BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FOURTH SEMESTER

PAPER CODE: C-402

Operating System

UNIT-I

Introduction: What is an operating system, Simple Batch Systems, Multi, programmed Batch systems, Time, Sharing Systems, Personal, Computer Systems, Parallel systems, Distributed systems, Real, Time Systems. **Process Management:** Process Concept, Process Scheduling, Cooperating Processes, Threads, Interprocess Communication, CPU Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling.

UNIT-II

Process Synchronization and Deadlocks: The Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Critical Regions, Monitors, **Deadlocks:** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock .

UNIT-III

Memory Management: Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with Paging, Virtual Memory, Demand Paging and its performance, Page Replacement Algorithms, Allocation of Frames, Thrashing, Page Size and other considerations, Demand Segmentation.

UNIT-IV

File Management: File Systems, Secondary Storage Structure, File concept, Access methods, Directory implementation, Efficiency and performance, Recovery.

UNIT-V

Disk Management: Disk Structure, Disk scheduling, Disk scheduling algorithm: FCFS, SSTF, SCAN, Recovery, Swap-Space Management, Disk Reliability.

Suggested Books:

1. Silber sachatz and Galvin, “Operating System Concepts”, Person, 5th Ed. 2001
2. Madnick E., Donovan J., “Operating Systems:, Tata McGraw Hill, 2001

BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FOURTH SEMESTER

PAPERCODE: C- 403

Cloud Computing

UNIT I

Introduction: Introduction to Cloud Computing, Definition of Cloud , Evolution of Cloud Computing, Underlying Principles of Parallel and Distributed Computing ,Cloud Characteristics, Elasticity in Cloud, On-demand Provisioning.

UNIT II

Cloud enabling technologies: Service Oriented Architecture , Basics of Virtualization, Types of Virtualization, Implementation Levels of Virtualization ,Virtualization Structures ,Tools and Mechanisms, Virtualization of CPU, Memory – I/O Devices , Virtualization Support and Disaster Recovery

UNIT III

Cloud architecture, services and storage: Layered Cloud Architecture Design ,Cloud Architecture ,Public, Private and Hybrid Clouds ,IaaS ,PaaS ,SaaS ,Architectural Design Challenges ,Cloud Storage: Storage as-a-Service, Advantages of Cloud Storage ,Cloud Storage Providers – S3.

UNIT IV

Resource management and security in cloud: Inter Cloud Resource Management, Resource Provisioning and Resource Provisioning Methods ,Security Overview ,Cloud Security Challenges, Software-as-a Service Security ,Security Governance

UNIT V

Cloud technologies and advancements: Hadoop , Map Reduce ,Virtual Box ,Google App Engine – Programming Environment for Google App Engine

Suggested Books:

1. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, —Mastering Cloud Computing, Tata Mcgraw Hill, 2013.

2. Rittinghouse, John W., and James F. Ransome, —Cloud Computing: Implementation, Management and Security, CRC Press, 2017.

BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FOURTH SEMESTER

COURSE CODE: C-404

Computer Organization and Architecture

UNIT I

Computer Evolution: Brief history of Computer, Classification of Computer, Structure of a Computer System, Arithmetic Logic Unit, Control Unit, Von Neumann Architecture. Integer Addition and Subtraction ,Floating point representation., Signed numbers, Binary Arithmetic, 1's and 2's Complements , Booths Algorithm, Hardware Implementation, IEEE Standards, Floating Point Arithmetic , The accumulator, Shifts, Carry and Overflow. Instruction Characteristics, CPU with Single BUS, Types of Operands, Types of Operations, Addressing Modes, Instruction Formats.

UNIT II

Processor Organization: Parallelism and Computer arithmetic, Computer arithmetic associatively. Floating Point in the 8086, Programmers Model of 8086, Register Organization, 8086 Registers, Instruction Cycles, Addressing Modes.Micro operations, The Instruction cycle, Control of the CPU, Functional Requirements, Single, Two,Three bus structure, Execution of a complete instruction, Branching, Sequencing of Control Signals, Hardwired Control Unit, Micro-Programmed Control.

UNIT III

Memory Organization: Characteristics of Memory Systems, Main Memory, Types of Memory, Memory system considerations, Design of memory subsystem using Static, Dynamic Memory Chips, Memory interleaving **High Speed Memories:** Cache Memory, Structure of cache and main memory, Elements of Cache Design, Mapping functions, Replacement algorithms, External Memory, Virtual memory

UNIT IV

I/O Organization: Input / Output Module: Need, Techniques, Interrupt Driven I/O, Basic concepts of an Interrupt , Response of CPU to an Interrupt, Design Issues, Priorities, Interrupt handling, Types of Interrupts**.** Data Transfer Techniques, Data Memory Access, Buses, Types of buses, I/O Interface, Synchronous and Asynchronous Data Transfer, Serial I/O, Input Devices, Output Devices, Multiprogramming vs. Multiprocessing, Comparison between closely coupled and loosely coupled Multiprocessor

UNIT V

Microprogramming: Basic Principles, Features , Hardwired vs. micro programmed computers, Applications and advantages of microprogramming, Limitations of microprogramming, Computer Clock, Micro Instructions and its Control Path, Microcode, Machine Instruction**.** Parallel Organization, Instruction Set Architecture (ISA), RISC and CISC, Characteristics of CISC, Characteristics of RISC, RISC versus CISC, Vector Processing Requirements and Characteristics of vector processing.

Suggested Books:

1. Computer Organization & Architecture– by Stallings
2. Computer Organization and Architecture: Designing for Performance by William Stallings
3. Computer Architecture and Organization by John Hayes

BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FOURTH SEMESTER

PAPER CODE: C-405

Optimization Techniques

UNIT-I

Basics of operation research (OR): Characteristics of OR, Necessity of OR in industry, OR and decision making, role of computers in OR. Linear Programming: Formulations and graphical solution of (2 variables) canonical and standard terms of linear programming problem.

UNIT-II

Algebraic solution: Simplex methods, Charnes method of penalties, two phase simplex method.

UNIT-III

Transportation Model: Definition, formulation and solution of transportation models, The row, minima, column, minima, matrix, minima and Vogel's approximation methods. Assignment model: Definition of assignment model, comparison with transportation model, formulation and solution of assignment model.

UNIT-IV

Sequencing Problem: Processing of n jobs through 2 machines, processing n jobs through 3 machines, processing 2 jobs through m machines.

UNIT-V

Game Theory: Characteristics of games, maxima, minimax criteria of optimality, dominance property, algebraic and graphical method of solution of solving 2 x 2 games.

Suggested Books:

1. Introduction to Management Science Operations Research,"KantiSwarup".
2. Operations Research Quantitative Techniques For Management,"V. K. Kapoor".
3. Nonlinear Programming: Theory and Algorithms"by Mokhtar S Bazara and C M Shetty".