



# R. V. CENTRE FOR COGNITIVE TECHNOLOGIES

## Detailed Schedule and Lesson Plan for First Contact Programme

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(Click on the Subject Names)

**MS-ASIC DESIGN****Paper-1****Subject: Basic VLSI and Analog VLSI Design****Texts books(TB):**

1. *Basic VLSI Design (Third Edition) by Douglas.A.Pucknell , Kamaran Eshraghian*
2. *CMOS Digital Integrated Circuits (Third Edition) by Sung MO Kang, Yousf Leblebici*
3. *Introduction to VLSI Circuits & Systems, by John.P. Uyemura*
4. *Analog Circuits and Devices - Principles and Applications in Engineering, by Wai-Kai Chen*
5. *Analysis and Design of Analog Integrated Circuits (4th Edition) by Paul R. Gray*

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	16-6-08	9.00-10.00	1	Introduction to MOS technology	Introduction to IC technology, Basic MOS Transistor Enhancement Mode, Depletion Mode, Threshold Voltage, Body Effect, VLSI Design flow, VLSI Design Styles.
2	17-6-08	11.00- 12.00	2	Fabrication Process	NMOS, CMOS, P Well, N Well process, Twin Tub Process, Silicon on insulator
3	19-6-08	10.00-11.00	3	Electrical Properties of MOS Circuits	Drain to Source Current VS Voltage relationship, MOS Transistor, transconductance and output conductance, figure of merit, pass transistors
4	23-6-08	9.00-10.00	3	Electrical Properties of MOS Circuits	NMOS inverters, determination pull up to pull down ratio for NMOS inverter driven by another NMOS inverter, determination pull up to pull down ratio for NMOS inverter driven through one or more pass transistors, alternative forms of pull up latch up in CMOS circuits
5	24-6-08	11.00-12.00	4	Basic Circuits concepts	Sheet resistance, Sheet resistance applied to MOS Transistors and inverters, Area capacitance of layers
6	26-6-08	10.00-11.00	4	Basic Circuits concepts	Standard unit of capacitance, delay unit, inverter delay, driving large capacitive loads, propagation delays

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**Paper-2**  
**Subject : ASIC Design**

**Texts books(TB):**

1. Michael John Sebastin Smith, - “Application - Specific Integrated Circuits” – Pearson Education, 2003
2. Malcolm R.Haskard; Lan. C. May, “Analog VLSI Design - NMOS and CMOS” Prentice Hall, 1998.
3. Andrew Brown, - “VLSI Circuits and Systems in Silicon”, McGraw Hill, 1991.
4. S.D. Brown, R.J. Francis, J. Rox, Z.G. Uranesic, “Field Programmable Gate Arrays”- Kluwer Academic Publishers, 1992.

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	16-06-08	10:00-11:00	1	Introduction to ASICs	1. Types of ASICs, Design flow, Case Study, Economics of ASICs, ASCI cell library.
2	18-06-08	09:00-10:00	2	CMOS logic cells	2. Combinational logic cells, Sequential Logic Cells, Datapath Logic cells, I/O cells, Cell Compilers.
3	19-06-08	11:00-12:00	3	ASIC Library Design	3. Transistor as resistors, Transistor as parasitic capacitance, Logic effort, Library cell design, Library architecture.
4	23-06-08	10:00-11:00	4	Gate Design	4. Gate array cell design, standard cell design, datapath cell design.
5	25-06-08	9:00-10:00	5	Programmable ASICs	5. Antifuse, Static RAM, EPROM,
6	26-06-08	11:00-12:00	5	Programmable ASICs	6. EEPROM technology, practical issues

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**Paper-3**  
**Subject : CAD Tools for VLSI**

**Texts books (TB):**

1. *Synthesis and Optimization of Digital Circuits. By Gianni De Micheli (Publisher TATA Mc Graw Hill Edition)*
2. *Algorithms for VLSI design Automation by Sabih H. Gerez (Publisher Willey)*
3. *Algorithms for VLSI Physical Design Automation(3<sup>rd</sup> Edition) Naveed Shervani (Publisher Springer International Edition )*

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	16-06-08	11:00-12:00	1	Scheduling Algorithms without resource constraints.	Introduction, A model for scheduling problems, scheduling without and with resource constraints,
2	18-06-08	10:00-11.00	1	Scheduling Algorithms with resource constraints.	scheduling algorithms for extended sequencing models, scheduling pipelined circuits
3	20-06-08	9.00-10.00	2	Resource Sharing and Binding:	Introduction, sharing and binding for resource-dominated circuits, sharing and binding for general circuits, concurrent binding and scheduling
4	23-06-08	11:00-12:00	3	Data Structure	Basic Terminology, Basic Data structures
5	25-06-08	10:00-11:00-	3	Basic Algorithms:	Graph Search Algorithms, Computational Geometry Algorithms,
6	27-06-08	9.00-10.00	4	Partitioning:	Problem Formulation, Classification of Partitioning Algorithms, Group migration Algorithms, Simulated Annealing and evolution algorithm, other partitioning algorithms

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**Paper-4 (Elective I a)**  
**Subject: Digital Circuit Design using VERILOG**

**Texts books (TB):**

1. Verilog Hardware Description Language by Thomas & Moorby, 5<sup>th</sup> Edition.
2. Verilog HDL a guide to digital design & synthesis by Samir Palnithkar, Sunsoft press, 1996,
3. Verilog HDL synthesis A practical primer by J. Bhasker, Star Galaxy press, 1997.
4. Digital system Design Using VHDL by Charles H. Roth PWS Publishing Company

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	17-06-08	09:00-10:00	1	Verilog –Introduction	Structural Description , Creating Ports For the Module, Test bench For a Module, Behavioral Modeling of Combinational Circuits, Procedural Modeling of Clocked Sequential Circuits, Module Hierarchy
2	18-06-08	11:00-12:00	2	Logic Synthesis	Synthesis, Combinational Logic, Procedural Statements to Specify Combinational Logic, Inferring Sequential Elements: Latch , Flip Flop. Inferring Tri-State Devices; Describing Finite State Machines.
3	20-06-08	10:00-11:00	3	Behavioral Modeling	Process Model, If-Then-Else, Loops, Multi-way Branching, Functions and Tasks, Rules of Scope and Hierarchical Names, The Wait Statement.
4	24-06-08	09:00-10:00	4	Concurrent Processes	Concurrent Processes, A Simple Pipelined Processor, Disabling Named Blocks, Intra-Assignment Control and Timing Events, Procedural Continuous Assignment, Sequential and Parallel Blocks
5	25-06-08	11:00-12:00	5	Module Hierarchy	Module Instantiation, Port Specifications, Parameters, Arrays of Instances, Generate Blocks.
6	27-06-08	10:00-11:00	6	Logic Level Modeling	Logic Level Modeling; Introduction, Logic Gates and Nets, Continuous Assignment, A Mixed Behavioral/Structural Example, Logic Delay Modeling .

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**Paper-4 (Elective I b)**  
**Subject : RF Micro Electronics**

**Texts books(TB):**

1. *B Razavi, RF microelectronics PHI PTR 1998*
2. *T H Lee, Design of CMOS RF ICs, Cambridge university press 1998*
3. *R Jacob Baker, HW Li and D.E boce CMOS circuit design layout and simulation PHI India 1998*
4. *Y P Tsividis Mixed Analog & Digital VLSI devices and technology Mc Graw Hill 1996*
5. *Behzad Razavi, RF Microelectronics, Upper Saddle River, NJ: Prentice Hall, 1998.*

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	17-06-08	09:00-10:00	1	Introduction to RF and wireless technology	Complexity, design and applications. Choice of technology.
2	18-06-08	11:00-12:00	2	Basic concepts in RF design	Non linearity and time variance, intersymbol interference, random processes and noise. Definitions of sensitivity and dynamic range, conversion gains and distortions.
3	20-06-08	10:00-11:00	3	Analog and digital modulation	RF circuits; comparison of various techniques for power efficiency. Coherent and non-coherent detections mobile RF communications.
4	24-06-08	09:00-10:00	4	Mobile communication systems	Basics of multiple access techniques. Receiver and Tx architecture and testing heterodyne homodyne image reject direct IF and sub sampled Rx's..
5	25-06-08	11:00-12:00	5	Direct conversion and two step Transmitters	BJT & MOSFET behavior at RF frequencies modeling of the transistor and SPICE models
6	27-06-08	10:00-11:00	6	performance and limitation	Noise performance and limitation of the devices integrated parasitic elements at high frequencies and their monolithic implementations

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**Paper-5 (Elective II a)**  
**Subject: PLD and FPGA**

**Texts books(TB):**

1. *John F Wakerly, Digital Design: Principles & Practices, Prentice Hall.*
2. *Kevin Skahil, VHDL for Programmable Logic, Addison Wesley.*
3. *PLD & FPGA Data Sheets.*
4. *Wayne Wolf, FPGA -Based Design, Prentice-Hall, 2004.*
5. *S. Brown, Z.Vranesic, Fundamentals of Digital Logic with VHDL Design .-McGraw-Hill, 2000.*

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	17-06-08	10:00-11:00	1	Programmable logic device	Programmable logic arrays (PLAs), Programmable array logics (PALs), Programmable logic devices (PLDs).
2	19-06-08	09:00-10:00	2	FPGAs	Xilinx 3000 series FPGAs, Designing with FPGAs, Xilinx 4000 series FPGAs, Using a one-hot state assignment, ALTERA CPLDs, ALTERA flex 10K series CPLDs
3	20-06-08	11:00-12:00	3	Hierarchy in Design	Controllers, Mealy and Moore Machines, Meta-stability, synchronization
4	24-06-08	10:00-11:00	4	FSM issues	Clock Trees, Clock skew, Pipelining, Multiple clock domains, Case studies.
5	26-06-08	09:00-10:00	5	VHDL	Behavioral, Data Flow, Structural Models, Simulation Cycles,
6	27-06-08	11:00-12:00	5	VHDL	Process, Concurrent and Sequential Statements

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**Paper-5 (Elective II b)**  
**Subject: Low Power VLSI Design**

**Texts books (TB):**

1. Gary K. Yeap, "Practical Low Power Digital VLSI Design", KAP, 2002
2. Rabaey, Pedram, "Low power design methodologies" Kluwer Academic, 1997
3. Kaushik Roy, Sharat Prasad, "Low-Power CMOS VLSI Circuit Design" Wiley, 2000
4. Low Power Design in Deep Sub-micron Electronics by W. Nebel and J. Mermet, Kluwer Academic Publishers, 1997
5. Gary K. Yeap, Practical Low power Digital VLSI Design, Kluwer Academic Publishers, 1998.

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	17-06-08	10:00-11:00	1	Introduction	Need, sources of power dissipation, emerging low power approaches, physics of power dissipation in cmos devices
2	19-06-08	09:00-10:00	2	Device and technology impact on low power	Dynamic dissipation in cmos, transistor sizing & gate oxide thickness, Impact of technology scaling, technology and device innovation
3	20-06-08	11:00-12:00	3	Power estimation, simulation power analysis	Introduction, spice circuit simulator, Gate level logic simulation, Data correlation analysis in dsp systems
4	24-06-08	10:00-11:00	4	Power estimation, simulation power analysis	Statistical methods, monte-carlo method, Estimation of glitching power
5	26-06-08	09:00-10:00	5	Probabilistic power analysis	Random logic signals, Characterization of logic signals, partially reversible logic and quasi-adiabatic memories
6	27-06-08	11:00-12:00	6	Circuit level & logic level	Transistor and gate sizing, gate reorganization, local restructuring

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**6 LAB Sessions of 3 hours each:**  
**Basic VLSI Design Experiments**

Design and Verify the following by schematic simulation and layout Simulation.

1. Inverter using MOSFETs
2. Two input NAND, NOR, XOR and realization of Boolean expressions
3. D, T, JK, JK Master Slave flip-flops
4. Adders, MUX and Shift Registers
  - a) serial adder and 2-bit parallel adder
  - b) 4:1 multiplexer
  - c) A serial register capable of holding and shifting 4 – bit words
5. Design a basic differential amplifier circuit having the following specifications:

Gain:	50,000(94dB)
Output Swing	1.5V
Bandwidth	>30MHz
Input offset voltage	<100mV
Area and power dissipation	As minimum as possible
6. Use the op-amp available from the library of tools to convert a sinusoidal wave in to square waves by using Schmitt trigger. Design the Schmitt trigger circuit in such a way that  $UTP=4.5V$  and  $LTP=2.0V$ . Plot  $V_o$  versus  $V_i$ .
- 7 . Asynchronous and synchronous 4-bit counters

Note: Effect of changes in process technology parameters such as from 1.2 microns to 35 nano microns and step-wise fabrication processes (2D/3D view) for two of the above experiments to be studied.

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**MS-Mobile Communication and Internet Technologies**  
**Paper-1**  
**Subject : Data Structure & System Software**

**Texts books(TB):**

1. *Data Structures in C and C++: Andrew S Tenenbaum*
2. *Design of Algorithms: Sahani*

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	16-06-08	9:00-10:00	1	Introduction	Expressions and Operators, Decision Control statements, Conditional Operators, Loop Control Structures, Input and Output Statements, Functions, Structures and Unions
2	17-06-08	11:00-12:00	2	Stacks	Introduction to Stacks, Implementation of stack, Applications of stack, Infix to Postfix conversions, Infix to Prefix conversions
3	19-06-08	10:00-11:00	3	Queues and Linked List	Introduction to Queues, Implementation of Queues, Applications, Circular Queues, Priority Queues, Linked List, Singly Linked List and Doubly linked list, Implementation
4	23-06-08	9:00-10:00	4 & 5	Recursion and Trees	Recursions with example, Factorial, Fibinoci, Tower Hanoi Problem, Trees, Binary Tree, Tree traversals
5	24-06-08	11:00-12:00	5	Sorting Technique	Bubble Sort, Selection Sort, Merge Sort, Quick Sort
6	26-06-08	10:00-11:00	6	Searching Technique	Searching Technique, Hashing, Sequential Search

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**Paper-2**  
**Subject : Mobile Computing**

**Texts books(TB):**

3. Jochen Schiller, *Mobile Communications*, Pearson 2004.
4. Rapaport: *Wireless communication*
5. Asoke Talukder & Roopa Yavagal *Mobile Computing*, McGraw-Hill Communications Engineering Publications
6. *Mobile Computing And Wireless Communications* by Amjad Umar
7. *Principles of Mobile Computing and Communications* by Mazliza Othman

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	16-06-08	10:00-11:00	1	Introduction	Applications, History of wireless communications, Applications of wireless technology, A market for mobile communications, A simplified reference model
2	18-06-08	9:00-10:00	2	Wireless Transmission	Frequencies for Radio Transmission, Standards and Regulations, Path Loss of Radio Signals, Signal Propagation and Propagation Effects, Multipath Propagation, Space division multiple access,
3	19-06-08	11:00-12:00	2	Wireless Transmission	Frequency division multiple access, Time division multiple access, Spread spectrum, Frequency hopping and Direct Sequence Spread Spectrum Systems, Cellular Systems, Modulation: Amplitude, Phase and Frequency Shift Keying, Spread Spectrum,
4	23-06-08	10:00-11:00	3	Medium Access Control	Motivation, RF Link Quality, Hidden Node Problem, Near and Far Terminals, Technical explanation, Analogies, Space division multiple access, Frequency division multiple access, Time division multiple access, Aloha techniques, Aloha protocol, Carrier sense multiple access, CSMA/CA and CSMA/CD, Demand assigned multiple access, Packet reservation multiple access Inhibit Sense Multiple Access (ISMA)
5	24-06-08	9:00-10:00	4	Telecommunication Systems	GSM, System Architecture, The Switching System, Radio Interface, Handover, UMTS, UMTS Architecture, UMTS Radio Interface, TETRA
6	26-06-08	11:00-12:00	5	Satellite Systems	History: International Communications, Applications, Basics, LEO, GEO, MEO, Routing in Satellite Systems, Localization, Handover

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**Paper-3**  
**Subject: Data Communications**

**Texts books(TB):**

1. *Alberto Leon – Garcia and Indra Widjaja , Communication Networks -Fundamental Concepts and Key architectures, Tata McGraw-Hill 2<sup>nd</sup> edition.*
2. *Behrouz A. Forouzan , Data Communications and Networking, Tata McGraw-Hill 3<sup>rd</sup> Edition .*
3. *William Stallings , Data and Computer Communication, Fifth Edition, Prentice Hall India.*
4. *William A. Shay, Understanding Data Communications and Networks, 2<sup>nd</sup> Edition, Thomson.*
5. *Godbole, Data Communications and Networks, Tata McGraw-Hill 2002.*

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	16-6-08	11.00-12.00	1	Communication Networks and Services	Introduction to Communication and Communication Networks, Evolution of Network architecture and Services, Telegraph Networks and Message Switching, Telephone Networks and Circuit Switching, Internet, Computer Networks and Packet Switching, Protocols, Terminal Oriented Networks , Computer Networks , Packet Switching , Elements of Network Architecture.
2	18-6-08	10.00-11.00	2	Applications and Layered Architectures	Protocols, Services and Layers, Characteristics of Protocols, Functions of Protocol, Interfaces and Services, Services: Connection Oriented and Connectionless , HTTP, DNS and SMTP, TCP and UDP Transport Layer Services
3	20-6-08	9.00-10.00	3	Applications and Layered Architectures	OSI Reference Model., Seven layer OSI Reference Model, Unified View of Layers, Protocols and Services., Overview of TCP/IP Architecture, TCP/IP Architecture, TCP/IP Protocol: How the Layers Work Together, Application Layer Protocols and TCP/IP Utilities.
4	23-6-08	11.00-12.00	4	Digital Transmission Fundamentals - I	Digital Representation of Information., Block-Oriented Information & Stream Information, Basic Properties of Digital Transmission Systems., Digital Representation of Analog Signals., Bandwidth of Analog Signals, Sampling of Analog Signals, Digital Transmission Of Analog Signals, Communication Channels – Characterization., Frequency Domain and Time Domain Characterizations
5	25-6-08	10.00-11.00	5	Digital Transmission Fundamentals - II	Transmission of information, Nyquist Signaling Rate- Sampling:, Shannon Channel Capacity, Relationship between Information, Bandwidth and Noise, Line Coding: Timing Control in Digital Communication, Digital Transmission and Switching, Digital modulation, ASK, FSK, PSK QAM and Telephone Modem, Description and types of communication channels - , Properties of Media: Transmission Lines, Optical fiber waveguide, Radio Transmission: The Electromagnetic Spectrum& Propagation in Free-Space., Microwave Link Communication, Infrared Light , Errors in Digital Communication : Error Detection & Correction

6	27-6-08	9.00-10.00	6	<b>Circuit Switching Networks</b>	<b>Multiplexing: FDM, TDM &amp; WDM. , T1 carrier System (TDM), North American Digital multiplexing Hierarchy, CCITT Digital hierarchy (Europe)., SONET: Overview, Specifications, Multiplexing, frame structure &amp; layers (SONET Model) Transport networks, SONET Networks, Circuit Switches, Switching: Transfer Modes, Switches &amp; Switching services in networks.</b>
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**Paper-4(Elective-1a)**  
**Subject: Code Division Multiple Access**

**Texts books(TB):**

1. W. Stallings, “Wireless Communication and Networks”, Prentice hall. 2002
2. T.S.Rappaport, “Wireless Commn.: Principles & Practice”. 2E, PHI, 2002
3. J.Schiller, “Mobile Communications”, Addison Wesley, 2000
4. Vijay K. Garg, “IS-95 CDMA and CDMA2000: Cellular/PCS Systems Implementation”, Pearson Education 2000

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	17-6-08	9.00-10.00	1	Introduction to Access Technologies	Major Attributes of CDMA Systems.,Third-Generation Systems. Multiple Access Technologies.,Modes of Operation in Wireless Communications.
2	18-6-08	11.00- 12.00	2	Direct Sequence Spread Spectrum and Spreading Codes.	Types of Techniques Used for Spread Spectrum., The Concept of Spread Spectrum System. The Performance of DSSS., Bit Scrambling., The Performance of a CDMA System. Pseudorandom Noise Sequences.
3	20-6-08	10.00-11.00	3	Diversity, Combining, and Antennas	Diversity Reception., Types of Diversity., Basic Combining Methods., BPSK Modulation and Diversity., Examples of Base Station and Mobile Antennas.
4	24-6-08	9.00-10.00	4	IS-95 CDMA : System Architecture and Air Interface	TR-45/TR-46 Reference Model., Functional Model Based on Reference Model., Wireless Intelligent Network., TIA IS-95 CDMA System.
5	25-6-08	11.00- 12.00	5	Physical and Logical Channels of IS-95 CDMA.	Physical Channels., Modulation., Bit Repetition., Block Interleaving., Channel Coding., Logical Channels.
6	27-6-08	10.00-11.00	6	IS-95 CDMA Call Processing and Signaling Applications.	CDMA Call Processing State., CDMA Registration., Authentication., Layered Structure. A-Interface,Roaming

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**Paper-4(Elective-1b)**  
**Subject : Multimedia Computing**

**Texts books(TB):**

1. Nalin K Sharad: “Multimedia Information Networking”, PHI, 2001.
2. K. R. Rao, Zoran S: “Multimedia Communications”, 2002.

Hour	Date	Time	CHAP TER	Main Topics As per syllabus	
1	17-06-08	9:00- 10:00	1	Introduction	Multimedia Elements, Application, System Architecture, Evolving Technologies for Multimedia; Defining objects to multimedia, Data Interface Standards , Need for data compression, Multimedia Database.
2	18-06-08	11:00- 12:00	2	MEDIA AND DATA STREAMS	All Medias, Presentation Space And Values, Presentation Dimensions , Discrete & Continuous Media, Independence media, Computer controlled system, Integration; Charactering Data Streams : All Transmission Modes; Charactering Continuous Media Data Streams
3	20-06-08	10:00- 11:00	3	AUDIO TECNOLOGY	Properties of Sound, Sound Perception and Psychoacoustics; Three Dimensional Sound Projection, Audio Representation on Computers, Music and MIDI Standards;
4	24-06-08	9:00- 10:00	3	AUDIO TECNOLOGY	Speech Signals and Speech Output; Speech Input,;
5	25-06-08	11:00- 12:00	4	GRAPHICS AND IMAGES	Speech Transmission, Capturing Graphics and Images, Computer Assisted Graphics. Images Processing
6	27-06-08	10:00- 11:00	4	GRAPHICS AND IMAGES	Image properties , Reconstructing Images , Graphics and Image Output Options.

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**Paper-5(Elective-11 a)**  
**Subject : JAVA & J2ME**

**Texts books(TB):**

1. Patrick Naughton : *The Java Hand Book, TMH, Eleventh Reprint, 2002*
2. Herbert Schildt : *The Complete Reference, TMH, Fourth Edition, 2002.*
3. James Lee & Brent Ware : *Open Source Web Development with LAMP – using Linux, Apache, MySQL, Perl and PHP by James Lee and Brent Ware, Addison – Wesley/Person Education Inc. 2003*

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	17-06-08	10:00-11:00	1	Java Language	The Java Revolution – Java Applets, Revolutionary Programming Language, Rich Object Environment, Java Language Introduction- Hello World, Lexical Issues, Variables, Types- Simple Types, Arrays, Classes-Object References, The new operator, The Dot(.) Operator, Method Declaration, Constructors, Method Overloading, Inheritance, Dynamic Method Dispatch, Abstract, Packages and Interfaces- Packages, Interfaces.
2	19-06-08	09:00-10:00	2	Java Classes	String handling- Constructors, String syntax, Character Extraction, Comparison, String Copy Modifications, Exception Handling – Exception Types, try and Catch, Multiple catch Clauses, Nested try Statements, Exception sub Classes, Threads and Synchronization- Single Threaded Event Loop, The Java Thread Model, Input/ Output- File, Input Stream, Output Stream, File Streams, Applets- HTML Applet Tag.
3	20-06-08	11:00-12:00	6	Java Language	Java Virtual Machine and bytecode, Classes, source and compilers, Class files, loaders and compilers, Object orientation, Classes and instances, Object Oriented techniques, Classes and Objects, Abstract classes, Interfaces, Polymorphism, Dynamic dispatch, Error handling, Using inner classes.
4	24-06-08	10:00-11:00	7	Standard Libraries	Storing data in Java, Collections, Hashtable and HashMap, Vector and List, Collections in Java 2, I/O Programming, GUI Programming, AWT, Swing.
5	26-06-08	9:00-10:00	3	Structural	The Web Explained- How It Works, Apache Web Server- Introduction, Starting, Stopping and Restarting Apache, Configuration, Securing Apache, Create The Website, Apache Log Files,
6	27-06-08	11:00-12:00	3	Structural	MySQL- Introduction, Tutorial, Database Independent Interface, Table Joins, Loading and Dumping a Database.

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**Paper-5(Elective-11 b)**  
**Subject: Wireless and ATM Network**

**Texts books(TB):**

1. Yi-Bing Lin, Imrich Chlamtac, *Wireless and mobile network architectures*, John Wiley, 2001
2. Kaveh Pablayan, P. Krishnamurthy, *Principles of wireless networks*, Pearson education, 2002
3. P. Venkataram, S. S. Manvi, B. P. Vijaykumar, *WLANs: Architectures, Protocols and Applications*, Pearson education (In Press), 2005
4. Marlyn Mallick, *Mobile and wireless design essentials*, Wiley, 2003
5. *Wireless Network Security: Books: John R. Vacca by John R. Vacca.*

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	17-6-08	10.00-11.00	1	PCS Architecture:	Cellular telephony, Advanced Mobile Phone Services (AMPS), Cordless telephony & low tier PCS, 3 <sup>rd</sup> & 4 <sup>th</sup> , Generation wireless systems., Second Generation wireless systems:, A Global System for Mobile Communication (GSM)
2	19-6-08	9.00- 10.00	1	PCS Architecture:	IS-136 digital cellular system:, IS-95 Digital Cellular System:, Cordless telephony and low tier PCS., Cellular Systems and Multiple Access :, Third generation and fourth generation wireless systems, Beyond 3G
3	20-6-08	11.00-12.00	2	Mobility Management	Handoff, Roaming management for SS and CT2, Handoff detection strategies, Channel assignment, Link transfer types, Hard and soft handoff
4	24-6-08	10.00-11.00	3	IS-41 Signaling	Land mobile systems, IS-41 handoff, Handoff measurement, Authentication, CDPD Architecture and CDPD Air Interface, Radio Resource allocation, GSM Architecture
5	26-6-08	9.00- 10.00	4	Data Services	GSM Short message services (SMS), HSCSD (High Speed Circuit Switched Data), GPRS Architecture, GPRS Mobility Management
6	27-6-08	11.00-12.00	5	International Roaming	GPRS Network Component, Architecture, Interfaces, WAP, International Roaming, GSM to GPRS

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**LAB Programs****Paper-1 Data Structure and System Software**

1. Write a C Program to create a sequential file with atleast 5 records, each record having the structure shown below:

	Name	Marks 1	Marks 2	Marks 3
Non zero positive Integer	25 Character	Positive Integer	Positive Integer	Positive Integer

**Write necessary functions**

a. To display all the records in the file.  
 b. To search for a specific record based on the USN. In case the record is not found, suitable message should be displayed. Both the options in this case must be demonstrated.

2. Write and demonstrate the following C functions:

a. newStrCpy that does the same job as strcpy  
 b. newStrCat that does the same job as strcat without using any library functions.

3. Write a C Program, which accepts the Internet Protocol (IP) address in decimal dot format (ex. 153.18.8.105) and converts it into 32-bit long integer (ex. 2568095849) using strtok library function and unions.

4. Write a C Program to construct a stack of integers and to perform the following operations on it:

a. Push  
 b. Pop  
 c. Display

The program should print appropriate messages for stack overflow, stack underflow, and stack empty.

5. Write a C Program to convert and print a given valid parenthesized infix arithmetic expression to postfix expression. The expression consists of single character operands and the binary operators + (plus), - (minus), \* (multiply) and / (divide).

6. Write a C Program to evaluate a valid suffix/postfix expression using stack. Assume that the suffix/postfix expression is read as a single line consisting of non-negative single digit operands and binary arithmetic operators. The arithmetic operators are + (add), - (subtract), \* (multiply) and / (divide).

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### **Paper-3 DATA COMMUNICATIONS**

1. Verification of sampling theorem & reconstruction using hardware.
2. Generation of signals and their study using Mat-lab software.

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### **Paper-5(Elective 2a)**

#### **JAVA Programming Laboratory**

1. Program in Java to compute factorial of a number.
2. Program in Java to grade a student based on his marks as First Grade, second, third and fail using switch statements.
3. Program in Java to check if the triangle is equilateral or isosceles or scalene using nested if.
4. Program in Java to implement the concept of threads.
5. Program to manipulate student records such as input, store and display student data. Student to use inheritance concepts
6. Program to display various server information like Server name, server software, server protocol.
7. Program to accept a username and display a greeting message.
8. Program to display a greeting based on the access time.
9. Program to display a digital clock which displays the current time of the server.
10. Program to query the database and to display the result on the webpage.
11. Program to accept student information viz. Name, student\_id and branch from webpage and to store those in database.
12. Program to search a student given by the user on a webpage and display the results with proper headings.

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**MS-Information Technologies**  
**Paper-1**  
**Subject : Principles of Programming Languages**

**Texts books(TB):**

1. *Programming Languages, design and implementation second edition by Terrence W. Pratt Prentice Hall of India pvt.ltd. New Delhi*
2. *Programming Language. Kenneth Loudon, Principles and practices 2<sup>nd</sup> Edition.*
3. *Principles of Programming Languages: Design, Evaluation and Implementation: Books: Bruce J. MacLennan.*
4. *Principles of Programming Languages, Sriram Krishnamurthi Addison-Wesley*
5. *Principles of Programming Languages, M.L Scott, Pragmatics publisher.*

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	16-06-08	9:00-10:00	1	Introduction	Brief history of programming language, Characteristics of programming language.
			2	Programming Language Processors	The structure and operation of a computer, Hardware and firmware computers, Translators and simulator computers,
2	17-06-08	11:00-12:00	2	Programming Language Processors	Syntax, semantics and virtual computers, hierarchies of computers, binding and binding time.
			3	Elementary data Types	Data object, variable and constants, data types,
3	19-06-08	10:00-11:00	3	Elementary data Types	Specification of elementary data types, declarations, type checking and type conversion, assignment and initialization, numeric data types,
4	23-06-08	9:00-10:00	3	Elementary data Types	Enumerations, Boolean, Characters.
			4	Structured Data Types	Structured data object and data types, specification of data structure types, implementation of data structure types, declarations and type checking for data structures.
5	24-06-08	11:00-12:00	4	Structured Data Types	vectors and arrays, record, character strings, variable sized data structures, pointers and programmer-constructed data objects, sets, file and input/output.
6	26-06-08	10:00-11:00	5	Subprogram and Programmer-Defined Data Types	Evolution of the data type concept, Abstraction, encapsulation and information hiding, subprogram, type definitions, abstract data types.

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**Paper-2**  
**Subject :Operating Systems**

**Texts books ((TB):**

1. *Operating Systems: Gary Nutt,3<sup>rd</sup> Edition, Pearson Education,2005.*
2. *Operating Systems: Deitel, Deitel and Choffnes,3<sup>rd</sup> Edition, Pearson Education,2004*
3. *Operating System Concepts: Silberschatz,6<sup>th</sup> Edition, John Wiley and Sons,2003*
4. *Modern Operating Systems(2<sup>nd</sup> Edition): Andrew Tanenbaum, Pearson publications*
5. *Operating Systems: Design and Implementation, Third Edition with Albert S. Woodhull*

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	16-06-08	10:00- 11:00AM	1	Introduction	Software and Hardware, Operating System Strategies.
2	18-06-08	09:00- 10:00AM	2,3	Using The Operating System	The Programmer's Abstract machine, Resources,Processes and Threads,Writing Concurrent Programs
3	19-06-08	11:00- 12:00AM	3,4	Operating system organization, Device Management	Objects, I/O system, Device class Characteristics
4	23-06-08	10:00- 11:00AM	4	Memory Management	Modern memory Manager Strategies
5	25-06-08	09:00- 10:00AM	5	File Management	File implementations, Abstractions
6	26-06-08	10.00- 11.00AM	5	File Management	Abstract Machine Interface,The process Abstraction

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**Paper-3**  
**Subject : Software Engineering**

**Texts books(TB):**

1. Ian Sommerville, - “Software Engineering” - Pearson Education Asia.
2. Pressman R. S., - “Software Engineering” - McGraw Hill
3. Jalote P., - “An Integrated approach to Software Engineering”- Narosa
4. Shari Lawrence Pfleeger, - “Software Engineering Theory and Practice”- Pearson Education Asia.
5. Mall R, - “Fundamentals of Software Engineering” - Prentice Hall of India.

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	16-6-08	11:00-12:00	1	<b>Introduction</b>	<b>Introduction:</b> FAQ’s about software Engineering, Professional and ethical responsibility. <b>Computer based system engineering:</b> System modeling, System engineering process
2	18-6-08	10:00-11:00	2	<b>Requirements Engineering</b>	<b>Software processes:</b> Software process models, Process iteration, Software specification, Software design and implementation, Software validation, Software evolution, Automated process support <b>Software requirements:</b> Functional and non-functional requirements, User requirements, System requirements, Software requirement specification <b>Requirements engineering processes:</b> Feasibility studies, Requirements elicitation, Requirements analysis, Communicating requirements, Requirements validation, Requirements management
3	20-6-08	9:00-10:00	3	<b>Software Prototyping</b>	<b>System models:</b> Context models, Behavioral models, Data models, Object models, CASE workbenches <b>Software Prototyping:</b> Prototyping in the software process, Rapid prototyping, User interface prototyping <b>Formal Specification:</b> Formal specification in the software process, Interface specification, Behavioral specification
4	23-6-08	11:00-12:00	3	<b>Software Design</b>	<b>Architectural design:</b> System structuring, Control models, Modular decomposition, Domain specific architectures <b>Distributed systems architecture:</b> Multiprocessor architectures, Client-server architectures, Domain-specific architectures
5	25-6-08	10:00-11:00	4	<b>Software Design</b>	<b>Object-oriented design:</b> Objects and object classes, An object oriented design approach, Design evolution <b>Real-time software design:</b> System design, Real time executives, Monitoring and control systems
6	27-6-08	9:00-10:00	4	<b>Software Design</b>	<b>Design reuse:</b> Component based development, Application families, Design patterns <b>User interface design:</b> User interface design principles, User interaction, Information presentation, User support, Interface evaluation

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**Paper-4(Elective-I a)**  
**Subject : System Simulation & Modeling**

**Texts books(TB):**

1. Jerry Banks, John S. Carson, Barry L. Nelson, David M. Nicol, “Discrete-Event System Simulation”, Third Edition, Prentice-Hall India
2. Averill M. Law, W. David Kelton, “Simulation Modeling and Analysis”, Third Edition, McGraw-Hill.
3. Geoffrey Gordon, “System Simulation”, Second Edition, Prentice-Hall India.
4. Jerry Banks, John S. Carson, Barry L. Nelson, David M. Nicol – Event System Simulation (3<sup>rd</sup> Edition)
5. An Introduction to System Simulation : Books : Howard T. Odum, Elisabeth C. Odum

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	17-6-08	9:00-10:00	1	Introduction To Simulation	7. When Simulation is the Appropriate Tool; When Simulation Is Not Appropriate; Advantages and Disadvantages of Simulation; Areas of Application; Systems and System Environment; Components of a System; Discrete and Continuous Systems; Model of a System; Types of Models; Discrete-Event System Simulation; Steps in a Simulation Study.
			2	Simulation Examples	1. Characteristics of Queuing Systems; Queuing Notation
2	18-6-08	11:00-12:00	2	Simulation Examples	2. Simulation of Queuing Systems; Simulation of Inventory Systems.
3	20-6-08	10:00-11:00	3	General Principles:	3. Concepts in Discrete-Event Simulation: The Event-Scheduling / Time-Advance Algorithm, World Views, Manual simulation Using Event Scheduling.
4	24-6-08	9:00-10:00	4	Random-Number Generation:	4. Properties of Random Numbers; Generation of Pseudo-Random Numbers; Techniques for Generating Random Numbers; Tests for Random Numbers.
5	25-6-08	11:00-12:00	4	Random-Number Generation	5. Tests for Random Numbers (contd..)
			5	Random-Variate Generation:	5. Inverse Transform technique: Exponential Distribution, Uniform Distribution
6	27-6-08	10:00-11:00	5	Random-Variate Generation:	6. Discrete Distributions; Acceptance-Rejection Technique: Poisson Distribution.

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**Paper-4(Elective-I b)**  
**Subject : Multimedia Systems (ITCS142)**

**Texts books(TB):**

1. Ralf Steinmetz, Klara Narstedt, "Multimedia Fundamentals: Vol 1-Media Coding and Content Processing", Pearson Education, 2004.
2. Prabhat K. Andleigh, Kiran Thakrar, "Multimedia Systems Design", PHI, 2004.
3. Fred Halsall, "Multimedia Communications, applications, networks, protocols, and standards", Pearson Education, 2002.

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	17-06-08	9:00-10:00	1	Media and Data Streams	Media: Perception Media, Representation Media, Presentation Media, Storage Media, Transmission Media, Information Exchange Media, Presentation Spaces & Values, and Presentation Dimensions; Key Properties of a multimedia system.
2	18-06-08	11:00-12:00	2	Multimedia System	Discrete & Continuous Media, Independence Media, Computer Controlled Systems, Integration; Characterizing Data Streams: Asynchronous Transmission Mode, Synchronous Transmission Mode, Isochronous Transmission Mode; Characterizing Continuous Media Data Streams.
3	20-06-08	10:00-11:00	3	Audio Technology	Sound: Frequency, Amplitude, Sound Perception and Psychoacoustics; Audio Representation on Computers; Three Dimensional Sound Projection;
4	24-06-08	9:00-10:00	4	Music and MIDI Standards	Speech Signals; Speech Output; Speech Input; Speech Transmission.
5	25-06-08	11:00-12:00	5	Graphics and Images	Capturing Graphics and Images Computer Assisted Graphics , Graphics and Image Processing;
6	27-06-08	10:00-11:00	5	Graphics and Images	Reconstructing Images; Graphics and Image Output Options.

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**Paper-5(Elective-II a)**  
**Subject: Object oriented Analysis and design using UML**

**Text books (TB):**

1. Grady Booch, James Rumbaugh, Ivar Jacobson. 'The Unified Modeling Language User Guide, Pearson Education 2002.
2. Ian Sommerville, 'Software Engineering Sixth Edition' 2003.
3. Meilir Page Jones, ' Fundamentals of Object Oriented Design in UML' , Addison Wesley, 2000
4. James J. Odell by James J. Odell. *Object-Oriented Analysis and Design Using UML*
5. *Agile Software Development, Principles, Patterns, and Practices* by Robert C. Martin

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	17-6-08	10:00-11:00	1	Object oriented Design and Modeling	Object oriented fundamentals, object and object classes, object oriented design process, importance of modeling, principles of modeling, and object oriented modeling.
2	19-6-08	9:00-10:00	2	Introduction to UML	Conceptual model of UML, building blocks of UML, Mechanisms in UML, architecture, software development life cycle.
3	20-6-08	11:00-12:00	3	Classes and Objects	Basic Structural Modeling Classes, relationships, common mechanisms, class and object diagrams.
4	24-6-08	10:00-11:00	4	Advanced structural Modeling	Advanced classes, advanced relationships, Interfaces types and roles.
5	26-6-08	9:00-10:00	4	Advanced structural Modeling	Packages, instances and object diagrams
6	27-6-08	11:00-12:00	5	Sequence Diagrams	Terms and concepts in sequence diagrams

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**Paper-5(Elective-II b)**  
**Subject : COMPILER DESIGN**

**Text Books:**

1. *Compiler Construction Principles & Practice* By Kenneth C Louden, International Student Edition, 2003, Vikas Publishing.
2. *Compilers Principles Techniques & Tools* By A V Aho, Ravi Sethi & J D Ullman
3. *Engineering a compiler* by Keith, D Cooper & Linda Torezon, Margan Kafmann publishers, First Indian reprint 2004
4. *The Essence of Compilers* by Robin Hunter, Pearson Education, First Indian Reprint 2004
5. *The Art of Compiler Design: Theory and Practice* by Thomas Pittman and James Peters.

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	17-06-08	10:00-11:00	1	Introduction to Compilers	Introduction to Compilers, Overview of Compilers, Why Compilers? A brief History, Program Related to Compilers, The Translation Process, Major data structures in a Compiler, Other issues in compiler structure, Bootstrapping and porting, Compiler Construction Tools.
2	19-06-08	09:00-10:00	2	Lexical Analysis	The Role of the Lexical analyser, The scanning process, regular expressions, Finite Automata, From regular expressions to DFA's, Design of a Lexical Analyser generator, Use of Lex to generate a Scanner Automaticall
3	20-06-08	11:00-12:00	3	Syntax Analysis	The role of parser, The parsing process, Context-free grammars, parse tree and Abstract syntax trees, Ambiguity, External Notations, EBNF and syntax diagrams, Formal properties of context-free languages, The parser Generator.
4	24-06-08	10:00-11:00	4	Top-Down parsing	Top Down parsing by Recursive Descent, LL(1) parsing
5	26-06-08	09:00-10:00	4	Top-Down parsing	First and Follow sets, Error-recovery in Top Down parsers
6	27-06-08	11:00-12:00	5	Bottom-Up Parsing	Overview of Bottom-Up parsing, Finite Automata of LR(0) Items and LR(0) Parsing, SLR(1) parsing

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**Lab Experiments**  
**OOAD using UML**

1. Given an STUDENT class containing data members Student Name, Reg.no, Class and Mark and member functions get name (), get Number () and get mark (), Draw a Class diagram assuming that the student class has two derived classes BE and ME.
2. Draw a class diagram to show polymorphism as an example using a class called VEHICLE.
3. Design a sequence diagram for an ATM transaction.
4. Design a waterfall model of SDLC using appropriate functions in UML tool.
5. Design a use case diagram for a restaurant system.
6. Design an Object model of a Banking system.
7. Design a state chart diagram of operations depicting the use of a microwave oven.
8. Given an EMPLOYEE class containing data members: Employee Number Employee Name, Basic, DA, IT, Net Sal, member functions: to read data, to calculate Net salary and to print output, Design a flow chart for computing net salary for N employee.
9. Design a class diagram to depict Single inheritance and multiple inheritance taking Restaurant booking as an example.
10. Design an Organization chart for a Software company(XXX) having the hierarchy CEO, Directors, Business unit head, Group managers, Project Managers, Project leaders, Senior Software engineer, Software Engineer.
11. Model a physical database of college database.
12. Design a UML Model diagram of a Super market.
13. Draw diagrams to show Initial and final states.
14. Draw diagrams to show transition and self transitions.
15. Draw diagrams to show association and aggregation.

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