DEPARTMENT OF COMPUTER SCIENCE
ALIGARH MUSLIM UNIVERSITY
ALIGARH, U.P. - 202002
INDIA

SYLLABUS

B. Sc. (Hons.) (Computer Applications)-I Year

COURSE CC-111 : Fundamentals of Information Technology

OBJECTIVES OF THE COURSE

- Obtain understanding of the concepts of Information Technology and its applications.
- Become familiar with the use of Information Technology tools.

NOTE:
1. In all five questions are to be set; atleast one from each unit. 1/3 more sections are to be set for choice within each unit.
2. Laboratory should be an integral part of the course.

Sessional Marks: 10
Exam Marks : 40

UNIT- I

Introduction to Computers: Definition, Capabilities, Limitations, History, Generations and Types of Computers. Block Diagram of the Computer.

Introduction to various functional units of a Computer System: Input unit, Central Processing Unit, Memory, Output Unit. Latest configuration of the PC.

Hardware and Software : Systems and Applications Software, Operating Systems, Programming Languages, General concepts, Features and trends.

Range of Application : Scientific, Business, Educational, Industrial, Banking, Multilingual applications, Use in Modern Society, etc.

Introduction to Data processing: Data and Information.

UNIT- II

Programming Languages : Classification, Machine language, Assembly language, Higher Level languages, Fourth generation languages. Translators.

Operating System : Concept as resource manager and coordinator of processes, devices and memory. Command interpreter. **CUI, GUI**. Typical commands of DOS/Windows. Boot Process, in IBM PC.

UNIT-III

Introduction to Office Automation Tools using Windows : Introduction to MS-Office : MS-Word, MS -Power Point, MS- Excel.

UNIT-IV **Introduction to Databases and DBMS, Business Files** : Concept Of Character, Field, Record And File. Types Of Data Files **:** Master File, Transaction File, Archival File. SQL Statements, Developing simple database applications using MySQL/Access.

UNIT-V ***Computers and Communication***: Single user and multi-user systems, Computer networks: LAN, WAN. **Internet,** WWW, Network topologies, Simple Website Development using Basic HTML.

Books :

Text Books :

1. Computer Fundamentals – P.K.Sinha and Preeti Sinha, B.P.B.
2 Fundamentals of Information Technology. Dr. Mohd. Ubaidullah Bokhari, et.al; Dhanpat Rai Publication.
3. Fundamental of Computers - V. Rajaraman, PHI.
4. Schaum's Outline Series : Theory and Problems of Data Processing- Lipshutz and Lipschutz.
5. Introduction to Information Technology-V. Rajaraman, PHI

Reference Books :

1. Computers today - Donald Sanders, Mc. Graw Hill.
2. Computers -Trainer T. , et al, Mc. Graw Hill.
3. DOS - User Manual.

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SYLLABUS

B. Sc. (Hons.) (Computer Applications)-I Year

COURSE CC-112 : Data Structures Using C++

OBJECTIVES OF THE COURSE

- To introduce basic concepts of C++ language, algorithm analysis, data structures, sorting and searching techniques. The learner will be able to determine which data structures and which sorting and searching techniques are appropriate in various situations during program development and will be able to implement them as classes in C++.

NOTE:
1. In all five questions are to be set; atleast one from each unit. 1/3 more sections are to be set for choice within each unit.
2. Laboratory should be an integral part of the course.

Sessional Marks: 10
Exam Marks : 40

UNIT-I **COMPUTER ALGORITHMS:**
Problem analysis, Concept and proper properties of Algorithm. Elementary Algorithm Development, Algorithm involving Decisions and Loops, Introduction to Analysis of Algorithm, Testing of an Algorithm and its Efficiency, flowchart and its Applications, Sketching Flowchart for various problems.

UNIT-II RECURSION, SORTING, SEARCHING, MERGING AND LINEAR DATA STRUCTURE :
Recursive Procedures and Algorithms, Internal Sorting and Searching Algorithms, External Sorting, Merging, Complexities of Sorting and Searching Algorithms. The notion of data structure, Primitive and non-primitive Data Structures, Arrays, Lists, Stacks, Queues, Linked Lists, Algorithms for manipulating data Structures, Polish Notation, Applications of Linear Data Structures.

UNIT-III **NON-LINEAR DATA STRUCTURES :**
Trees, Binary Trees, Operations on binary Trees, Binary tree Traversal, representation and Manipulation of Binary trees, Binary Search Trees, Heap, Graphs and Digraphs, Basic Definitions, Representation and Manipulation of Graphs in Computer, Balancing Trees, Hash Coding. Applications of Non-linear Data Structures.

UNIT-IV **PROGRAMMING WITH C++:**

Overview of C++, Data Types, Storage Classes, operators and Expressions, Console I/O, Control Statements, Arrays and Strings; Storage Classes, Pointers, Functions, Procedures : Call by Value, by reference and name, Formal parameters and Actual parameters. Structures and union, File Handling etc., Programming exercises.

UNIT-V Introduction to Various Programming paradigms: Concept of Structured Programming, its Advantages, Problem Analysis, program Design Method, program Testing and implementation, Pseudo Code, Stepwise.

Refinement, Structured Walkthrough, modular Approach of Program Design : Top Down & Bottom up approaches, Concept of object oriented Programming Paradigm, Characteristic of oops, Objects, Classes Encapsulation, Inheritance. Polymorphism, Benefits of Oop, object oriented Programming in C++ :

Functions (Advance concepts),Classes & objects, constructor & Destructors, Inheritance-Extending class & Polymorphism (Operator & Function overloading).

Programming Exercises in C++ : A graded Sheet of assignments/Problems will be given to the students to develop Algorithms/Flowcharts & Programs In C++.

TEXT BOOKS:

1. How to solve it by Computer
   R.G. Dromey
2. Joan K Hughes, Jay I Michtom.
   A structured Approach to programming (PHI)
3. Horowitz, Fundamentals of programming languages
4. Introduction to data structures with Application by Trembley & Sorenson.
5. Programming with C++ : Schaum Series by Hubbard
6. C++ - A complete reference : Herbert Schildt.
7. Object Oriented Programming with C++ and JAVA by Samanta (PHI)

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SYLLABUS

B. Sc. (Hons.) (Computer Applications)-I Year

COURSE CC-1P2: Practical (MS-DOS/Windows, MS-Office, C++)

OBJECTIVES OF THE COURSE

- To acquire skills of using Operating Systems (like, DOS/Windows/Linux).
- To learn using PC-Packages.
- To learn C programming language.

Pract.Exam/Viva-Voce Marks : 50

Course Content

LAB :

1. Introduction to Operating system Like MS-DOS, WINDOWS

2. Programming Exercises in C (Graded Sheets of Problems)

3. Editing with MS-Word:

4. MS Power Point: Developing Simple Presentations.

5. MS Excel : Spreadsheets Handling for small applications.

6. MS-Access/MySQL: Development of Small Application packages (like Employee Information system, Student Information system, Inventory Control System, Payroll system etc.) using MS-Access/MySQL

7. Website Development using HTML/MySQL

Individual teachers are responsible for assignments related to their theory classes.

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SYLLABUS

B. Sc. (Hons.) (Computer Applications)-II Year

COURSE CC-211: Internet and Web Technology with Java Programming

OBJECTIVES OF THE COURSE

- To introduce the concepts of Web Programming using Java Technologies.

NOTE:
1. In all five questions are to be set; atleast one from each unit. 1/3 more sections are to be set for choice within each unit.
2. Laboratory should be an integral part of the course.

Sessional Marks: 10
Exam Marks : 40

UNIT-I Internet, Growth of Web, Protocol governing the web, security aspects in web, business-oriented approach of effective websites, Introduction to client-server technologies, Distributed Networking technology. Web Pages & Browsers: Types of Web Pages-Static, Dynamic, Active etc., Type of Browsers, Netscape Navigator-Internet Explorer. History of the WEB, Internet, Communicating on the Internet, Internet domain, IP Address, Brief Overview of TCP/IP and its services World Wide Web (WWW), WWW attributes, Web Client and Web Server, Web sites, Web Addresses and Web Pages, Hypertext Transfer Protocol (HTTP), Internet Services: Connecting PC to Internet, E-mail, Search Engine, Usenet and News group, FTP, Video conferencing, Chat, TELNET, Information Retrieval, Browsers, Search engines : Netscape Navigator, Microsoft Internet Explorer, Mosaic, Gopher etc.

UNIT- II Introduction to Java Programming : **Introduction, Operator, Data types, Variables, Methods & classes, Multithreaded Programming, I/O, Java Applets.**

UNIT-III Web creation & the Markup Languages : Hypertext & HTML, HTML document feature, Documents structuring Tags in HTML, Special Tags in HTML, Creating Dynamic Webpages using DHTML.
XML: Introduction, Displaying an XML Document, Data Interchange with an XML document, Document type definition, Parsers using XML, Developing Websites using HTML/Dream Weaver/PHP, creating animations using FLASH, Introduction to WML & WAP.

UNIT-IV Dynamic Functionality in Web pages: Common Gate Way Interface (CGI), Perl, Java Script, Dynamic page functionality using Java Serverlets & JSPs, ASP.NET, ActiveX Controls, Applets.

UNIT-V **JavaScript :** Scripting, Client side Scripting, Introduction to JavaScript, Advantages of JavaScript, Web Pages, Hierarchy mode: JavaScript vs Java, Declaration and Expressions, Control Structures and Functions, Properties, Methods Events in JavaScript, Design of interactive Forms, Layers, Image Handling. Objects in JavaScript : Array Object, Date Object, Math Object, String Object. Introduction to Middleware Architecture : CORBA, RMI, COM & DCOM.

Text Books :

1. Internet and Web Technology	S Raj Kamal, TMH, New Delhi 3rd Edition, PHI
2. Web Technology	A.S Godbole & A. Kahate TMH, New Delhi

References :

1. Burdman, "Collaborative Web Development", Addision Wesley.
2. Sharma & Sharma "Developing E-Commerce Sites", Addision Wesley.
3. Ivan Bayross, "Web Technologies Part II", BPB Publications.
4. Shishir Gundavarma, "CGI Programming on the Word Wide Web", O' Reilly & Associate.
5. Don Box, "Essential COM", Addision Wesley.
6. Greg Buczek, "ASP Developer's Guide", TMH

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SYLLABUS

B. Sc. (Hons.) (Computer Applications)-II Year

COURSE CC-212 : Database Management System Using Oracle

OBJECTIVES OF THE COURSE

- To introduce the concepts of DBMS and Oracle.

NOTE:
1. In all five questions are to be set; atleast one from each unit. 1/3 more sections are to be set for choice within each unit.
2. Laboratory should be an integral part of the course.

Sessional Marks : 10
Exam Marks : 40

UNIT-I **Introduction and Conceptual Modeling:**
Basic Concepts
Database & Database Users
Characteristics of the Database
Database Systems. Concepts & Architecture
Date Models, Schemas & Instances
DBMS Architecture & Data Independence
Data Base Languages & Interfaces
Data Modeling using the Entity-Relationship Approach

UNIT-II **Relational Models:**
Relational Model Concepts
Relational Data Model
Relational Model Constraints
Relational Algebra
SQL - A Relational Database Language
Data Definition in SQL
Data Manipulation in SQL
View & Queries in SQL
Specifying Constraints & Indexes in SQL

UNIT-III **Relational Database Design:**
Function Dependencies & Normalization for Relational Databases
Functional Dependencies
Normal forms based on primary keys
(INF, 2NF, 3NF & BCNF)
Loss less join & Dependency preserving decomposition

UNIT-IV **Transaction Processing Concepts:**
Concurrency Control & Recovery Techniques
Concurrency Control Techniques
Locking Techniques
Time stamp ordering
Granularity of Data items
Recovery Techniques
Recovery concepts
Database backup and recovery from catastrophic failures.

UNIT-V **A Relational Database Management Systems**
ORACLE/INGRES:
Introduction to Oracle, Oracle database structure, Oracle Processes.
Introduction to PL/SQL, PL/SQL data types, PL/SQL environment, PL/SQL syntax.
Cursors, Use of cursors, Type of cursors.
DATABASE TRIGGERS : Introduction, Use of Database Triggers, Type of Triggers.
Design and Development of information system using Oracle.
Like : Library Management System, Student Management System, Payroll Management System and Stock Management System.

References
Text Books:

- Date, C. J., "Introduction to Database Systems".
- Desai, B., " An Introduction to Database Concepts."
- Elmmsari and Navathe, " Fundamentals of Database Systems."
- Hansen and Hansen, " Database Management and Design."
- Henry F. Korth, A. Silberschatz, Sudershan, "Database System Concepts."
- Ullman, J.D., " Principals of Database Systems."
- Ivan Bayross, "SQL,PL/SQL"

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SYLLABUS

B. Sc. (Hons.) (Computer Applications)-II Year

COURSE CC-2P2: Practical (Oracle, Developer 2000, Java, Javascript etc.)

OBJECTIVES OF THE COURSE

- To learn developing application softwares.

Pract. Exam/Viva-Voce Marks: 50

Course Content

LAB :

1. Oracle, Developer 2000/VB
2. Java Script, Java, J2EE Platform,
3. HTML, DHTML, VB Script etc.

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SYLLABUS

B. Sc. (Hons.) (Computer Applications)-III Year

COURSE CC-311: Operating System and System Programming

OBJECTIVES OF THE COURSE

- To introduce the basic concepts of Operating System & System Programming.

NOTE: 1. In all five questions are to be set; atleast one from each unit. 1/3 more sections are to be set for choice within each unit.

Sessional Marks : 10
Exam Marks : 40

UNIT-I Introduction to Software Processor, Interactive Computing and Program Development, Interpreters, elements of Assembly Language Programming, Overview of assembly Process, Single pass assembler, Design of Two pass Assembler, Loader and linkage Editors.

UNIT-II Compiler, Aspect of Compilation, Overview of Compilation Process, Programming Language grammar Scanning, Parsing, Compilation of expressions.

UNIT-III Operating System and its function, Interaction of operating system with hardware and user programs. Evolution of operating system, Batch Processing, Multiprogramming and time sharing Operating System.

UNIT-IV Introduction to various memory management techniques. Introduction to various scheduling techniques.

UNIT-V Introduction to UNIX, scheduler, Swapping, UNIX Shell, UNIX files System. Various components of DOS, Directory Structure of DOS, Internal External Command of DOS, BIOS.

Text Book: System Programming & Operating System by D.M. Dhamdhere

Reference Book :

1. System Programming by J.J. Donovan
2. Operating System by Milan Milenkovic
3. Compiler Writing by J.P. Tremblay & P. G. Sorenson
4. Explaining UNIX System by S.G. Kochan & P. G. Wood
5. MS-DOS book by R. R. King

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SYLLABUS

B. Sc. (Hons.) (Computer Application) - III Year

COURSE CC-312: Analysis and Design of Information System

Sessional Marks : 10
Exam Marks : 40

NOTE : In all five questions are to be set; at least one from each unit. 1/3 more sections are to be set for choice within each unit.

UNIT-I System concept, Data, information, formal versus informal information, information attributes, Data operations, Organisation perceived as a system. Information requirements for Organisation, Management requirements, planning, controlling, decision-making, programmed decision making non-programmed decision making. Design making requirement, operations requirements.

UNIT-II System Development Life Cycle, Information Sources And Gathering Methods, Interviewing Techniques, System Requirement Specifications, Questionnaires, Modularizing Requirements Specifications. Deciding On Project Goals.

UNIT-III Data Flow Diagrams, Developing A Proposal: Feasibility Study And Cost Estimation: Cost-Benefit Analysis, Pay Back Period. Feasibility Study Report.

UNIT-IV Role & Task of a System Analyst, Attributes of a System Analyst, Tools used by System Analyst, Input, Output And Controls. User Interface, Design Guidelines, Control, Forms, Programs And Procedure.

UNIT-V System Implementation & Testing: Making The System Operational: Systems Implementation, Conversion And Support,Testing, System Conversion, Follow-Up To Implementation.

References :

1. Haryszkiewycz, I.T., "Introduction of Systems Analysis and Design", Prentice Hall of India, 1989.
2. Rajarman, V., "Analysis and Design of Information Systems", Prentice Hall of India, 1989.
3. Senn, J.A., "Analysis and Design of Information Systems", Tata Mc-Graw Hill Book Company, 1986.
4. Whiten, J.K.,Bentley,L.D.,Beslow,V.M.,"Systems Analysis and Design Methods", Galgotia Publications Pvt. Ltd., 1994.
5. Booch, G., "Object Oriented Analysis and Design", 2nd Edition, Benjamin/Cummins Publishing Co .Redwood City, Ca,U.S.A., 1994.
6. Rebecca Wirfs-Brock, et.al, Designing Object Oriented Software", Prentice Hall of India, 1996.
7. Rumbaugh.J., Et al "Object Oriented Modelling and Design", Prentice Hall of India, New Delhi, 1991.

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SYLLABUS

B. Sc. (Hons.) (Computer Applications)-III Year

COURSE CC-313 : Data Communication & Computer Networks

OBJECTIVES OF THE COURSE

- To introduce the basic concepts of Data Communication and Computer Networks.

NOTE:
1. In all five questions are to be set; atleast one from each unit. 1/3 more sections are to be set for choice within each unit.
2. Laboratory should be an integral part of the course.

Sessional Marks: 10
Exam Marks : 40

UNIT-I Introduction to Networks: Computer Network, Network goals and uses, Network Topologies, Switching: Message, Circuit and Packet switching, Client Server and peer to peer networks, Introduction to standard organizations and OSI models, Layers of OSI model.

UNIT-II Internetworking with TCP/IP, TCP/IP Protocols: TCP, UDP&IP, IP-Addresses, Transmission media: Magnetic media, Twisted pair, Coaxial cables, Fiber Optics etc. Radio and Microwave transmission, Satellite Communication, Routers, Bridges, Gateways etc.

UNIT-III Introduction to Data communication: Fundamentals of data transmission, Channel speed and bit rates, Bandwidth, digital and analog signals, Asynchronous and Synchronous Transmission, Encoding, Error Detection and Corrections, Modulation, Multiplexing, TDM, FDM and STDM, Terminal handling-polling techniques.

UNIT-IV Local Area Networks: Introduction to LAN, Primary attributes of LAN, LAN Standards Introduction to Internet, Email.

UNIT-V Work experience on LAN e.g.: Novel Netware/ Windows 2000 Professional/UnixWare etc.

Books:

- "Computer Networks". By Tanenbaum (PHI).
- "Data Communication and Network" By B. Forouzan (TMH).
- "Computer Networking By Kurose" By J. F., Ross, K.W (Pearson India).
- "Data and Computer Communication" By Stallings, W. (PHI).
- "Internetworking with TCP/IP" By Comer & Stevens (PHI).

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B. Sc. (Hons.) (Computer Applications)-III Year

COURSE CC-314 : Programming Languages Theory & Concepts

OBJECTIVES OF THE COURSE

- To introduce the theory and concepts of Programming Languages.

NOTE: 1. In all five questions are to be set; atleast one from each unit. 1/3 more sections are to be set for choice within each unit.

Sessional Marks : 10
Exam Marks : 40

UNIT-I Reasons for studying concepts of programming languages, programming domains, language evaluation criteria, influences on language design, language categories, language design trade-offs, implementation methods, programming environments, programming paradigms, comparative study of important programming languages.

UNIT-II Evaluation of the major programming languages: FORTRON, LISP, COBOL, BASIC,, PL/1, PROLOG, SMALLTALK, C++, JAVA, JavaScript, PHP, C# and Markup/Programming Hybrid Languages. Describing Syntax and Semantics of programming language.

UNIT-III Names, bindings, type checking, and scopes, data types, expressions and assignments, statement–level control structures, fundamentals of subprograms, design issues for subprograms, local referencing environments, parameter passing methods, overloaded subprograms, design issues for functions, user-defined overloaded functions and operators.

UNIT-IV Concept of Object Oriented Paradigm, Comparative study of different OOP languages, Class, Object, Method, constructor, Packages, Abstraction, Encapsulation, Inheritance, Polymorphism, Exception handling.

UNIT-V Concept of logic programming paradigm, detailed study of PROLOG language to understand concept of logic programming paradigm.

Text book:

1.Robert W. Sebesta , Concepts of Programming Languages, Addison Wesley.

Reference Books:

1. Terrance W Pratt, Programming Languages: Design and Implementation , PHI.
2. Sethi, Programming Language , Addison Wesley.
3. E Horowitz, Fundamental of Programming Languages , Galgotia.
4. Pratt, Zolkowitz, Programming Languages Design Implementation , Pearson Edition.
5. Tucker Noonan, Programming languages: Principles and Paradigms , TMH
6. D. A. Watt, Programming Languages and Paradigms , PHI
7. J. Lloyd, Foundation of Logic Programming , Springer verlag

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SYLLABUS

B. Sc. (Hons.) (Computer Applications) - III Year

COURSE CC-3P1: Computer Lab

OBJECTIVES OF THE COURSE

- To design, develop and implement Web based applications.

Sessional Marks : 25
Exams Mark : 25

Lab:

Computer Lab (Development of Web based applications using J2EE/.NET technologies).

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B. Sc. (Hons.) (Computer Applications) - III Year

COURSE CC-3P2: Seminar Presentation

OBJECTIVES OF THE COURSE

- To learn Presentation Skills.

Sessional Marks : 25
Exams Mark : 25

Seminar :

Seminar Presentation on recent trends and technologies.

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