BACHELOR OF COMPUTER APPLICATION (B.C.A.)
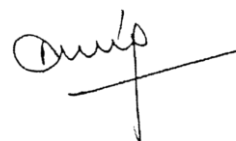# COURSE STRUCTURE
SECOND YEAR

IV SEMESTER

Paper Code	Paper Name	Term Exam Max./Min. Marks	Internal Assessment Max./Min. Marks	Total Max./Min. Marks
C-401	Web Technology with PHP & MySQL	50/20	50/20	100/40
C-402	Operating System	50/20	50/20	100/40
C-403	Cloud Computing	50/20	50/20	100/40
C-404	Computer Organization and Architecture	50/20	50/20	100/40
C-405	Optimization Techniques	50/20	50/20	100/40
C-406	Practical based on above Papers			100/40
Total marks of IV Semester				600/300

BACHELOR OF COMPUTER APPLICATION (B.C.A.)
DETAILED SYLLABUS
FOURTH SEMESTER
PAPER CODE: C-401
Web Technology with PHP & MySQL

UNIT I
PHP: Introduction to PHP Evaluation of PHP, Basic Syntax, Defining variable and constant, PHP Data type, Operator and Expression. Decisions and loop Making Decisions, Doing Repetitive task with looping, Mixing Decisions and looping with Html. Function: Define a function, Call by value and Call by reference, Recursive function, String Creating and accessing, String Searching & Replacing String, Formatting String, String Related Library function.

UNIT II
Array: Anatomy of an Array, Creating index based and Associative array Accessing array, Element Looping with Index based array, Looping with associative array using each () and foreach(),Some useful Library function. Handling Html Form with PHP Capturing Form, Data Dealing with Multi-value filed, and Generating File uploaded form, redirecting a form after submission.

UNIT III
Working with file and Directories: Understanding file& directory, Opening and closing, a file, Coping, renaming and deleting a file, working with directories, Creating and deleting folder, File Uploading & Downloading.
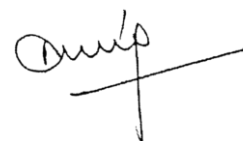
UNIT IV
Session and Cookie: Introduction to Session Control, Session Functionality What is a Cookie, Setting Cookies with PHP. Using Cookies with Sessions, Deleting Cookies, Registering Session variables, Destroying the variables and Session. 8. Database Connectivity with

UNIT V
MySQL: Introduction to RDBMS, Connection with MySQL Database, Performing basic database operation (DML) (Insert, Delete, Update, Select), Setting query parameter, Executing query Join (Cross joins, Inner joins, Outer Joins, Self joins.) Exception Handling Understanding Exception and error, Try, catch, throw. Error tracking and debugging.

Suggested Books:
1. Learning PHP, MySQL, books by "O riley Press".
2. Beginning PHP and MySQL by" W. Jason Gilmore"

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.
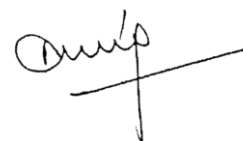
UNIT-IV

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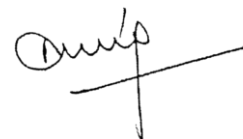
UNIT IV
Resource management and security in cloud: Inter Cloud Resource Management, Resource Provisioning and Resource Provisioning Methods ,Security Overview ,Cloud Security Challenges, Software-as-a Service Security ,Security Governance

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.
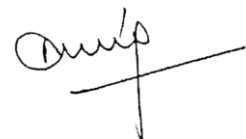
UNIT II
Processor Organization: Parallelism and Computer arithmetic, Computer arithmetic associatively. Floating Point in the 8086, Programmers Model of 8086, Register Organization, 8086 Registers, Instruction Cycles, Addressing Modes.Micro operations, The Instruction cycle, Control of the CPU, Functional 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
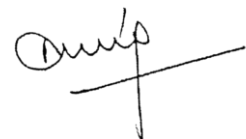
UNIT V

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".