded Programming- Multithreading Models, Thread Libraries, Threading Issues. Process Scheduling- Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling. Process Synchronization-The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization Examples, and Atomic Transactions. Deadlocks- System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention. Deadlock Avoidance, Deadlock Detection. Recovery from Deadlock. Memory Management Strategies- Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Example: The Intel Pentium Virtual Memory Management- Demand Paging , Page Replacement , Allocation of Frames , Thrashing , Memory-Mapped Files , Allocating Kernel Memory. File-System - The Concept of a File, Access Methods, Directory and Disk Structure, File-System Mounting, File Sharing, Protection. File system Implementation- File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery, NFS, Example: The WAFL File System.

TEXT BOOKS:

1. Silberschatz & Galvin, 'Operating System Concepts', 9th edition, Wiley 2012.

REFERENCE BOOKS:

- 1.W.Richard stevans,pearson," Advanced programming in the Unix environment", 2nd edition, pearson 2009 . 2.William Stallings , "Operating Systems: Internals and Design Principles" ,6th edition, pearson 2009 . Albert S. Woodhull, Andrew S.Tanenbaum , "Operating Systems: Design and Implementation",Pearson Education International, 2009.3.Harvey M. Deitel , Paul J. Deitel , David R. Choffnes: "Operating Systems",3/E, Pearson/Prentice Hall, 2004. 4. Crowley, "Operating System : A Design-Oriented Approach", : 1/E, Tata Mcgraw Hill Education Private Limited (2009) .5.Gary Nutt."Operating Systems",3/E Pearson (2004) . 6. Graham Glass, King Ables, "Linux for Programmers and users", Prentice Hall (2006).

SYLLABUS

Operational Amplifiers: Differential amplifier: Introduction, cascade Differential amplifier stages, Differential amplifier with active load. Types of current sources: Widlar Current Source, Wilson Current Source, Level translators. Op-Amp characteristics and parameters, ideal op-amps, Inverting and Non-inverting configuration, Addition, Subtraction, Multiplication, Current to Voltage and Voltage to current converters. **Applications of Op-Amps:** Integration, Differentiation, Active Filters, Comparators, Schmitt trigger. **Converters:** Sample & Hold circuit, Digital to analog converters, Analog to digital converters: Successive Approximation, Dual Slope Integration, Flash type. **Signal Generation and waveform shaping Circuits:** Basic principles of sinusoidal oscillators, OP Amp RC Oscillators circuits, LC and crystal oscillators, Generation of square and triangular waveforms, 555 timer and Applications. Phase Locked Loops and Applications. **An Introduction to the Linear Regulator:** Basic Linear Regulator Operation, General Linear Regulator Considerations, Linear Power Supply Design Examples, Elementary Discrete Linear Regulator Designs, Basic Three-Terminal fixed and variable Regulators. **Switch Mode Power Supplies:** Fundamentals of PWM Switching Power Supplies, Forward-mode Converter, Power Supply Topologies: Boost and Buck mode Flyback and Resonant Converters. Semiconductors used in SMPS. Basic Principles of SMPS transformers. SMPS design examples using LM2575, Monolithic Switching Regulator.

TEXT BOOKS

1. Rama Kant A. Gayakwad, "Op-Amps and Linear Integrated Circuits", PHI, 1987.
2. S. Shalivahanan, V.S. Kanchana Bhaskaran, "Linear Integrated Circuits", Tata McGraw-Hill, 2008.
3. Brown, "Practical Switching Power Supply Design", Academic Press.

REFERENCES TEXT BOOKS

4. D. Roy and Chowdhury, Shail B. Jain, "Linear Integrated Circuits", 2nd Ed, New Age International, 2003.
5. David Bell "Op-Amps & Linear Integrated Circuits", 11th Ed.

B.TECH III YEAR II SEM

INTERNET PROGRAMMING

11-EM301

L-T-P: 3-0-2

Credits: 4

SYLLABUS

HTML, DHTML, Cascading Style Sheets, XML, A closer look at methods and Classes, Inheritance, Packages and Exception Handling. Multithread programming, Threading, I/O, Applets, and other topics, The Applet Class, Event Handling. Servlets and Java Server Pages, Database Access through the web: Architecture for Database Access, The Mysql Database System, Database Access, the Mysql Database System, Database Access with JDBX and Mysql.

Textbooks:

1. Dietel & Dietel & Nieto, “ Internet & World Wide Web- How to Program”, PEA, Third Edition.
2. Herbert Schildt,” Java the Complete Reference, 7th Edition, Tata McGraw Hill 2007.
3. Robert W. Sebesta: Programmin the World Wide Web, 4th Edition, Pearson Education,2008.

Reference books:

1. M.Deitel, P J Dietel, A.B. Goldberg: Internet & World Wide Web, How to Program, 4th Edition, Pearson Education,2004.
2. Chris Bates: Web Programming Building Internet Applications, 3rd Edition, Wiley India, 2006.
3. Y.Daniel Liang: Introduction to JAVA Programming, 7th Editio, Pearson Education, 2007.
4. Xue Bai: The Web Warrior Guide to Web Programming, Cengage Learning,2003.
5. Anders Moller, Michael Schwartzbach, “ An Introduction to XML and Web Technologies”, 1st edition, Pearson Education,2006.
6. Ivan BayRoss, “Web Enabled Commercial Application Development using HTML, DHTML, JavaScript, Perl” BPB Publication, 3rd Edition,2005.
7. Cay S, Horstmann, Gary Cornell, “Core Java, Volume I-Fundamentals”, 8th Edition, Pretice Hall, Sun Microsystems Press, 2008.
8. Uttam K Roy, “Web Technologies”, OXFORD University Press,2012.
9. Jeffrey C Jackson,” Web Technologies: A computer Science Perspective”, Pearson Education, 2009.

B.TECH III YEAR II SEM

DESIGN WITH PLD AND FPGAS

11EC312

L-T-P: 3-0-2

Credits: 4

SYLLABUS

Introduction: Full Custom Design; Semicustom Design; Programmable Logic Devices; Notations for Programmable Logic Devices; Design Methodology Using Programmable Logic Devices; Design Soft Ware; **Programmable Read Only Memory (PROM):** Mask programmed ROM; EPROM; EEPROM; Programmable Logic Element (PLE); Combinational Logic Design using PLEs; Sequential Circuit Realization using PLEs; **Programmable Logic Devices:** Programmable Logic Device (PLD); Sequential PLD; Complex PLD; Field Programmable Gate Array (FPGA); Xilinx SRAM-Based FPGA; Comparison between FPGA, ASIC and CPLD; FPGA based system design; **Field Programmable Gate Arrays:** Introduction; The Xilinx logic Cell Array; Advanced futures of the 4000 series; The Actel ACT; Technology Trends; **New generation Architectures of Programmable Logic Device:** Erasable Programmable Logic Devices; Reprogrammable Generic Logic Devices; Erasable Programmable Logic Array (EPLA); Generic Array Logic (GAL); Programmable Electrically Erasable Logic (PEEL).

TEXT BOOKS

1. Parag K. Lala, "Digital System Design Programmable Logic Devices", B S Publications
2. Debaprasad Das, "VLSI Design", Oxford – 2011.
3. Pak K. Chan, Samiha Mourad, "Digital Design Using Field Programmable Gate Array", Pearson Education – 2009.

REFERENCE TEXT BOOKS

1. Michael John Sebasatian Smith, "Appliction Specific Integrated Circuits" Pearson Education
2. Bob Zeidman, "Designing with FPGAs and CPLDs", CMP Books, ISBN: 1-57820-112-8.
3. Stephen Brown and Zvonko Vranesic "Fundamentals of Digital Logic with Verilog Design" Mc Graw-Hill.

B.TECH III YEAR II SEM

PE-II

PCB DESIGN

13 EM 332

L-T-P: 3-0-0

Credits: 3

SYLLABUS

ELECTRONICS COMPONENTS & MOUNTING: Active and passive components – resistor, capacitor, inductor, semiconductor diode, LED, Zener diode, Bipolar junction transistor, IC's, SMD, connectors use of multimedia & CRO. Preparation & mounting of components – lead cutting. **BASIC OF PCB & SOLDERING TECHNIQUES:** Introduction – Classification of PCB – single, double, multilayer and flexible boards – copper clad laminates materials of copper clad laminates – manufacturing process – properties of laminates (electrical & physical) - types of laminates. Hand soldering Tools Solder alloys – soldering flexes – soldering techniques – Iron soldering – mass soldering, DIP soldering – wave soldering – solder mask. **SCHEMATIC & LAYOUT DESIGN:** Schematic diagram – Net list – Design rule check – creating components for library – Imperial – metric Tracks – Pads – Vias – Clearances – Rats nest – silk screen – selection of board size – power plane – grounding. **DESIGN OF PCB'S:** Single sided PCB – Double sided PCB – Multilayer PCB – Auto routing – manual routing – Design rule check – creating of foot print for library creating Gerber file. **PCB FABRICATION:** Film master preparation - Image transfer - photo printing – Screen Printing – Plating techniques etching techniques – Mechanical Machining operations.

TEXT BOOKS

1. Printed Circuit Board – Design, Fabrication, Assembly & Testing by R.S.Khandpur,

TATA McGraw Hill Publisher

2. Printed circuit Board – Design & Technology by Walter C.Bosshard

3. ISTE Hand book on Printed Circuit Board **Fabrication.**

B.TECH III YEAR II SEM

PE-II

VISUAL PROGRAMMING

13 EM 333

L-T-P: 3-0-0

Credits: 3

SYLLABUS

The Philosophy of .NET Understanding the previous states affair, The .NET Solution, The building Block of the .NET platform (CLR,CTS,CLS), the role of the .NET base class libraries, what C# brings to the table, additional .NET – Aware programming Languages, An overview of .NET binaries (aka assemblies), The role of the common intermediate language, Compiling CIL to platform specific instruction, Understanding the common type system, Intrinsic CTS data types, Understanding the common languages specification, Understanding the common languages runtime, A tour of the .NET namespace, increasing your namespace nomenclature, Deploying the .NET runtime. Building C# Applications The role of the command line compiler (CSC.exe), Building C# application using csc.exe, Working with csc.exe response file, generating bug reports, Remaining C# compiler option, The command line debugger, using the visual studio. Net IDE, Other key aspects of the VS.Net IDE, Documenting your source code via XML, C# preprocessor directives, An interesting Aside: The System. Environment class, Building .Net application with other IDEs. C# Language Fundamentals : An Anatomy of a basic C# class, Creating objects: Constructor basic, the composition of a C# application, Default Assignment and variable scope, The C# member initialization syntax, Basic input and output with the console class, Understanding value types and reference types, The master node: System. Objects, The system Data type (And C# aliases), Converting between value type and reference type: Boxing and Unboxing, Defining program constraints, C# Iterations constructs, C# control flow constructs, The complete set C# operator, Defining Custom class methods, Understanding static methods, Method parameter modifiers, Array manipulation in C#, String manipulation in C#, C# Enumerations, Defining structures in C#, Defining custom namespaces. Object Oriented Programming with C# Formal definition of the C# class, Definition the "Default public interface" of a type, Recapping the pillars of OOP,

The first pillar: C# Encapsulation services, Pseudo Encapsulation: Creating read only field, The second pillar: C#'s Inheritance supports keepingfamily secrets: The "Protected" keyword, The Nested type definitions, The third pillar: C#'s Polymorphic support casting between types, Generating class definitions using Visual Studio. Net. Exceptions and Objects Life Time Ode to errors, Bugs and exceptions, The role of .NET exceptions handling, The system. Exception base class throwing a generic exception catching exception, CLR system level exception (System. system exception),Custom application level exception (System. application exception), Handling multiple exception, The finally block, The last chance exception, dynamically identify application and system level exception, Debugging system exception using VS.Net, Understanding Object life time, The CIT of new, The basic of garbage collection, Finalizing a type, Finalization process, building and Ad hoc destruction method, garbage collection optimization, The system .GC type.

Interfaces and Collections Defining interfaces using C#, Invoking interface member at the object level, Exercising the shape hierarchy, Understanding explicit interface implementation, Interfaces as Polymorphic agents, Building interface hierarchies, Implementing interface using VS.Net, Understanding the Iconvertible interface, Building a custom enumerator (I Enumerable and Ienumerator), Building cloneable objects (Icloneable), Building comparable objects (I Comparable), Exploring the system the collection namespace, Building a custom container (Retrofitting the carstype). Understanding .Net Assemblies Problems with classic COM Binaries, An overview of .Net assembly, Building a simple file test assembly, A C# Client

Application, A Visual Basic .Net Client application, Cross Language Inheritance, Exploring the Carlibrary's manifest, Exploring the Carlibrary's Types, Building the multi file assembly, Using the multi file assembly, Understanding private assemblies, Probing for private assemblies (The Basics), Private assemblies and XML Configuration files, Probing for private assemblies (The Details), Understanding Shared assembly, Understanding Shared Names, Building a Shared assembly, Understanding delay Signing, Installing/Removing shared assemblies, Using a Shared assembly.

Text Book:

1. Andrew Troelsen C# and The .Net platform, , Second edition, 2003, Dream TECH Press, India.
2. Tom Archer Inside C#, , 2001, WP Publishers.

Reference Books

1. Joe duffy, Professional .NET Framework 2.0, Worx Publications, Willey India Edition, 2006 Edition
2. David S Platt, Introducing Microsoft .NET, Prentice Hall of India, Eastern Economy edition, 2nd Edition
3. Matthew Reynolds, Karli Watson, Bill Forgey, Brian Patterson, .NET

B.TECH III YEAR II SEM

PE-III

MICRO CONTROLLERS INTERFACING & SYSTEM DESIGN

11 EM 334

L-T-P: 3-0-0

Credits: 3

SYLLABUS

OVERVIEW OF ARCHITECTURE AND MICROCONTROLLER RESOURCES: Architecture of microcontroller-Microcontroller resources-Resources in advanced and next generation microcontrollers-8051 microcontroller-Internal and External memories-Counters and Timers-Synchronous serial cum asynchronous serial communication-Interrupts. **8051 FAMILY MICROCONTROLLERS INSTRUCTION SET:** Basic assembly language programming-Data transfer instructions-Data and bit manipulation instructions-Arithmetic instructions-Instructions for logical operations on the bytes among the Registers, Internal RAM, and SFR's Program flow control instructions-Interrupt control flow. **SREAL TIME CONTROL: INTERRUPTS:** Interrupt handling structure of an MCU-Interrupt Latency and Interrupt deadline-Multiple sources of the interrupts Non-maskable interrupt sources-Enabling of disabling of the sources-polling to determine the interrupt resources and assignment of the priorities among them-Interrupt structure in Intel 8051. **TIMERS:** Programmable Timers in MCU's-Free running counter and real time control-Interrupt interval and density constraints. **PIC MICROCONTROLLER:** Instruction, Architecture overview, memory organization Interrupts and reset, I/O ports, Timers. **SYSTEM DESIGN: DIGITAL AND ANALOG INTERFACING METHODS:** Switch, key and keyboard interfacing –LED and Array of LEDs-Keybaord-cum-Display controller (8279) - Alphanumeric Devices-Display Systems and its Interfaces. Interfacing with the Flash memory-Interfaces-Interfacing to High power Devices-Analog input Interfacing-Analog output Interfacing Optical motor Shaft Encoders- Industrial Control-Industrial process Control System-prototype MCU based Measuring Instruments-Robotics and embedded control.

Text Books (Maximum 2) :

1. D.V.Hall "Microprocessor and Interfacing", 2nd Edition Tata McGraw Hill Publishing Company, 2006
2. A.K. Ray & K. M Bhurchandi, "Advanced Microprocessors & peripherals", Tata Mc Graw Hill Publishing Company 2002
3. Rajkamal, "Microcontrollers - Architecture, Programming, Interfacing & System Design", 2nd edition, Pearson Education
4. Mazidi & Mc Kinley "The 8051 Micro controller and Embedded systems: using assembles and C, 2nd edition

Reference Books (Maximum 2):

1. Embedded C Programming and the Microchip PIC-Richard Barnett, O" Cull, Cox, 2009, Cengage Learning.
2. An Embedded Software Premier - David E- Siman, PEARSON Education
3. Embedded System Design - Frank Vahid / Tony Givargis, WILEY India

B.TECH III YEAR II SEM

PE-III

WEB MIDDLEWARE AND WEB SERVICES

13 EM 335

L-T-P: 3-0-0

Credits: 3

SYLLABUS

Distributed Information systems – design, architecture and communication, Middleware – understanding middleware, RPC and related middleware, TP monitors, object brokers, message-oriented middleware. Enterprise Application Integration (EAI) – from middleware to application integration, EAI middleware **Workflow management systems**, Web technologies – exchanging information over the internet, web technologies for supporting remote clients, application servers and application integration. Web services and their approach to distributed computing, Web services technologies and web services architecture **Basic web services technology**, minimalistic infrastructure. SOAP, WSDL, UDDI, web services at work, interactions between specifications, related standards. Service coordination protocols, introduction, infrastructure for coordination protocols. **WS-coordination**, WS-transaction, RosettaNet, other standards, Service composition – basics, a new chance of success, service composition models, dependencies between coordination and composition. **BPEL, Outlook** – state of the art in web services, applicability of web services, web services as a problem and solution. Case studies - Web services: industry adoption, case studies: context setting, a proposed solution.

Textbooks

1. Web Services: Concepts, Architectures and Applications (Data-Centric Systems and Applications) – Gustavo Alonso, Fabio Casati, Harumi kuno and Vijay Machiraju, Springer pub, 2003
2. Web Services, An introduction, B.V. Kumar and S.V Subrahmanya, Tata Mcgraw Hill, 2004

References

1. Web Services Essentials Distributed Applications with XML-RPC, SOAP, UDDI & WSDL by Ethan Cerami, O'Reilly , First Edition, February 2002.
2. Programming Web Services with SOAP by James Snell, O'Reilly First Edition Dec 2001.
3. Web Services Theory & Practice by Anura Guruge, Digital Press, 2004.
4. Executive's Guide to Web Services by Eric A. Marks & Mark. J. Werrell, John Wiley & Sons, 2003.

B.TECH IV YEAR

EMBEDDED SYSTEMS

09-EM401

Credits: 4

L – T – P: 3--0--2

Pre Requisite: 11-EC 311

SYLLABUS

Introduction to Embedded Systems: Definition, Comparison with Loaded Systems, Challenges of Embedded systems, Application of Embedded Systems. **Hardware fundamentals and devices:** CHIPS, GATES, PCB, Power and decoupling, Timing Diagrams, Signal Processing related issues, Clocks, Flip Flops, Memories, Micro Processors, PINS, ports, Address Resolution, Address Decoding within Micro Processors, Micro Processors VS Micro Controllers, Busses and Bus Handling, DMA, UART and RS232, PAL, FPGA, Timers, Counters, Pulse width Modulators for speed control, LCD Controllers, Key Pad Controllers, Stepper motor controllers, A/D Converters. **Introduction to:** Temp Sensors, Flow Control devices, Humidity Control devices, Speed Control devices. **Interfacing:** Communication basics, Basic Terminology, Basic Protocol concepts, I/O Addressing: Port Based Addressing, Bus Based addressing, Memory mapped I/O, Standard I/O, Interfacing Micro Processors through Interrupts and DMA, Arbitration Techniques, Multi Bus Architecture Serial Communication and Protocols: I2C, CAN, Fire-wire, USB, Parallel Communication and protocols: PCI Bus, ARM Bus, Wireless Communication and Protocols: IrDA, Blue Tooth, 802.11g. **ES Software Processing Platform:** Micro Processor Architecture both CISC and RISC, Interrupt Processing, Shared data problem, Interrupt Latency, Software Architectures: Round Robin, Round Robin with Interrupts, Function Queue Scheduling, RTOS, Selecting architecture. **Real Time Operating Systems:** Tasks and Task data, Scheduler, Re-Reentrancy, Semaphores, Semaphore Problems, Message Queues, Mail Boxes, Pipes, Timer Functions, Event Handling, Memory Management, Interrupt Processing, and Power saving Functions. Introduction to μ cos and VxWorks. **Analysis, Design and Software Development:** Analysis and designing Embedded Systems using RTOS: Overview, General Design Principles, Hardware and software CO design in Embedded Systems, Encapsulating Semaphores and Queues, Real Time Scheduling Considerations, Software development process and tools Testing and Debugging Techniques, Testing and Debugging Tools.

TEXT BOOKS

1. An Embedded Software Premier - David E- Siman, PEARSON Education
2. Embedded System Design - Frank Vahid / Tony Givargis, WILEY India

REFERENCE BOOKS

1. Embedded / real - time systems - DR.K.V.K.K.Prasad, dreamtech
2. Embedded Systems - Raj – Kamal, Second Edition TMH

B.TECH IV YEAR

CMOS VLSI DESIGN

11-EC206

Credits: 4

L – T – P: 3--0--2

Prerequisite: 11EC201

SYLLABUS

Technology Introduction: Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & Bi-CMOS Technologies. VLSI Fabrication, Oxidation, Lithography, Diffusion, Ion Implantation, Metallization, Integrated Resistors and Capacitors. **MOS Theory Analysis:** Basic Electrical Properties of MOS Circuits: **Ids-Vds** Relationships, MOS Transistor Threshold Voltage **V_{th}**, **g_m**, **g_{ds}**, Figure of Merit **ω_o**, Short Channel and Narrow Channel Width Effects. Pass Transistor, Transmission Gate, NMOS Inverter, Various Pull-ups, CMOS Inverter Analysis and Design, Bi-CMOS Inverters, Latch up in CMOS Circuits. **CMOS Circuits and Logic Design Rules:** MOS Layers, Stick Diagrams, Design Rules and Layout, 2μm, 1.2 μm Design Rules, Rules for Vias and Contacts, Stick Diagrams and Simple Symbolic Encodings for NMOS, PMOS, CMOS and BiCMOS Logic Gates. Scaling of CMOS Circuits. **CMOS Circuit Characterisation and Performance Estimation:** Sheet Resistance **R_S** and its Concept to MOS, Area Capacitance Units, Calculations - Delays, Driving Large Capacitive Loads, Delay Estimation, Logical Effort and Transistor Sizing, Power Dissipation, Reliability. **CMOS Fault models:** need for testing, manufacturing test principles.

TEXT BOOKS

- 1.Kamran Ehraghian, Dauglas A. Pucknell and Sholeh Eshraghiam, “Essentials of VLSI Circuits and Systems” – PHI, EEE, 2005 Edition.
- 2.Neil H. E. Weste and David. Harris Ayan Banerjee,, “CMOS VLSI Design” - Pearson Education, 1999.
3. Neil H. E. Weste, Principles of CMOS VLSI Design Second Edition.

REFERENCES

- 1.Sung-Mo Kang, Yusuf Leblebici, ”CMOS Digital Integrated Circuits” TMH 2003
- 2.Jan M. Rabaey, “Digital Integrated Circuits” Pearson Education, 2003
- 3.Wayne Wolf, “Modern VLSI Design ”, 2nd Edition, Prentice Hall,1998.

SIMULATION TEXT BOOKS

- 1.Etienne Sicard, Sonia Delmas Bendhia, “Basics of CMOS Cell Design”, TMH, EEE, 2005.

B.TECH IV YEAR PE-IV

ADVANCED EMBEDDED PROCESSOR ARCHITECTURES

11 EM430

Credits: 3

L – T – P: 3--0--0

Pre Requisite: 11-EC 311

SYLLABUS

ARM Processor as System-on-Chip: Acorn RISC Machine – Architecture inheritance – ARM programming model – ARM development tools – 3 and 5 stage pipeline ARM organization – ARM instruction execution and implementation – ARM Co-processor interface. **ARM Assembly Language Programming:** ARM instruction types – data transfer, data processing and control flow instructions – ARM instruction set – Co-processor instructions, Thumb Instruction set. **Architectural Support for System Development:** Advanced Microcontroller bus architecture – ARM memory interface – ARM reference peripheral specification – Hardware system prototyping tools – ARMulator – Debug architecture. **ARM Processor Cores:** ARM7TDMI, ARM8, ARM9TDMI, ARM10TDMI, The AMULET Asynchronous ARM Processors-AMULET1. **Embedded ARM Applications:** The VLSI Ruby II Advanced Communication Processor, The VLSI ISDN Subscriber Processor, The OneCTM VWS22100 GSM chip, The Ericsson-VLSI Bluetooth Baseband Controller, The ARM7500 and ARM7500FE

TEXT BOOKS

1. ARM System on Chip Architecture – Steve Furber – 2nd ed., 2000, Addison Wesley Professional.
2. Design of System on a Chip: Devices and Components – Ricardo Reis, 1st ed., 2004, Springer

REFERENCE BOOKS

1. Co-Verification of Hardware and Software for ARM System on Chip Design (Embedded Technology) – Jason Andrews – Newnes, BK and CDROM
2. System on Chip Verification – Methodologies and Techniques –Prakash Rashinkar, Peter Paterson and Leena Singh L, 2001, Kluwer Academic Publishers.

B.TECH IV YEAR PE-IV

HARDWARE SOFTWARE CO –DESIGN

11 EM 432

Credits: 3

L – T – P: 3--0--0

Pre Requisite: 11-EC 311

SYLLABUS

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. **Prototyping and Emulation:** Prototyping and emulation techniques, prototyping and emulation environments, future developments in emulation and prototyping. **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. **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 **Languages for System – Level Specification and Design-I** System – level specification, design representation for system level synthesis, system level specification languages. **Languages for System – Level Specification and 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 – 2009, Springer.
2. Hardware / software co- design Principles and Practice, 2002, kluwer academic publishers

B.TECH IV YEAR PE-IV

ENTERPRISE PROGRAMMING

13-EM431

Credits: 3

L – T – P: 3--0--0

Pre Requisite: 11-EM301

SYLLABUS

Java EE Essentials, J2EE Multi-Tier Architecture, Advanced JSP topics, Java Server Faces, Working with Databases, Advanced topics in JDBC. EJB Fundamentals and Session Beans, EJB Entity Beans, Message Driven Beans, EJB Relationships, EJB QL, and JDBC. Design Patterns and EJB. J2EE Design patterns and Frameworks: Pattern Catalog- Handle-Forward pattern, Translator pattern, Distributor pattern, Broadcaster pattern, Zero sum pattern, Status Flag Pattern, Sequencer pattern, Behavior Separation pattern, Consolidator pattern, Simplicity pattern, Stealth Pattern. Web Services and JAX-WS. Java Mail API, Java Interface Definition Language and CORBA, Java Remote Method Invocation, Java Messaging Service, Java Naming and Directory Interface API.

TEXTBOOKS

1. Kevin Mukhar, James L. Weaver, Jim Crume, Chris Zelenak, “Beginning Java EE 5 from Novice to Professional”, Apress, 2005 Edition.
2. James Keogh, “J2EE: The Complete Reference”, McGraw-hill Osborne Media: 1st Edition, 2002.

REFERENCES

1. Jan Graba, “An Introduction to Network Programming with Java”, Springer, 2nd edition, 2006.
2. Antonio Goncalves, “Beginning Java EE 6 Platform with GlassFish 3”, Apress, 2009.
3. Mark D Hansen, “SOA Using Java web services”, Pearson, 2007.
4. Dreamtech Software Team, “Java Server Programming J2EE: Black Book”, Wiley, 2007.

B.TECH IV YEAR PE-IV

SEMANTIC WEB

13 EM 433

Credits: 3

L – T – P: 3--0--0

Pre-requisite: 13 EM 331

SYLLABUS

INTRODUCTION Components – Types – Ontological Commitments – Ontological Categories – Philosophical Background -Sample - Knowledge Representation Ontologies – Top Level Ontologies – Linguistic Ontologies – Domain Ontologies – Semantic Web – Need – Foundation – Layers – Architecture. **LANGUAGES FOR SEMANTIC WEB AND ONTOLOGIES** Web Documents in XML – RDF - Schema – Web Resource Description using RDF- RDF Properties – Topic Maps and RDF – Overview – Syntax Structure – Semantics – Pragmatics - Traditional Ontology Languages – LOOM- OKBC – OCML - Flogic Ontology Markup Languages – SHOE – OIL - DAML + OIL- OWL **ONTOLOGY LEARNING FOR SEMANTIC WEB** Taxonomy for Ontology Learning – Layered Approach – Phases of Ontology Learning – Importing and Processing Ontologies and Documents – Ontology Learning Algorithms - Evaluation **ONTOLOGY MANAGEMENT AND TOOLS** Overview – need for management – development process – target ontology – ontology mapping – skills management system – ontological class – constraints – issues. Evolution – Development of Tools and Tool Suites – Ontology Merge Tools – Ontology based Annotation Tools. **APPLICATIONS** Web Services – Semantic Web Services - Case Study for specific domain – Security issues – current trends.

TEXT BOOKS

1. Asuncion Gomez-Perez, Oscar Corcho, Mariano Fernandez-Lopez “Ontological Engineering: with examples from the areas of Knowledge Management, eCommerce and the Semantic Web” Springer, 2004
2. Grigoris Antoniou, Frank van Harmelen, “A Semantic Web Primer (Cooperative Information Systems)”, The MIT Press, 2004
3. Alexander Maedche, “Ontology Learning for the Semantic Web”, Springer; 1 edition, 2002

REFERENCES

1. John Davies, Dieter Fensel, Frank Van Harmelen, “Towards the Semantic Web: Ontology – Driven Knowledge Management”, John Wiley & Sons Ltd., 2003.
2. John Davies (Editor), Rudi Studer (Co-Editor), Paul Warren (Co-Editor) “Semantic Web Technologies: Trends and Research in Ontology-based Systems”Wiley Publications, Jul 2006
3. Dieter Fensel (Editor), Wolfgang Wahlster, Henry Lieberman, James Hendler, “Spinning the Semantic Web: Bringing the World Wide Web to Its Full Potential”, The MIT Press, 2002
4. Michael C. Daconta, Leo J. Obrst, Kevin T. Smith, “The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management”, Wiley, 2003

DATA WAREHOUSING AND MINING

11-OE-432

Credits: 3

L – T – P: 3--0--0

SYLLABUS

INTRODUCTION TO DATA MINING: Motivation and importance, What is Data Mining, Relational Databases, Data Warehouses, Transactional Databases, Advanced Database Systems and Advanced Database Applications, Data Mining Functionalities, Interestingness of a pattern Classification of Data Mining Systems, Major issues in Data Mining.

Data Warehouse and OLAP Technology for Data Mining: What is a Data Warehouse, Multi-Dimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Development of Data Cube Technology, Data Warehousing to Data Mining.

Data Preprocessing: Why Pre-process the Data? Data Cleaning, Data Integration and Transformation Data Reduction, Discretization and Concept Hierarchy Generation. Data Mining Primitives: Mining Association rule in large Databases, Association Rule Mining, Mining Single-dimensional Boolean Association rules from Transactional Databases, Mining Multi-dimensional Association rules from relational databases & Data Warehouse

Classification and prediction, Concepts and Issues regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian. Classification, Classification by Back-propagation, Classification Based on Concepts from Association Rule Mining.

Cluster Analysis: What is Cluster Analysis? Types of Data in Cluster Analysis, A Categorization of Major clustering methods, partitioning methods, Hierarchical methods, Density-Based Methods: DBSCAN, Grid-based Method: STING; Model-based Clustering Method: Statistical approach, Outlier analysis.

TEXT BOOK

1. Jiawei Han and Micheline Kamber, Data Mining Concepts and Techniques, Morgan Kaufman Publications

REFERENCE BOOKS

1. Adriaan, Introduction to Data Mining, Addison Wesley Publication
2. A.K.Pujari Data Mining Techniques, University Press

B.TECH IV YEAR OE-II

E-COMMERCE

11-OE-433

Credits: 3

L – T – P: 3--0--0

SYLLABUS

Electronic Commerce: Revolution. E-Commerce Business models and concepts: The Internet and World Wide Web: E-commerce infrastructure. Building an E-commerce web site, Security and Encryption, E-Commerce payment systems E-Commerce Marketing concepts, E-Commerce Marketing communications, Ethical, Social and Political issues in E-Commerce Retailing on the Web, Online Service industries, B2B E-Commerce: Supply chain management and collaborative commerce. Internet Resources for Commerce, Technologies for Web Servers, Internet Applications for commerce, Internet Charges, Internet Access and Architecture, Searching the Internet

TEXT BOOKS

Kenneth C.Laudon, Carol G.Traver , E-Commerce, (Pearson Education)

REFERENCE BOOKS

1. Daniel Minoli, Emma Minoli, 'Web Commerce Technology Handbook', (TMG)
2. Elias M.Awad 'Electronic Commerce' (PHI)

M.TECH EMBEDDED SYSTEMS**SECOND SEMESTER**

S.NO	COURSE CODE	COURSE NAME
1	11-EM601	ADVANCED EMBEDDED PROCESSOR ARCHITECTURES
2	13-EM602	DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES
3	11-EM603	HARDWARE SOFTWARE CO –DESIGN
4	13-EM604	LINUX SYSTEM CONCEPTS
5		ELECTIVE – 3 --GROUP-A
6		ELECTIVE -4 --GROUP-B
7		TERM PAPER
GROUP-A		
S.NO	COURSE CODE	COURSE NAME
1	13-EM-E32	EMBEDDED NETWORKING
GROUP-B		
1	11-EM-E40	EMBEDDED LINUX

M.TECH (ES) SECOND SEMESTER

COURSE NO. : 11-EM601
COURSE TITLE : ADVANCED EMBEDDED PROCESSOR ARCHITECTURE
COURSE STRUCTURE : 3:1:2
SYLLABUS:

UNIT I:

ARM Processor as System-on-Chip: Acorn RISC Machine – Architecture inheritance – ARM programming model. 3 and 5 stage pipeline ARM organization – ARM instruction execution and implementation – ARM Co-processor interface

UNIT II:

ARM Assembly Language Programming: ARM instruction types – data transfer, data processing and control flow instructions – ARM instruction set – Co-processor instructions, Thumb Instruction Set.

UNIT III: Architectural Support for System Development: Advanced Microcontroller bus architecture – ARM memory interface – ARM reference peripheral specification – Hardware system prototyping tools – ARMulator – Debug architecture.

UNIT IV:

ARM Processor Cores: ARM7TDMI, ARM8, ARM9TDMI, ARM10TDMI, the AMULET Asynchronous ARM Processors- AMULET1

UNIT V:

Embedded ARM Applications: The VLSI Ruby II Advanced Communication Processor, The VLSI ISDN Subscriber Processor, The OneC™ VWS22100 GSM chip, The Ericsson-VLSI, Bluetooth Baseband Controller, The ARM7500 and ARM7500FE.

Text Books:

1. ARM System on Chip Architecture – Steve Furber – 2nd ed., 2000, Addison Wesley Professional.
2. Design of System on a Chip: Devices and Components – Ricardo Reis, 1st ed., 2004, Springer

References:

1. Co-Verification of Hardware and Software for ARM System on Chip Design (Embedded Technology) – Jason Andrews – Newnes, BK and CDROM
2. System on Chip Verification – Methodologies and Techniques –Prakash Rashinkar, Peter Paterson and Leena Singh L, 2001, Kluwer Academic Publishers.

M.TECH (ES) SECOND SEMESTER

COURSE NO. : 13-EM602
COURSE TITLE : DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES
COURSE STRUCTURE : 3-1-0

SYLLABUS:

UNIT I

Introduction To Digital Signal Processing: Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), linear time-invariant systems, Digital filters, Decimation and interpolation

Computational Accuracy in DSP Implementations: Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT II

Architectures for Programmable DSP Devices: Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT III

Programmable Digital Signal Processors: Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT IV

Analog Devices Family of DSP Devices: Analog Devices Family of DSP Devices- ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP2100, ADSP-2181 high performance Processor.

Introduction to Blackfin Processor – The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNIT V

Interfacing Memory And I/O Peripherals To Programmable DSP Devices: Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

Text Books

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. A Practical Approach to Digital Signal Processing – K Padmanabhan, R. Vijayarajeswaran, Ananthi.S, New Age International, 2006/2009.
3. Embedded Signal Processing with the Micro Signal Architecture Publisher: Woon-Seng Gan, Sen M. Kuo, Wiley-IEEE Press, 2007.

References

1. Digital Signal Processors, Architecture, Programming and Applications – B. Venkataramani and M. Bhaskar, 2002, TMH.
2. Digital Signal Processing – Jonathan Stein, 2005, John Wiley.
3. DSP Processor Fundamentals, Architecture & Features- Lapsley et al. 2000, S. Chand & Co.
4. Digital Signal Processing Applications Using the ADSP-2100 Family by The Applications Engineering Staff of Analog Devices, DSP Division, Edited by Amy Mar, PHI.
5. The Scientist and Engineering's Guide to Digital Signal Processing by Steven W. Smith, Ph.D., California Technical Publishing, ISBN 0-9660176-3-3, 1997.
6. Embedded Media Processing by David J. Katz and Rick Gentile of Analog Devices, Newnes, ISBN 0750679123, 2005.

M.TECH (ES) SECOND SEMESTER

COURSE NO. : 11-EM603
COURSE TITLE : HARDWARE SOFTWARE CO -DESIGN
COURSE STRUCTURE : 3-1-0

SYLLABUS:

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

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 – III

Compilation Techniques and Tools for Embedded Processor Architectures:

Modern embedded architectures, embedded software development needs, compilation technologies practical consideration in a compiler development environment.

UNIT – IV

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.

Languages for System – Level Specification and 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 – 2009, Springer.
2. Hardware / software co- design Principles and Practice, 2002, kluwer academic publishers

M.TECH (ES) SECOND SEMESTER

COURSE NO. : 13-EM604
COURSE TITLE : LINUX SYSTEM CONCEPTS
COURSE STRUCTURE : 3-1-2

SYLLABUS:

UNIT1

GNU Development tools: Compilation tools and its functionalities, Debugging applications, Using Make, Creating Libraries.

UNIT – II

Operating Systems Concepts: Structure of Linux Operating System, Process Management, Memory Management, File System Management, I/O Management, Networking Subsystem.

UNIT – III

Introduction Linux Kernel: Linux installation, partitioning, Compilation of open sources, Configuration & Compilation of kernel sources, Kernel modules, Implementing System Calls.

UNIT – IV

Linux Kernel Concepts: The proc file system, Unified Device Model and systems, Memory Management and Allocation, User and Kernel Space communication, Interrupt Handling. Kernel Debugging.

UNIT – V:

Linux Device drivers:, Skeleton of device drivers, Character Driver, Block Drivers, Building driver into the kernel

Networking in Linux: Sockets, a sample example

Text Books:

1. Programming Embedded Systems, 2nd Edition With C and GNU Development Tools by Michael Barr, Anthony Massa.
2. Michael Beck (1998), “Linux Kernel Internals”, Addison Wealey
3. Doug Abbott. (2003), “Linux for Embedded and Real time Applications”, Newnes publishers.

Reference Books:

1. Understanding the Linux Kernel, Third Edition Daniel P. Bovet , Marco Cesati, 3rd edition, Orally Publications
2. Linux Device Drivers, 3rd edition, Linux Device Drivers, 3rd Edition Jonathan Corbet, Alessandro Rubini , Greg Kroah-Hartman, Orally Publications
3. Advanced Programming in UNIX Environment– Richard Stevens, Addison-Wesley, 1992.
4. Linux Kernel Development, Robert Love, 2nd Edition, 2006, Pearson Education.

M.TECH (ES) ELECTIVE – I GROUP-A

COURSE NO. : 13-EM-E32
COURSE TITLE : EMBEDDED NETWORKING
COURSE STRUCTURE : 3-0-0

SYLLABUS:

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 – Firewire.

UNIT-II

USB Bus: Introduction – Speed Identification on the bus – USB States – USB bus communication: Packets –Data flow types –Enumeration –Descriptors –PIC 18 Microcontroller USB Interface

UNIT-III

CAN Bus: Introduction - Frames –Bit stuffing –Types of errors –Nominal Bit Timing – PIC microcontroller CAN Interface –A simple application with CAN.

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. Frank Vahid, Givargis 'Embedded Systems Design: A Unified Hardware/Software Introduction', Wiley Publications
2. Jan Axelson, 'Parallel Port Complete', Penram publications
3. Dogan Ibrahim, 'Advanced PIC microcontroller projects in C', Elsevier 2008
4. Jan Axelson 'Embedded Ethernet and Internet Complete', Penram publications
5. Bhaskar Krishnamachari, 'Networking wireless sensors', Cambridge press 2005

M.TECH (ES) ELECTIVE – I GROUP-B

COURSE NO. : 11-EM-E40
COURSE TITLE : EMBEDDED LINUX
COURSE STRUCTURE : 3-0-0

SYLLABUS:

UNIT – I:

Introduction: History of Embedded Linux, Embedded Linux versus Desktop Linux, Embedded Linux Distributions, Architecture of Embedded Linux, Linux Kernel Architecture, Linux Start-Up Sequence, GNU Cross-p\Platform Tool chain.

UNIT – II:

Board Support Package: Inserting BSP in Kernel Build Procedure, Boot Loader Interface, Memory Map, Interrupt Management, PCI Subsystem, Timers, UART, and Power Management.

Embedded Storage: Flash Map, MTD—Memory Technology Device, MTD Architecture, Flash-Mapping Drivers, MTD Block and Character devices, Embedded File systems, Optimizing Storage Space.

UNIT – III:

Embedded Drivers: Linux Serial Driver, Ethernet Driver, I2C subsystem on Linux, USB Gadgets, Watchdog Timer, and Kernel Modules.

UNIT-IV:

Porting Applications: Architectural Comparison, Application Porting Road Map, Programming with Pthreads, Operating System Porting Layer (OSPL), Kernel API Driver.

Unit-V:

Real-Time Linux: Linux and Real-Time, Real-Time Programming in Linux, Hard Real-Time Linux.

Text Books:

1. Embedded Linux System Design and Development, P.Raghavan, Amol Lad, SriramNeelakandan, 2006, Auerbach Publications

Reference Books:

1. Embedded Linux – Hardware, Software and Interfacing