



GULBARGA UNIVERSITY



DEPARTMENT OF COMPUTER SCIENCE

Syllabus in Computer Science for B. Sc. Course (as one of the optional subject) under semester scheme effective from the academic year 2004-2005 and onwards as recommended by the B. O. S. in Computer Science of Gulbarga University in its meeting held on 6.9.2003 .

Paper Title	Examination		IA	Teaching Hours/week
	Duration Hours	Max. Marks		
I Semester:				
CS-101: Introduction to Computers and C Programming	03	80	20	04 Hrs.
Practical-I	03	40	10	03 Hrs. (twice)
II Semester:				
CS-201: Advanced C Programming	03	80	20	04 Hrs.
Practical-I	03	40	10	03 Hrs. (twice)
III Semester:				
CS-301: Information System Analysis and Design & COBOL	03	80	20	04 Hrs.
Practical-I	03	40	10	03 Hrs. (twice)
IV Semester:				
CS-401: Database Management System	03	80	20	04 Hrs.
Practical-I	03	40	10	03 Hrs. (twice)
V Semester:				
CS-501: Multimedia and Windows Programming	03	80	20	04 Hrs.
CS-502: OOP with C++	03	80	20	04 Hrs.
Practical-I	03	40	10	03 Hrs.
Practical-II	03	40	10	03 Hrs.
VI Semester:				
CS-601: Data Structures using C++	03	80	20	04 Hrs.
CS-602: Java and Internet programming	03	80	20	04 Hrs.
Practical-I	03	40	10	03 Hrs.
Practical-II	03	40	10	03 Hrs.

The detailed syllabus and the pattern of the question paper are enclosed.

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Date _____

First Semester of B. Sc. (Computer Science as one of the Optional Subjects)
(w. e. f. academic year 2004-2005 and onwards)

CS-101 : INTRODUCTION TO COMPUTERS AND C PROGRAMMING

Teaching Hrs. : 4 Hrs./Week

Max. Marks: 80

I.A. Marks : 20

INTRODUCTION TO DIGITAL COMPUTER: System logical organization, Von Neumann concept, Physical organization – Central Processing unit, Arithmetic logic unit, Main memory, input and output units. Number system, Basics of Boolean Algebra, Basic Logic Gates and Universal Gates.

HARDWARE: Auxiliary storage devices, input devices, output devices. Specification of peripherals and computer system.

SOFTWARE: System software-machine language, Assembly language, higher level programming language, Assembler and compiler, Editors, Operating system, utilities, Application software.

COMPUTING ENVIRONMENT: Types of computers – personal computers, Mini, Mainframes and Super Computers. Batch processing, time – sharing and real time systems. LAN, WAN, Internet and world wide web, E-mail, computers in office automation.

C PROGRAMMING: Algorithm and flow chart, Basic structure of C programs, Programming style, executing a C program. Constants, variables and data types. Operators and expression - Arithmetic Operators, Relational operators, Logical operators, Assignment operators, Increment and decrement operators, Conditional operators, Bitwise operators, Special operators, precedence of operators, Arithmetic expressions, type conversion in expression, Mathematical functions. Input functions, Output functions, formatted input/output. Decision making with if statements, Simple if statement, The if..else statement, Nesting if..else statements, The else if ladder, The Switch statement, The ? : Operator, The goto statement. The while statement, The do..while statement, The for.. statement, Jumps in loops. Character strings. One – dimensional arrays, two – dimensional arrays and Multidimensional arrays.

REFERENCES:

1. V. Rajaraman, Fundamental of Computers, PHI, 4th Edition (1989).
2. Alexis Leon and Mathews Leon, Introduction to Computers, Leon Vikas (1999).
3. Peter Norton, Computing Fundamentals, 5th Edition, McGraw Hill-Osborne (2003).
4. E. Balaguruswamy, Programming in ANSI C, Edition 2.1, Tata McGraw Hill, (2002).
5. Byron S Gottfried , Programming with C, Schaum's Outline Series, McGraw Hill,(1997).
6. S. Kochan, Programming in C, CBS Publications, Delhi (1991).
7. P. B. Kotur ,Programming in C, Sapna (2000).

PRACTICAL-I:

Practical Hrs. : 03Hrs.(twice)/Week

Max. Marks: 40

I.A. Marks : 10

Programming in C :

- i) Evaluation of arithmetic Expressions.
- ii) Control Structures: for, while , do while , switch , If.
- iii) String processing.
- iv) Array manipulation

Note: Minimum of 20 Practical Assignments on the above topics shall be done. Algorithm and flowchart shall be written.

QUESTION PAPER PATTERN:

1. Theory: There are eight questions in the question paper each carrying 16 marks. The candidate has to answer any five questions.
2. The practical marks of 40 is distributed as follows:
 - I. Writing two programs (including algorithm/flowchart) 14 marks (7 each)
 - II. Execution of two programs 20 marks (10 each)
 - III. Laboratory record and viva-voce 06 marks

Total 40 marks

Second Semester of B. Sc. (Computer Science as one of the Optional Subjects)
(w. e. f. academic year 2004-2005 and onwards)

CS-201 : ADVANCED C – PROGRAMMING

Teaching Hrs. : 4 Hrs./Week

Max. Marks: 80

I.A. Marks : 20

USER-DEFINED FUNCTIONS: Need for User-defined functions, A multi-function program, The form of C function. Return values and their types, calling a function, Category of functions – No arguments and no return values, Arguments but no return values, Argument with return values, Handling of non-integer functions, Nesting of functions, Recursion, Function with arrays.

STRUCTURES AND UNIONS: Structures definition, Giving values to members, structure initialization, comparison of structure variables, Arrays within structures, structures within structures, Functions within Structures, Unions.

POINTERS: Understanding pointers, accessing the address of the variable, Declaring and initializing pointer, accessing a variable through its pointer, pointers and arrays, pointers and functions, pointers and structures dynamic storage allocation.

FILES: Opening and closing a data file, creating a data file, processing a data file, unformatted data files.

ADDITIONAL FEATURES: Storage classes, The type definition, Enumerated data types, File inclusion, MACRO definition, conditional compilation, command line arguments, Function prototypes.

Elementary Computer Graphics.

REFERENCES:

1. E. Balaguruswamy, Programming in ANSI C, Edition 2.1, Tata McGraw Hill(2002).
2. Byron S Gottfried , Programming with C, Schaum's Outline Series, McGraw Hill(1997).
3. Ashok N. Kamthane, Programming with ANSI and Turbo C, Pearson Education(2002).
4. Herbert Schildt, The Complete Reference C, 4th Edition, Tata McGraw Hill(2002).
5. P. B. Kotur, Computer Concepts and C Programming, Sapna (2000).
6. Yeshwant Kanetkar, Programming in C, 3rd Edition, BPB Publications(1999).

PRACTICAL-I:

Practical Hrs.: 03Hrs. (twice)/Week

Max. Marks: 40

I.A. Marks : 10

Programming in C involving

- i) User defined functions.
- ii) Structures and Unions.
- iii) Pointers.
- iv) Files, macros, conditional compilation and command line arguments.
- v) Graphics Functions.

Note: Minimum of 20 Practical Assignments on the above topics shall be done. Algorithm and flowchart shall be written.

QUESTION PAPER PATTERN:

1. Theory: There are eight questions in the question paper each carrying 16 marks. The candidate has to answer any five questions.
2. The practical marks of 40 is distributed as follows:

IV. Writing two programs (including algorithm/flowchart)	14 marks (7 each)
V. Execution of two programs	20 marks (10 each)
VI. Laboratory record and viva-voce	06 marks

Total	40 marks

Third Semester B. Sc. (Computer Science as one of the Optional Subjects)

(w. e. f. academic year 2005-2006 and onwards)

CS-301 : INFORMATION SYSTEM ANALYSIS AND DESIGN & COBOL

Teaching Hrs. : 4 Hrs./Week

Max. Marks: 80

I.A. Marks : 20

INFORMATION AND MANAGEMENT: Types of information, Management Structure, Management and Information Requirements, Qualities of information, Example of information systems.

INFORMATION SYSTEMS ANALYSIS: Role, task and attributes of a System Analyst, tools used by the system analyst, Information gathering, system requirement specification, feasibility analysis, Data flow diagrams, Process specifications and decision tables, logical database design, data input methods, designing output.

IMPLEMENTATION OF INFORMATION SYSTEM: Implementing most changeable systems, implementation tasks, implementation strategies, system testing, quality control, user training.

DATA PROCESSING THROUGH COBOL: Structure of COBOL program, character sets, reserve words, data types, data and file descriptions, COBOL verbs, operators, I/O statements, control structures, table handling and file handling, report generation.

REFERENCES:

1. Rajaraman V, Analysis and Design of Information System, PHI ,(2000).
2. Ashok Kumar Sharma, Analysis, Design and Implementation of Information Systems, Vikas Publishing House (2000).
3. Elias M. Awad, Systems Analysis and Design, 2nd Edition, Galgotia Publications (1999).
4. Hawrojszkiewicz I.T., Introduction to Systems Analysis and Design, 3rd edition, PHI (1997)
5. Roy M. K. and Dastidar D. G., COBOL Programming, TMH (1993).
6. Rajaraman V. and Sahasrabudde H. V., Computer Programming in COBOL, PHI (1989).

PRACTICAL-I:

Practical Hrs. : 03Hrs. (twice)/Week

Max. Marks: 40

I.A. Marks : 10

Programming in COBOL :

1. ACCEPT and DISPLAY
2. Evaluation of arithmetic Expressions using arithmetic verbs and COMPUTE verbs with CORRESPONDING, ONSIZE ERROR options.
3. Conditional and sequential control verbs
4. OCCURS clause.
5. PERFORM with different options.
6. Sequential, Indexed Sequential, Random access files .
7. Sorting and Merging of files.
8. Report generation.

Note: Minimum of 20 Practical Assignments on the above topics shall be done. Algorithm and flowchart shall be written.

QUESTION PAPER PATTERN:

1. Theory: There are eight questions in the question paper each carrying 16 marks. The candidate has to answer any five questions.
2. The practical marks of 40 is distributed as follows:
 - I. Writing two programs (including algorithm/flowchart) 14 marks (7 each)
 - II. Execution of two programs 20 marks (10 each)
 - III. Laboratory record and viva-voce 06 marks

Total 40 marks

Fourth Semester B. Sc. (Computer Science as one of the Optional Subjects)
(w. e. f. academic year 2005-2006 and onwards)

CS-401 : DATABASE MANAGEMENT SYSTEM

Teaching Hrs. : 4 Hrs./Week

Max. Marks: 80

I.A. Marks : 20

INTRODUCTION: Data, database, DBMS, characteristic of the database approach, DBMS users, advantages of DBMS, implications of database approach, data models, schemas and instances, DBMS architecture and data independence, database languages and interfaces, database systems environment, classifications of DBMS's.

E-R MODEL: using high level conceptual data models for database design, Entity types, entity sets, attributes and keys, relationships, relationship types, roles and structural constraints, weak entity types, ER diagrams, naming conventions and design issues, enhanced E-R modeling.

RELATIONAL DATA MODEL: Relational model concepts, relational constraints and relational database schemas update operations relational database design using ER-to-relational mapping, relational algebra operation, tuple relational calculus, domain relational calculus.

STRUCTURED QUERY LANGUAGE(SQL): Database creation, simple retrieval, compound conditions, computed fields, sorting, built-in functions, nesting, grouping queries, joining tables, union, updating tables, views and indexes, overview of QBE Language.

DATABASE DESIGN THEORY: Informal design guidelines for relational scheme, functional dependencies, concept of normalization, normal forms – 1NF, 2NF, 3NF and BCNF, multivalued dependences 4NF, join dependencies and 5NF, inclusion dependencies, database design process, physical database design in relational database, database tuning in relational system.

SYSTEM IMPLEMENTATION: Database system architecture and system catalog, transaction processing, concurrency control techniques, database recovery techniques, database security and authorization.

REFERENCES:

1. Rameez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems, 3rd Edition, Pearson Education (2003).
2. Alexis Leon and Mathews Leon, Database management Systems, Vikas-Leon (2002).
3. C. J. Date, An Introduction to Database Systems, 7th Edition, Addison-Wesley (2000).
4. Mujumdar and Bhattacharya, Introduction to database management systems, Tata Mc Graw Hill (2002).
5. Desai Bipin C., An Introduction to Database Systems, West Publishing Co. (1999).

PRACTICAL-I:

Practical Hrs. : 03Hrs. (twice)/Week

Max. Marks: 40

I.A. Marks : 10

Practical assignments on Access/Oracle, or any latest DBMS Package.

Studying features of a commercial DBMS package and Structured Query Language. Defining a scheme for applications-creation of database, modification and updation of database, writing SQL Queries to retrieve information from the database. Forms and reports generation. Writing simple applications like Accounting for a shop, Personal Accounts-Insurance, Loans, Mortgage payments, Hotel Accounting, Admission etc.

Note: Minimum of 20 Practical Assignments on the above topics shall be done. Algorithm and flowchart shall be written.

QUESTION PAPER PATTERN:

1. Theory: There are eight questions in the question paper each carrying 16 marks. The candidate has to answer any five questions.
2. The practical marks of 40 is distributed as follows:
 - I. Writing two programs (including algorithm/flowchart) 14 marks (7 each)
 - II. Execution of two programs 20 marks (10 each)
 - III. Laboratory record and viva-voce 06 marks

Total 40 marks

Fifth Semester B. Sc. (Computer Science as one of the Optional Subjects)
(w. e. f. academic year 2006-2007 and onwards)

CS-501 : MULTIMEDIA AND WINDOWS PROGRAMMING

Teaching Hrs. : 4 Hrs./Week

Max. Marks: 80

I.A. Marks : 20

Introduction to Multimedia: Elements of Multimedia, Growth of Multimedia, major categories of multimedia and other categories of Multimedia.

Multimedia Tools: Hardware Components of Multimedia System, Multimedia elements: Texts and Graphics, Sound, Animation and Video, Multimedia authoring programs, delivering multimedia.

Developing Multimedia: Developing multimedia titles, steps in developing interactive multimedia, The planning phase, the creating phase, the testing phase, designing for multimedia- basic design principles, design for interactivity, guidelines for interactive design.

Producing and Distributing Multimedia: Producing multimedia titles, distributing multimedia titles.

Multimedia-Issues and the Future of Multimedia: The internet and World Wide Web, Issues and trends in Multimedia.

Developing an interactive presentation.

Windows Programming : Building a Multimedia application with VB, Tool Box, Text Box control, The Picture Box , Label Box, Option Button, Frame, List Box, Data, Command Button, Check Box Etc., Forms and control, Variables in VB, Working with Files, Menus, Multiple Document Interface Application, The common Dialogue control, Creating table, working with Data control , Data access objects, data reports.

REFERENCES:

1. Shuman James E., Multimedia in Action, Thomson Learning-Vikas Publishing House (2001).
2. Franklin Kuo, Wolfgang and J.J. Garsia, "Multimedia Communications, Protocols and Applications", Prentice Hall PTR (1998).
3. Fred T Hofstetter, Multimedia Literacy, 3rd Edition, Tata McGraw Hill (2001).
4. Gottfried, Programming with Visual Basic, Schaum's Series- Tata McGraw Hill.
5. V. K. Jain, Introduction to OOP and VB, Vikas Publishing House (2003).
6. Neol Jerke, The Complete Reference Visual Basic 6, Tata McGraw Hill(1999).
7. Evangelas and Petroustos, Mastering VB 6, 1st Edition, BPB Publications (2001).

PRACTICAL-I:

Practical Hrs. : 3 Hrs./Week

Max. Marks: 40

I.A. Marks : 10

- I. Simple assignments for Multimedia Programming.
- II. Assignments on VB based on the contents in "Multimedia Programming".

Note: Minimum of 20 Practical Assignments on the above topics shall be done. Algorithm and flowchart shall be written.

QUESTION PAPER PATTERN:

1. Theory: There are eight questions in the question paper each carrying 16 marks. The candidate has to answer any five questions.
2. The practical marks of 40 is distributed as follows:
 - I. Writing two programs (including algorithm/flowchart) 14 marks (7 each)
 - II. Execution of two programs 20 marks (10 each)
 - III. Laboratory record and viva-voce 06 marks

Total 40 marks

CS-502 : OOP WITH C++

Teaching Hrs. : 4 Hrs./Week

Max. Marks: 80

I.A. Marks : 20

INTRODUCTION: Principles of object oriented programming (OOP), Object oriented programming paradigm, basic concepts of object oriented programming, benefits of OOP and objected oriented languages.

C++ : Structure of C++ program, tokens, expressions, control structures, functions, function overloading, friend and virtual functions.

Classes and Objects, constructors and destructors, , operator overloading and type conversion, inheritance, pointers, virtual functions, polymorphism, console I/O operations and standard library, files, exceptional handling, templates, standard template library, string manipulations.

OBJECT ORIENTED SYSTEM DEVELOPMENT: Procedure oriented paradigm, object oriented programming paradigm, object oriented notations and graphs, steps in object oriented analysis and design, implementation, prototype paradigm.

REFERENCES:

1. E. Balaguruswamy, Object oriented programming with C++, 2nd Edition, Tata McGraw Hill Pub. Pvt. Ltd. (2002)
2. Paul S. Wang, Standard C++ with Object Oriented Programming, Thomson Learning-Vikas Publishing House (2001).
3. Herbert Schildt, C++: The Complete Reference, 4th Edition, Tata McGraw Hill Pub. Pvt. Ltd. (2002).
4. Ashok N. Kamthane, Object Oriented Programming with ANSCI and Turbo C++, Pearson Education(2003)
5. Bjarne Stroustrup, The C++ Programming Language,3rd Edition, Addison Wesley (1997).

PRACTICAL-II:

Practical Hrs. : 3 Hrs/Week

Max. Marks: 40

I.A. Marks : 10

Programming in C++ :

1. Implementation of OOP features – classes and objects.
2. Function Implementation-constructors and destructors, Inline functions, friend functions and static functions.
3. Implementation of polymorphism concepts-function overloading, operator overloading and virtual functions.
4. Inheritance implementation- single level inheritance, multilevel inheritance, multiple inheritance, hierarchical inheritance, hybrid inheritance.
5. File handling- In a text file mode and in binary mode.
6. Exception handling- User defined exception and using nested try statement.
7. Templates

Note: Minimum of 20 Practical Assignments on the above topics shall be done. Algorithm and Flowchart Shall be written.

QUESTION PAPER PATTERN:

1. Teaching Hrs.: There are eight questions in the question paper each carrying 16 marks. The candidate has to answer any five questions.
2. The practical marks of 40 is distributed as follows:

I. Writing two programs (including algorithm/flowchart)	14 marks (7 each)
II. Execution of two programs	20 marks (10 each)
III. Laboratory record and viva-voce	06 marks

Total	40 marks

Sixth Semester B. Sc. (Computer Science as one of the Optional Subjects)
(w. e. f. academic year 2006-2007 and onwards)

CS-601 : DATA STRUCTURES USING C++

Teaching Hrs. : 4 Hrs./Week

Max. Marks: 80

I.A. Marks : 20

INTRODUCTION: Concepts of data structures, implementation of data structures

ARRAYS: One dimensional and multidimensional arrays, memory allocation for an array, operations on arrays, sparse matrices, pointer arrays.

LINKED LISTS: Single, circular, double, circular double linked lists, operations on linked lists, representation of linked list in memory, Applications of linked lists, Compaction.

STACKS: Representation of stacks, operations on stacks, Application of stacks.

QUEUES: Representation of queues, circular queue, dequeue and priority queue, Application of queues

TREES: Binary tree, representation of binary tree, operations on binary trees, types of binary trees, B tree.

SETS: Representation of sets, operations on sets, Application of sets.

SORTING: Bubble sort, Quick sort, Insertion sort, Selection sort, Radix sort, Merge sort Etc.

SEARCHING: Sequential Searching , Binary Searching , Tree Searching , Hashing Etc.

REFERENCES:

1. D. Samanta, Classic Data Structures, PHI (2001).
2. Satraj Sahni, Data Structures, Algorithms and Applications in C++, Tata McGraw Hill (1999).
3. Rowe, Introduction to Data Structures and Algorithms in C++, PHI (2001).
4. Adam Drozdek, Data Structures and Algorithms in C++, Thomson Learning- Vikas Publishing House (2000).
5. K. S. Easwarakumar, Object Oriented Data Structures Using C++, Vikas Publishing House (2000).
6. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 2nd Edition(2002), Pearson Education

PRACTICAL-I:

Practical Hrs. : 3 Hrs/Week

Max. Marks: 40

I.A. Marks : 10

Programming in C++ involving:

Implementation of arrays, operations on one-dimensional and two-dimensional arrays, arrays, linked lists, operations of linked list, stacks, operations on stacks, binary tree, operations on binary tree, queues, operations on queues, operations on sets. Implementation of sort and search algorithms.

Note: Minimum of 20 practical assignments on the above topics shall be done. Algorithm and flowchart shall be written.

QUESTION PAPER PATTERN:

1. Theory: There are eight questions in the question paper each carrying 16 marks. The candidate has to answer any five questions.
2. The practical marks of 40 is distributed as follows:

I. Writing two programs (including algorithm/flowchart)	14 marks (7 each)
II. Execution of two programs	20 marks (10 each)
III. Laboratory record and viva-voce	06 marks

Total 40 marks

CS-602 : JAVA AND INTERNET PROGRAMMING

Teaching Hrs. : 4 Hrs./Week

Max. Marks: 80

I.A. Marks: 20

JAVA: Java features, java and internet, java and world wide web, web browsers, hardware and software requirements, java support systems, java environment, java program structure.

Tokens, statements, java virtual machine, constants, variables, data types, operators and expressions, decision making and branching, decision making and looping, classes, objects and methods, arrays, strings and vectors, interfaces, packages-putting classes together, managing errors and exceptions.

Thread programming, applet programming, managing Input/Output files in java, graphics programming.

INTERNET: Introduction, Objectives, Networks, TCP/IP, Client-Server Model, E-mail, finger and talk, USENET, newsgroups, Internet Programming – WWW, hypertext, http, URL, HTML/XML programming.

REFERENCES:

1. E. Balagurusamy, Programming with JAVA, 2nd Edition, Tata McGraw Hill (2001).
2. Patrick Naughton and Herbert Schild, The Complete Reference Java 2, 3rd Edition, Tata McGraw Hill(1999).
3. Decker and Hirshfield, Programming. Java, 2nd Edition, Thomson Learning-Vikas Publishing House (2000).
4. Shelly Power, et.al., Dynamic Web Publishers, Tech. Media (1998).
5. Keiko Pitter et.al., Every Student Guide To The Internet: Windows version, Tata McGraw Hill (1985).
6. Joel Sklar, Principles of Web Design, Thomson Learning-Vikas Publishing House (2003).
7. Barrie Sosinsky and Valda Hilley, Programming the Web, McGraw Hill- Osborne (2003).
8. Rajkamal, Internet and Web Technologies, Tata McGraw Hill (2002).

PRACTICAL-II:

Practical Hrs. : 3 Hrs/Week

Max. Marks: 40

I.A. Marks : 10

I. Assignments on JAVA:

1. Implementation of OOP features – classes and objects.
2. Function Implementation-constructors and destructors, Inline functions, friend functions and static functions.
3. Implementation of polymorphism concepts-function overloading, operator overloading and virtual functions.
4. Inheritance implementation- single level inheritance, multilevel inheritance, multiple inheritance, hierarchical inheritance, hybrid inheritance.
5. File handling- In a text file mode and in binary mode.
6. Templates: Template functions and Template classes.
7. Exception handling- User defined exception and using nested try statement.
8. Threads.

II. Web Page designing using HTML/XML.

Note: Minimum of 20 Practical Assignments on the above topics shall be done. Algorithm and Flowchart Shall be written.

QUESTION PAPER PATTERN:

1. Theory: There are eight questions in the question paper each carrying 16 marks. The candidate has to answer any **five** questions.
2. The practical marks of 40 is distributed as follows:
 - I. Writing two programs (including algorithm/flowchart) 14 marks (7 each)
 - II. Execution of two programs 20 marks (10 each)
 - III. Laboratory record and viva-voce 06 marks

Total 40 marks

