GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY
KASHMERE GATE, DELHI
Bachelor / Master of Technology (Dual Degree)
Information Technology

Fifth Semester

Fifth Semester					
Code	Paper ID	Paper	L	T/P	C
IT305	15301	Computer Architecture	3	1	4
IT307	15307	Digital Signal Processing	3	1	4
IT309	15309	Object Oriented Software Engineering	3	1	4
IT313	15313	Communication Systems	3	1	4
IT315	15315	Linux and Win32 Programming	3	1	4
IT317	15317	Operating Systems	3	1	4
Practicals					
IT353	15353	Digital Signal Processing Lab.		2	1
IT359	15359	Object Oriented Software Engineering Lab.		2	1
IT361	15361	Linux and Win32 Programming Lab.		2	1
IT357*	15357	Summer Training (Conducted at the end of the 4th Semester) Report, Seminar and Viva - Voce			1
Total			18	12	28

*NUES

FIFTH SEMESTER

Code: IT 305   L:3 T/P:1 C: 4
Paper ID: 15305   **Paper: Computer Architecture**

Unit I
Computer Arithmetic and Register transfer language:
Unsigned notation, signed notation, binary coded decimal, floating point numbers, **IEEE 754 floating point standard**, Micro-operation, Bus and Memory Transfers, Bus Architecture, Bus Arbitration, Arithmetic Logic, Shift Micro operation, Arithmetic Logic Shift Unit.

Unit II
Instruction set architecture & computer organization
Levels of programming languages, assembly language instructions, **8085 instruction set architecture**, Instruction Codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycle, Memory Reference Instructions, Input-Output and Interrupts

Unit III
Control Design:
Instruction sequencing & interpretation, Hardwired & Micro Programmed (Control Unit), Micrprogrammed computers, Micro coded CPU: Pentium processor
CPU Design
Specifying a CPU, Design & implementation of simple CPU, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, **Internal architecture of 8085 microprocessor**.

Unit IV
Memory organization
Memory Technology, Main Memory (RAM and ROM Chips), Virtual memory, High-speed memories
Input/Output organization
Asynchronous Data Transfers, Programmed I/O, interrupts, Direct memory Access, Serial communication, UARTs, **RS-232-C & RS-422** standard

Text:
1.   J. D. Carpinelli, "Computer Systems Organization and Architecture", Pearson Education, 2006.
2.   J. P. Hayes, "Computer Architecture and Organization", McGraw Hill, 1988.
Reference:
1.   J. L Hennessy and D. A. Patterson, "Computer Architecture: A quantitative approach", Morgon Kauffman, 1992.
2.   W. Stallings, "Computer organization and Architecture", PHI, 7th ed, 2005.
3.   B. Parhami, "Computer Architecture: From Microprocessors to Supercomputers", Oxford University press, 2006.

Code: IT 307   **L:3 T/P:1 C: 4**
PaperID: 15307   **Paper : Digital Signal Processing**

Unit I
Signals and signal Processing: Characterization & classification of signals, typical Signal Processing operations, example of typical signals, typical Signals Processing applications.

Time Domain Representation of Signals & Systems: Discrete Time Signals, Operations on Sequences, the sampling process, Discrete-Time systems, Time-Domain characterization of LTI Discrete-Time systems.

Unit II
Transform-Domain Representation of Signals: Discrete Fourier Transform (DFT), DFT properties, computation of the DFT of real sequences, Linear Convolution using the DFT. Z-transforms, Inverse z-transform, properties of z-transform.

Unit III
Computation of the Discrete Fourier Transform: Computational complexity of the direct computation of the DFT, different approaches for reducing the computations, Decimation-in-Time FFT algorithms, Decimation-in-frequency FFT algorithms.

Unit IV
Digital Filter Structure: Block Diagram representation, Signal Flow Graph Representation, Signal Flow Graph Representation, FIR Digital Filter Structure, IIR Filter Structures, Parallel all pass realization of IIR Filter design based on Frequency Sampling approach.

Text / Reference:
1.   A. Y. Oppenhein and R. W. Schater, "Digital Signal Processing", PHI 1975.
2.   Sanjit K. Mitra, "Digital Signal Processing: A Computer based approach", TMH, 2005.
3.   J. G. Proakis and D.G. Manolakis, "Digital Signal Processing, Principals, Algorithms, and Applications", Pearson Education, 4th ed., 2007.
4.   A. Y. Oppenhein, R. W. Schater and J. R. Buck, "Discrete Time Signal Processing", PHI 1999

Code No.: IT 309   **L:3 T/P:1 C: 4**
PaperID: 15309   **Paper: Object Oriented Software Engineering**

Unit I
Introduction to Software Engineering: Software Engineering Development, Software Life Cycle Models, Standards for developing life cycle models.

Object Methodology & Requirement Elicitation: Introduction to object Oriented Methodology, Overview of Requirements Elicitation, Requirements Model-Action & Use cases, Requirements Elicitation Activities, Managing Requirements Elicitation.

Unit II
Architecture: Model Architecture, Requirements Model, Analysis Model, Design Model, Implementation Model, Test Model

Unit III
Modeling with UMLZ: Basic Building Blocks of UML, A conceptual Model of UML, Basic Structural Modeling , UML Diagram
System Design: Design concepts & activities, Design Models, Block design, Testing

Unit IV
Testing Object Oriented Systems: Introduction, Testing Activities & Techniques, The Testing Process, Managing Testing

Case Studies

Text Books:

1. I. Jacobson, "Object-Oriented Software Engineering: A Use Case Driven Approach", Pearson, 1992
2. B. Breugge and A. H. Dutoit, "Object Oriented Software Engineering: Using UML, Patterns, and Java", Prentice Hall, 2004.
3. G. Booch, J. Rumbaugh and I. Jacboson, "The Unified Modeling Language User Guide" Addison-Wesley, 2005

Code No.: IT 313   **L:3 T/P:1 C: 4**
Paper ID: 15313   **Paper: Communication Systems**

Unit I
Classification of signals & systems, Fourier Series, Fourier transforms and their applications to system analysis. Representations of random signals, Concept of Probability, Probability distribution Function, Probability density Function, Gaussian, Binomial, Raleigh and Poisson's distribution, Random Process, Correlation Function, Power Spectral Density, Response of Linear systems to random signals. Gaussian distribution, Central Limit theorem, Ergodicity, co-variance.

Unit II
Concepts of Modulation, Various Analog modulation and demodulation techniques (AM, FM, PM). Multiplexing,

Unit III
Analog to Digital Conversion, Various pulse modulation techniques (PAM, PPM, PWM & PCM). Delta Modulation.

Unit IV
Introduction to Information Theory & Noise: Introduction, Noise its sources, mathematical representation of noise, noise temperature, S/N ratio & Noise figure. Measure of Information, Channel Capacity, Bandwidth S/N trade off.

Text:
1. W. Tomasi, "Electronic communications systems(baics through advanced)", Pearson Education, 2th ed, 2004.
2. H. Taub and D. L. Schilling, "Principles of Communication Systems", TMH, 1992.

Reference:
1. J. C. Hancock, "An Introduction to the Principles of Communication Theory", McGraw Hill, 1961.
2. S. Haykins, "Introduction to Analog and Digital Communication", Wiley, 1986.
3. G. Kennedy and B. Davis, "Electronic communication systems", TMH, 1993.
4. J. G. Proakis, M. S.alehi, "Communications Systems Engineering", PHI, 2nd ed, 2002.
5. D. Roddy and J. Coolen, "Electronic Communications", PHI, 1995.
6. S. Haykins, "Communication Systems", Wiley, 2001.

Code: IT 315   **L:3 T/P:1 C: 4**
Paper ID: 15315   **Paper: Linux & Win32 Programming**

Linux:
Unit I
Linux overview, Compiler options, libraries, make, file system objects, error handling, I/O, file locking, manageing files, directory management, temporary files and cleanup, command line processing.
Unit II
UserID, password and group management; signals, and signal handling, process management, fork and exec, regular expression, IPC, message queues, semaphores, shared memory, memory mapped files, Introduction to X-Windows.

Win32:

Unit III
Windows environment, Windows programming options, Windows and messages, text, controls, keyboard management, Mouse management, Timer, Child window controls, Menus and other resources, Dialog boxes, Clipboard management

Unit IV
GDI, Printer management, Bitmaps and Bitblts, Device Independent Bitmaps, Palette manager, Metafiles, Multiple Document Interface, Introduction to MFC.

Text:
1. K. Wall, M. Watson, and M. Whitis, " Linux Programming Unleashed", SAMS, 1999.
2. C. Petzold, "Programming Windows: The definitive guide to Win32 API", Microsoft Press, 5th Eds., 1998.

Code No.: IT 317   **L:3 T/P:1 C: 4**
Paper ID: 15317   **Paper: Operating System**

Unit I.
Introduction to the Operating System

Types of OS: Batch System, Time Sharing System, Real Time System, Multiuser/Single User System

Functions of Operating System: Process Management, Memory Management, File Management, I/O Devices Management, Information Management.

Process Management : Process concepts, Process State, Process Control Block, Process Scheduling, Context Switch, CPU Scheduling, Scheduling Criteria, Scheduling Algorithms, Pre Emptive/ Non Preemptive Scheduling, Threads, Thread Structure.

Unit II
Process Synchronisation: Critical Section Problem, Race Condition, Synchronisation Hardware, Semaphores, Classical Problems of Synchronisation.

Dead Locks: Characterisation, Methods for Handling Deadlocks Avoidance, Recovery and Detection.

Unit III
Memory Management: Contiguous Allocation, External Internal Fragmentation, Paging, Segmentation, Segmentation with Paging.

Unit IV
Virtual Memory: Virtual Memory Concepts, Access Methods, Directory Structure, allocation Methods; Contiguous Allocation, Linked Allocation, Indexed Allocation Free Space Management.

Device Management: dist Structure, Disk Scheduling Algorithms, Disk Management, Case study on DOS, Windows 2000, Windows XP, Linux.

Text:
1.   Silbershatz and Galvin, "Operating Systems Concepts", Addition Weseley, 2002
2.   Flynn, Mchoes, "Understanding Operating System", Thomson Press, Third Edition, 2003
3.   Godbole Ahyut, "Operating System", PHI, 2003

References:
1.   Charles Crowley, "Operating Systems, Tata Mcgraw-Hill Edition.
2.   A.S. Tannenbaum, "Operating System Concepts", Addition Weseley, 2002