B.P.S. Mahila Vishwavidalaya Khanpur Kalan (Sonepat-131305)



B.P.S. Institute of Higher Learning (Department of Computer Science)

Curriculum and Scheme of Examination of Three Year B.Sc. Computer Science (w.e.f. July,2022) Programme Code- 057



B.Sc. Computer Science Curriculum and Scheme (w.e.f. July, 2022)

Programme Outcome for B.Sc. (Computer Science):

- Develop ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution.
- To prepare students to undertake careers involving problem solving using computer science and technologies.
- > Develop ability to pursue advanced studies and research in computer science.
- > To produce entrepreneurs who can innovate and develop software product.

Programme Specific Outcomes for B.Sc. (Computer Science):

- > Apply fundamental principles and methods of Computer Science to a wide range of applications.
- > Design, correctly implement and document solutions to significant computational problems.
- > Impart an understanding of the basics of our discipline.
- > Prepare for continued professional development.
- > Develop proficiency in the practice of computing.
- After the completion of B.Sc. Computer Science students will be able to get teaching job in schools, colleges and universities.
- A computer science graduate is well equipped with the skills to work in banking sector as a computer programmer, data entry operator and manager etc.
- > A computer science student can work as capable software designing personnel.
- > Computer science graduates can develop software for various firms and operating units.
- Computer science students can develop various applications pertaining to smart phones, video games, online shopping and similar functions.
- Computer science qualified candidates can work as a graphic designer, operator etc. in forensic science and research centres.
- > Computer science helps in developing full stack developer skills.
- They can work as System Administrator, System Architect, Data Analyst Business Development Manager, Computer System Analytics, Network Engineer, Software Tester, Technical Writer, UI/UX Developer, Software Quality Assurance, Tester, IT Analyst, Website developer, Network, Security Research etc.
- > Many more areas because computer science is needed in almost every field in today era.



Here are the top master's courses after B.Sc. Computer Science:

- Master in Computer Applications (MCA)
- MBA in Data Science
- M.Tech. in Computer Science/Data Science
- > PG Diploma in Computer Applications (PGDCA)
- PG Diploma in Business Analytics (PGDBA)
- > PG in Data Science
- Masters in Artificial Intelligence
- Masters in Machine Learning





B. P. S. Mahila Vishwavidyalaya, Khanpur Kalan (Sonepat)

(State University Established Under the Legislative Act No 31/2006)

Course Curriculum & Scheme of Examination

For

B.Sc. Computer Science

(w.e.f. July,2022)

The Bachelor of Science in Computer Science is a three year full time programme. The course structure of the programme is given under:-

S.	Code	Course Title	He	Hours /Week		Total		Max Mar	ks
No.						Credits	Interna	External	Total
							Marks	Marks	Marks
			L	Τ	P				
The	ory								
1	CSC - 101A	Computer Fundamentals	3	-	-	3	10	40	50
2	CSC - 101B	Logical Organization of	3	-	-	3	10	40	50
		Computer							
Lab	oratory								
3	CSP - 101	Computer Fundamentals Lab.	-	-	4	2	10	40	50
Tot	al		6	-	4	8	30	120	150

Semester – 1

Total Contact Hours=10

Total Credits=8





B. P. S. Mahila Vishwavidyalaya, Khanpur Kalan (Sonepat) (State University Established Under the Legislative Act No 31/2006) Course Curriculum & Scheme of Examination

For

B.Sc. Computer Science

(w.e.f. July,2022)

Semester – 2

S.	Code	Course Title	Hours /Week		Hours /Week			Max Mar	ks
No.						Credits	Interna	External	Total
							Marks	Marks	Marks
			L	Т	Р				
The	ory								
1	CSC - 102A	Programming in C	3	-	-	3	10	40	50
2	CSC - 102B	Computer Networks	3	-	-	3	10	40	50
Lab).								
3	CSP - 102	Programming in C Lab.	-	-	4	2	10	40	50
Tota	al		6	-	4	8	30	120	150

Total Contact Hours=10

Total Credits=8

Institute of Higher Learning Khanpur Kalan (Sonipat)



B. P. S. Mahila Vishwavidyalaya, Khanpur Kalan (Sonepat)

(State University Established Under the Legislative Act No 31/2006)

Course Curriculum & Scheme of Examination

For B.Sc. Computer Science

(w.e.f. July,2022)

Semester – 3

S.	Code	Course Title	Hours /Week		Total		Max Mar	ks	
No.						Credits	Interna	External	Total
							Marks	Marks	Marks
			L	Т	Р				
The	ory								
1	CSC201A	Data & File Structure using C	3	-	-	3	10	40	50
2	CSC201B	Computer System Architecture	3	-	-	3	10	40	50
Lab	1								
3	CSP -201	Data & File Structure using C	-	-	4	2	10	40	50
		Lab.							
Tota	al		6	-	4	8	30	120	150

Total Contact Hours=10

Total Credits=8

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B. P. S. Mahila Vishwavidyalaya, Khanpur Kalan (Sonepat) (State University Established Under the Legislative Act No 31/2006) Course Curriculum & Scheme of Examination

For

B.Sc. Computer Science

(w.e.f. July,2022)

Semester – 4

S.	Code	Course Title	Hours /Week		Total		Max Mar	ks	
No.						Credits	Interna	External	Total
							Marks	Marks	Marks
			L	Т	Р				
The	ory								
1	CSC- 202A	Advanced Data and File	3	-	-	3	10	40	50
		Structure							
2	CSC- 202B	Object Oriented Programming	3	-	-	3	10	40	50
		with C++							
Lab)								
3	CSP- 202	Object Oriented Programming	-	-	4	2	10	40	50
		with C++ Lab.							
Tota	al		6		4	8	30	120	150

Total Contact Hours=10

Total Credits=8

Ancina BPS Institute of Higher Learning Khanpur Kalan (Sonipat)



B. P. S. Mahila Vishwavidyalaya, Khanpur Kalan (Sonepat) (State University Established Under the Legislative Act No 31/2006)

Course Curriculum & Scheme of Examination

For

B.Sc. Computer Science

(w.e.f. July,2022)

Semester – 5

S.	Code	Course Title	Hours /Week		Hours /Week			Max Mar	ks
No.						Credits	Interna	External	Total
							Marks	Marks	Marks
			L	Т	Р				
The	ory								
1	CSC- 301A	Data Base Management System	3	-	-	3	10	40	50
2	CSC - 301B	Operating System	3	-	-	3	10	40	50
Lab	•								
3	CSP -301	Data Base Management System	-	-	4	2	10	40	50
		Lab.							
Tota	al		6	-	4	8	30	120	150

Total Contact Hours=10

Total Credits=8

3PS Institute of Higher Learning Khanpor Kalan (Sonipat)



B. P. S. Mahila Vishwavidyalaya, Khanpur Kalan (Sonepat)

(State University Established Under the Legislative Act No 31/2006) Course Curriculum & Scheme of Examination

For

B.Sc. Computer Science

(w.e.f. July,2022)

Semester – 6

S.	Code	Course Title	Hours /Week		Total		Max Mar	ks	
No.						Credits	Interna	External	Total
							Marks	Marks	Marks
			L	Т	Р				
The	ory								
1	CSC - 302A	Visual Basic Programming	3	-	-	3	10	40	50
2	CSC- 302B	Software Engineering	3	-	-	3	10	40	50
Lab									
3	CSP- 302	Visual Basic Programming	-	-	4	2	10	40	50
		Lab.							
Tota	al		6	-	4	8	30	120	150

Total Contact Hours=10

Total Credits=8

BPS Institute of Higher Learning Khanpur Kalan (Sonipat)

B.Sc. Computer Science Curriculum and Scheme (w.e.f. July, 2022)

Evaluation:

The assessment will be 20% internal and 80% external. The students have to qualify internals well as external test separately. The weightage for internal evaluation (20%) is as follows:

Class Test/Minor Test/Sessional Test	:	10% (10 marks out of 100)
Assignments/Presentation/Seminar/Group Discussion	:	5% (05 marks out of 100)
Attendance	:	5% (05 marks out of 100)

Distribution of Marks for Attendance:

75% - 80%	: 2 Marks
75% - 80%	: 3 Marks
85% and above	: 5 Marks

- (1) Each subject/course in B.Sc. Computer Science of 3/3 Credit is of 50 marks having 10 internal and 40 external marks.
- (2) Each lab in scheme of B.Sc. Computer Science of 2 Credit is of 50 marks having 10 internal and 40 external marks.
- (3) Credits: The class/periods in BPSIHL are 45 minutes each. So, the 3 credits of theory paper refer to 4 periods and 1 credit of practical refers to 3 periods/ 2 hours.

Grand Total of Credits/Marks for the B.Sc. Computer Science, BPSIHL, BPSMV, Khanpur Kalan, Sonepat					
S.No.	Semester	Credits/Marks			
1	Ι	8/150			
2	Π	8/150			
3	III	8/150			
4	IV	8/150			
5	V	8/150			
6	VI	8/150			
Total 48/900					
All external examinations (Theory and Practical) are of three hours duration					



B.Sc. Computer Science Curriculum and Scheme (w.e.f. July, 2022) B.Sc. Computer Science 1st Semester CSC – 101A Computer Fundamentals

Paper Code: CSC – 101A

 $\begin{array}{ccc} L-T-P\\ 3 & \cdots & \cdots \end{array}$

Time-3 Hrs

Note: Examiner will be required to set 09 questions in all. Question Number 1 will consist of total 4 parts (short-answer type questions) covering the entire syllabus and will carry 8 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 8 marks. Student will be required to attempt five questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Course Objective:

- To understand the basics of knowledge of computer devices ,applications and MS-offices.
- To make the students understand the different aspects of computer fundamentals.

<u>Unit -1</u>

Introduction to computer - Evolution of computers, classification of computers, model of a digital computer, functioning of a digital computer, usefulness of computers, Human being Vs computers, applications of computers (desktop publishing, sports ,design and manufacturing research, military robotics, planning & management, marketing, medicine & health care, arts, communication etc.)

<u>Unit 2</u>

Input/out devices: Punch cards, card-readers, Keypunching machines, keyboards, mouse, joysticks, trackball, Digitizer, Voice-recognition devices, Scanner and terminal.

Hard copy devices - Types of printer: Impact printer (DMP, Daisy wheel, line, drum printer, chain printer), Non Impact printer (laser, inkjet, thermal), plotters, soft copy devices, monitor, video standards.

Memory & Mass Storage devices: Characteristics of memory system, types of memory : RAM, ROM, Magnetic disks, floppy disk ,hard disk, optical disk, optical disk CD, CD-ROM, magnetic tapes, concept of virtual & cache memory.

<u>Unit 3</u>

Software Concepts: Introduction, types of software - System & Application software; Language translators-Compiler, Interpreter, Assembler; System utilities - Editor, Loader, Linker.

Overview of operating system: Definition, functions of operating system, concept of multiprogramming, multitasking, multithreading, multiprocessing, time-sharing, real time, single-user & multi-user operating system.

<u>Unit 4</u>

Features of Microsoft Windows: 98, XP, Windows-2003, Windows -7, Windows - 10.

MS-Word: Text manipulation (change the font size and type, aligning and justification of text, Underlining the text, indenting the text, Usages of numbering, bullets, footer and headers. Usages of spell check and find and replace, difference between .doc and .docx.

Tables and Manipulation: Creation, insertion, deletion (columns & rows) and usage of auto format, creation of documents using templates, Mail Merge concept, macros.



Total Credits: 03 External Marks: 40 Internal Marks: 10 Course Outcome: After completion of this syllabus

- Students will acquire skills and acumen to use computers in the working of offices, education, business etc.
- They will have understand the concept of evolution of computer, different types of models of computer, application of computer, analyse the working various input, output and storage devices, analyse the concept of software, its types and review of operating system and learn features of Microsoft Windows & MS-Word.

Suggested Readings:

1. Gill, Nasib S.: Essentials of Computer and Network Technology, Khanna Book Publishing Co., New Delhi.

2. Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.

- 3. Chhillar, Rajender S.: Application of IT in Business, Ramesh Publishers, Jaipur.
- 4. Donald Sanders: Computers Today, McGraw-Hill Publishers.
- 5. Davis: Introduction to Computers, McGraw-Hill Publishers.
- 6. V. Rajaraman : Fundamental of Computers, Prentice-Hall India Ltd., New Delhi.
- 7. Learning MS-Office2000 by R Bangia (Khanna Book Pub)
- 8. Teach yourself MS-Office by Sandlers (BPB Pub).
- 9. Using MS-Office by Bott(PHI).

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B.Sc. Computer Science Curriculum and Scheme (w.e.f. July, 2022) B.Sc. Computer Science 1st Semester CSC – 101B Logical Organization of Computer

Paper Code: CSC – 101B Logical (L – T – P

3 -- --

Time-3Hrs

Total Credits: 03 External Marks: 40 Internal Marks: 10

Note: Examiner will be required to set 09 questions in all. Question Number 1 will consist of total 4 parts (short-answer type questions) covering the entire syllabus and will carry 8 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 8 marks. Student will be required to attempt 05 questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Course Objective:

- To understand Number systems, codes, Boolean algebra and K-map and theorem.
- To develop a complete awareness about logic gates, sequential and combinational circuit.

<u>UNIT I</u>

Information Representation: Number Systems, Binary Arithmetic, Fixed-point and Floating-point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC, Unicode.

<u>UNIT II</u>

Binary Logic: Boolean algebra, Boolean Theorems, Boolean Functions and Truth Tables, De-Morgan's theorem, Simplifying logic circuits, sum of product and product of sum form, algebraic simplification, Karnaugh simplification.

<u>UNIT III</u>

Digital Logic: Basic Gates - AND, OR, NOT, Universal Gates – NAND, NOR, Other Gates –XOR, XNOR etc. NAND, NOR, AND-OR-INVERT and OR-AND-INVERT.

Sequential Logic: Characteristics, Flip-Flops, Clocked RS, D type, JK, T type, Race Around condition and Master-Slave flip flops.

<u>UNIT IV</u>

Combinational Circuits: Half-Adder, Full-Adder, Half-Subtractor, Full-Subtractor, Encoders, Decoders, Multiplexers, Demultiplexers, Comparators, Code Converters, BCD to Seven-Segment, Decoder. **Course Outcome:** After completion of this syllabus

- To gain the knowledge of number systems and concepts of coding.
- To understand Boolean algebra and K-map.
- To study the working of logic gates.
- To study combinational and sequential circuits

Suggested Readings:

- 1. M. Mano: Computer System Architecture, Prentice-Hall of India Ltd., New Delhi.
- 2. Gill N.S. and Dixit J.B.: Digital Design and Computer Organization, University Science Press (An Imprint of Laxmi Publications), N. Delhi)
- 3. William Stallings: Computer Architecture and Organization, Maxell Publication.
- 4. Mano, M.M.: Digital Design, 2nd ed., Prentice-Hall of India.
- 5. Salivahanan and Arivazhagan: Digital Circuits and Design, Vikas Publ. House Pvt. Ltd.,



- 6. J.P. Hayes: Computer Architecture and Organization by J.P. Hayes, Tata McGraw-Hill, New Delhi.
- 7. Gear C.W.: Computer Organization and Architecture, Prentice Hall of India Ltd., New Delhi.

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B.Sc. Computer Science Curriculum and Scheme (w.e.f. July, 2022)

Paper Code: CSP – 101

Computer Fundamentals Lab.

L – T – P - -- - 4 Time-3Hrs External Marks: 40 Internal Marks: 10 **Total Credits: 02**

Practical Based on CSC-101 (Windows, MS-Office)

Internal Assessment Marks (For Theory Papers)

Sr.No.	Criteria	Marks
1	One midterm exam	5
2	Seminar/Assignment	2.5
3	Attendance	2.5
	Total	10

Internal Assessment Marks (For Practical)

Sr.No.	Criteria	Marks
1	Practical Sheet/Program Execution	5
2	Practical File/Viva-Voce	2.5
3	Lab Attendance	2.5
	Total	10

Course Outcome: After completion of this

- Students will be acquire skills and acumen to use computers in the working of offices, education, business department etc. through suitable tools and commands.
- They will have understand operating system and learn features of Microsoft Windows & MS-Word.



B.Sc. Computer Science Curriculum and Scheme (w.e.f. July, 2022) B.Sc. Computer Science 2nd Semester

Paper Code: CSC- 102A

Programming in 'C'

L – T – P 3 – - - -Time-3Hrs Total Credits: 03 External Marks: 40 Internal Marks: 10

Note: Examiner will be required to set 09 questions in all. Question Number 1 will consist of total 4 parts (short-answer type questions) covering the entire syllabus and will carry 8 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 8 marks. Student will be required to attempt 05 questions in all.Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Course Objective:

- To understand basic knowledge of computer programming.
- To develop a complete awareness about variables, data types, operators, functions, array and pointer.

<u>Unit-I</u>

Basic concepts of programming, techniques of problem solving, algorithm designing and flowcharting, concept of structured programming-Top-Down design, Development of efficient program; Program correctness; Debugging and testing of programs

<u>Unit-II</u>

Overview of C: History of C, Importance of C, Structure of a C Program Elements of C: C character set, identifiers and keywords, Data types: declaration and definition. Operators: Arithmetic, relational, logical, bitwise, unary, assignment and conditional operators and their hierarchy & associatively, input/output statements, Arithmetic Expression, Evaluation of Arithmetic Expression, Type-casting and Conversion.

<u>Unit-III</u>

Decision making & branching: Decision making with if statement, if-else statement, nested if, elseif ladder, switch statement, goto statement. Decision making & looping: for, while, and do-while loop; Jumps in loop, break, continue **Functions**: Definition, prototype, passing parameters, Recursion.

Unit-IV

Pointers: Declaration, operations on pointers, array of pointers, pointers to arrays. Data Structures: **Arrays:** One Dimensional, Multidimensional, Pointers and arrays. Strings: String Constants, Input &Output, String Functions. Structure & Unions. File Handling: Standard I/O text File, Writing to File, Reading a File.

Course Outcome: After completion of this syllabus

- Explore algorithmic approaches to problem solving and explain about the basic concepts of program development statements and its syntax.
- Ability to analyse a problem and devise an algorithm to solve it.
- Able to formulate algorithms, pseudo codes and flowcharts for arithmetic and logical problems.
- Ability to implement algorithms in the 'C' language.



- Explain the various types of arrays and its structure.
- Discuss about the various types of Functions and String handling mechanisms.
- Explain the Concepts of structures and Unions.
- Illustrates the various operations performed on different types of files.

Suggested Readings:

- 1. Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.
- 2. Gottfried: C Programming (Schaum's Outline Series), Tata McGraw-Hill Publishers.
- 3. Kanetkar: Let Us C, BPB Publications, New Delhi.
- 4. E. Balagurusamy: C Programming (Tata McGraw-Hill Publishers)
- 5. Donald Sanders: Computers Today, McGraw-Hill Publishers.
- 6. Davis: Introduction to Computers, McGraw-Hill Publishers.

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B.Sc. Computer Science Curriculum and Scheme (w.e.f. July,2022) B.Sc. Computer Science 2nd Semester

Paper Code: CSC- 102A

Computer Networks

L – T – P 3 – - - -Time-3Hrs Total Credits: 03 External Marks: 40 Internal Marks: 10

Note: Examiner will be required to set 09 questions in all. Question Number 1 will consist of total 4 parts (short-answer type questions) covering the entire syllabus and will carry 8 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 8 marks. Student will be required to attempt 05 questions in all.Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Course Objective:

- To understand basic concepts of computer network, introduction to signals, multiplexing, switching.
- To develop a complete awareness about communication, internetworking, and network security.

<u>Unit I</u>

Basic Concepts: Components of data communication. Line configuration, transmission mode, OSI TCP/IP Models: Layers and their functions, comparison of models.

Digital Transmission: Interfaces and modems: DTC-DEC Interfaces, modems cable modem.

Transmission media: Guided and unguided attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Channel Capacity, Shannon capacity.

<u>Unit II</u>

Introduction to signals. Analogue and digital signals, Periodic and aperiodic signals, time and frequency domains, composite signals

Encoding and modulation: Digital to digital conversion analogue to digital conversion. Analogue to Analogue conversion

Multiplexing, error detection and correction: Many to one, many to many, WDM, TDM, FDM, Telephone system, DSL, CDMA, FTTC

<u>Unit III</u>

Data link control protocols: Line discipline, flow control, error control, synchronous and asynchronous protocols, character and bit oriented protocols, Ethernet. Token Bus, token ring, FDDI, SMDS. **Switching:** Circuit switching packet switching, message switching.

<u>Unit IV</u>

Internetworking: Repeaters, bridges, gateways, Switch/Hub, Router, Tunnelling, Fragmentation, Firewalls **Network Security:** Cryptography-Public Key, secret Key, DNS- E-mail and WWW, E-mail Architecture.

Course Outcome:

• Understand basic computer network technology.



- Understand and explain Data Communications System and its components.
- Able to identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
- Identify the different types of network devices and their functions within a network.

• Understand the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Suggested Readings:

- 1. B.A. Forouzan: Data Communication and Networks 2nd Edition Tata Mc Graw Hill
- 2. A.S. Tanenbaums. Computer Networks Prentics Hall of India
- 3. J.E. Hayes, Modeling and Analysis of Computer Communication Networks, press.
- 4. D.E. Comer. Internetworking with TCP/IP, Vol. I. Prentice Hall of India.
- 5. W. Sralling. Data & Computer Communication, Maxwell Miamian Intranation Edition.

SPS Institute of Higher Learning Khanpor Kalan (Sonipat)

Programming in 'C' Practical

Paper Code: CSP- 102 L – T – P - . . . 4 Time-3Hrs External Marks: 40 Internal Marks: 10

Total Credits: 02 Total Marks: 50

Note: Practical ("C" Language)

Internal Assessment Marks (For Theory Papers)

Sr.No.	Criteria	Marks
1	One mid term exam	5
2	Seminar/Assignment	2.5
3	Attendance	2.5
	Total	10

Internal Assessment Marks (For Practical)

Sr.No.	Criteria	Marks
1	Practical Sheet/Program Execution	5
2	Practical File/Viva-Voce	2.5
3	Lab Attendance	2.5
	Total	10

Course Outcome:

- Able to devise pseudo code and flowchart for computational problems.
- Understand how to write, debug and execute simple programs in C.
- To analyse decision making, branching and looping and Functions.
- To demonstrate the pointers, arrays, structure and union.



B.Sc. Computer Science Curriculum and Scheme (w.e.f. July,2022) B.Sc. Computer Science 3rd Semester

Paper Code: CSC – 201A	Data & File Structure using 'C'	
$\mathbf{L} - \mathbf{T} - \mathbf{P}$		Total Credits: 03
3		External Marks: 40
Time: 3 Hrs.		Internal Marks: 10

Note: Examiner will be required to set 09 questions in all. Question Number 1 will consist of total 4 parts (short-answer type questions) covering the entire syllabus and will carry 8 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 8 marks. Student will be required to attempt 05 questions in all.Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Course Objective:

- To understand basic operations on data structure.
- To understand the knowledge of stack, queue, searching, sorting and files.

<u>Unit I</u>

Introduction to data structures, memory management techniques, data structure Operations, Algorithm notations, complexity of algorithm & time space trade off, arrays, different operations on arrays.

<u>Unit II</u>

Stack, memory representation of stacks, operation of stack, application of stack (Polish notations recursion), Queues, Operations on Queues, types of Queues, liked lists, representation of liked list, types of linked list.

<u>Unit III</u>

Searching (Internal & External), Searching techniques (Linear & Binary Search) **Sorting techniques**: Bubble Sort, Selection Sort, Insertion sort, Quick sort, merge sort.

<u>Unit IV</u>

Introduction to files: Components of file. Reasons for structuring files, logical data organization concepts of keys, types of files (According to function, Access mode), file operations, and file system.

Course Outcome:

- To study the data structures and operations.
- To study implantation of stacks, queues and linked list.
- To implement the techniques of searching and sorting.
- To study the concepts of files, files operation and types.

Suggested Readings:

- 1. Lipschutz: Data Structures (Schaum's Outline Series), Tata McGraw-Hill.
- 2. Adam Drozdek: Data Structures and Algorithms in C++, Vikas Pub. House (Thmpson), New Delhi.
- 3. Gupta Amit: Data Structures Through C, Galgotia Booksource Pvt. Ltd., New Delhi.
- 4. Sofat S.: Data Structures With C and C++, Khanna Book Pub. Co.(P) Ltd, N. Delhi.
- 5. Dromey R.G: How to Solve it by Computer ?, Prentice Hall India.



21

6. Loomis: Data Structure and File Management, Prentice-Hall India Ltd.

7. Tannenbaum: Data Structure Using C, Tata McGraw-Hill.



B.Sc. Computer Science Curriculum and Scheme (w.e.f. July,2022) B.Sc. Computer Science 3rd Semester

Paper Code: CSC - 201BComputer System Architecture

L - T - P

Total Credits: 03 External Marks: 40 Internal Marks: 10

Time-3Hrs

Note: Examiner will be required to set 09questions in all. Question Number 1 will consist of total 4 parts (short-answer type questions) covering the entire syllabus and will carry 8 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 8 marks. Student will be required to attempt 05 questions in all.Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Course Objective:

• To understand basic knowledge of sequential circuit, registers, memory and I/O Devices and organization.

<u>UNIT I</u>

Sequential Circuits: Designing registers – Serial Input Serial Output (SISO), Serial Input Parallel Output (SIPO), Parallel Input Serial Output (PISO), Parallel Input Parallel Output (PIPO), State table, state diagram and state equations, Flip-flop excitation tables

<u>UNIT II</u>

Shift registers. Designing counters – Asynchronous and Synchronous Binary Counters, Modulo-N, Counters and Up-Down Counters.

UNIT III

Memory & I/O Devices: Memory Parameters, Semiconductor RAM, ROM, Magnetic and Optical Storage devices, Flash memory, I/O Devices and their controllers.

UNIT IV

Instruction Design & I/O Organization: Machine instruction, Instruction set selection, Instruction cycle, Instruction Format and Addressing Modes. I/O Interface, Interrupt structure, Program controlled, Interruptcontrolled & DMA transfer, I/O Channels, IOP.

Course Outcome:

- Learn to design sequential circuits, design registers, state table, state diagram, flip flop excitation table.
- To design shift registers and counters.
- To study the working of memory and I/O devices.
- To study the design & I/O organization, their controllers and instruction.

Suggested Readings:

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.



2. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.

3. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.

4. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill

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B.Sc. Computer Science Curriculum and Scheme (w.e.f. July,2022) B.Sc. Computer Science 3rd Semester

Data & File Structure Using 'C' Lab.

Paper Code: CSP – 201 L – T – P -- -- 4 Time-3Hrs External Marks: 40 Internal Marks: 10

Total Credits: 02 Total Marks: 50

Note: Practical (Data & File Structure Using "C" Lab.)

Internal Assessment Marks (For Theory Papers)

Sr.No.	Criteria	Marks
1	One mid term exam	5
2	Seminar/Assignment	2.5
3	Attendance	2.5
	Total	10

Internal Assessment Marks (For Practical)

Sr.No.	Criteria	Marks
1	Practical Sheet/Program	5
	Execution	
2	Practical File/Viva-Voce	2.5
3	Lab Attendance	2.5
	Total	10

Course Outcome:

- To implement different operations of the data structures.
- To implement the stacks, queues and linked list and techniques of searching and sorting.



B.Sc. Computer Science Curriculum and Scheme (w.e.f. July,2022) B.Sc. Computer Science 4th Semester

Paper Code: CSC – 202A Advanced Data and File Structure

 $\begin{array}{ccc} \mathbf{L} - \mathbf{T} - \mathbf{P} \\ \mathbf{3} & \cdots & \cdots \end{array}$

Total Credits: 03 External Marks: 40 Internal Marks: 10

Time-3Hrs

Note: Examiner will be required to set 09 questions in all. Question Number 1 will consist of total 4 parts (short-answer type questions) covering the entire syllabus and will carry 8 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 8 marks. Student will be required to attempt 05 questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Course Objective:

- To understand basic knowledge of advance data structure like graph, tree.
- To understand the concept of storage, files, index, levels of index, multi key access, Inverted file organization, Multi list organisation.

<u>Unit I</u>

Graphs: Representation of Graphs in Memory, Traversing of Graphs, Binary Tree, Storage representation, Tree Traversal, Binary Search Tree, Searching & Inserting in BST.

<u>Unit II</u>

Introduction to Files: Types of Files (According to function, Access mode), files Operations, file System, Storage devices, Magnates tape (Blocking & De –Blocking), tape utilization, Size of Block, Application Areas of Magnetic tape, Advantage & Disadvantage of tape, Timing Determination, Magnetic Disk (Access time, Advantage & Disadvantages), floppy disk, Comparison between different Storage Devices

<u>Unit III</u>

File Organization: Types of File Organization: Serial Sequential, Direct, Indexed Sequential Access Method (ISAM), Hashing algorithm, Collision & Synonym., Choice of file organization Methods.

<u>Unit IV</u>

Concepts of index, Levels of index, Multi Key Access, Inverted File Organization, Multi list Organization

Course Outcome:

- To implement the representation of graphs in memory, binary tree, Binary Search Tree, operation of graph.
- To study the types of files, file operations, file system
- To study the file organizations & types of files.
- To analyse the concept of index, levels of index, multi key access, Inverted file organization, Multi list organisation.



Suggested Readings:

1. Lipschutz: Data Structures (Schaum's Outline Series), Tata McGraw-Hill.

2. Adam Drozdek: Data Structures and Algorithms in C++, Vikas Pub. House (Thmpson), New Delhi.

3. Gupta Amit: Data Structures Through C, Galgotia Booksource Pvt. Ltd., New Delhi.

4. Sofat S.: Data Structures With C and C++, Khanna Book Pub. Co.(P) Ltd, N. Delhi.

5. Dromey R.G: How to Solve it by Computer ?, Prentice Hall India.

6. Loomis: Data Structure and File Management, Prentice-Hall India Ltd.

7. Tannenbaum: Data Structure Using C, Tata McGraw-Hill.



B.Sc. Computer Science Curriculum and Scheme (w.e.f. July,2022) B.Sc. Computer Science 4th Semester

Paper Code: CSC – 202B Object Oriented Programming with C++

 $\begin{array}{c} \mathbf{L} - \mathbf{T} - \mathbf{P} \\ \mathbf{3} \quad \cdots \quad \cdots \end{array}$

Total Credits: 03 External Marks: 40 Internal Marks: 10

Time-3Hrs

Note: Examiner will be required to set 09 questions in all. Question Number 1 will consist of total 4 parts (short-answer type questions) covering the entire syllabus and will carry 8 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 8 marks. Student will be required to attempt 05 questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Course Objective:

- To understand basic concepts of object oriented programming and applications.
- To understand the concept of object, classes, inheritance, data hiding etc.

<u>Unit-I</u>

Object Oriented Programming: Software evolution. Object oriented Languages and Applications. **Object Oriented Concepts**: Class, Object, Abstraction, Inheritance, Polymorphism, Overriding, Abstract Class & methods. Generalization, Aggregation, Associations.

<u>Unit-II</u>

Introduction to Programming C++: Object-Oriented Features of C++, data types in C++, variables, operators, flow control, recursion, array, Pointers and their manipulation, strings, structures, Class and Objects, Data Hiding & Encapsulation, Data members and Member functions, Inline Functions, Friend Functions, Comparing C with C++.

<u>Unit- III</u>

Inheritances: Single Inheritance, Multiple Inheritance, Hierarchical, Hybrid Inheritance, polymorphism, pointers, virtual functions, console I/O operations.

<u>Unit- IV</u>

Files: Classes for file stream Operations-opening, closing and processing file, End of file detection, file pointers, updating a file, Error Handling during file Operations.

Course Outcome:

- To study the basic concepts of object oriented programming and applications.
- Use the benefits of object oriented design and understand when it is an appropriate methodology to use.
- To learn object, oriented programming, data types, variables, operators, recursion, array, data hiding and encapsulation, inline function and friend function.
- To implement inheritance, polymorphism, virtual function, console I/O operation.
- To analyse classes for file stream, operation on file, error detection in file.



28

Suggested Readings:

- 1. Balagurusamy, E.: Object-Oriented Programming With C++, Tata McGraw-Hill.
- 2. Subburaj, R.: Object-Oriented Programming With C++, Vikas Pub. House, New Delhi.
- 3. Rumbaugh, J. et. al.: Object-Oriented Modelling and Design, Prentice Hall of India.
- 4. Booch, Grady: Object-Oriented Analysis & Design, Addison Wesley.
- 5. Chndra, B.: Object Oriented Programming Using C++, Narosa Pub. House, New Delhi.
- 6. Stroustrup, B.: The C++ Programming Language, Addison-Wesley.
- 7. Lippman: C++ Primer, 3/e, Addison-Wesley.
- 8. Schildt, Herbert: C++: The Complete Reference, 2/e, Tata McGraw-Hill



B.Sc. Computer Science Curriculum and Scheme (w.e.f. July, 2022) B.Sc. Computer Science 4th Semester

Paper Code: CSP- 202 Object Oriented Programming with C++ Lab. L – T – P Total Credits: 02 - -- - 4 Total Marks: 50 Time-3Hrs External Marks: 40

External Marks: 40 Internal Marks: 10

Note: Practical (OOPS Using "C++" Lab.)

Internal Assessment Marks (For Theory Papers)

Sr.No.	Criteria	Marks
1	One mid term exam	5
2	Seminar/Assignment	2.5
3	Attendance	2.5
	Total	10

Internal Assessment Marks (For Practical)

Sr.No.	Criteria	Marks
1	Practical Sheet/Program Execution	5
2	Practical File/Viva-Voce	2.5
3	Lab Attendance	2.5
	Total	10

Course Outcome:

- To learn and implement object, oriented programming, data types, variables, operators, recursion, array, data hiding and encapsulation, inline function and friend function.
- To implement inheritance, polymorphism, virtual function, console I/O operation.



B.Sc. Computer Science Curriculum and Scheme (w.e.f. July, 2022) B.Sc. Computer Science 5th Semester

Paper Code: CSC - 301AData Base Management System

 $\begin{array}{c} \mathbf{L} - \mathbf{T} - \mathbf{P} \\ \mathbf{3} \quad \cdots \quad \cdots \end{array}$

Time-3Hrs

Total Credits: 03 External Marks: 40 Internal Marks: 10

Note: Examiner will be required to set 09 questions in all. Question Number 1 will consist of total 4 parts (short-answer type questions) covering the entire syllabus and will carry 8 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 8 marks. Student will be required to attempt 05 questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Course Objective:

- To understand basic concepts of traditional files and database based approaches.
- To understand the knowledge of Centralized and Client Server architecture, Data Independence, E-R Model and SQL.

<u>UNIT-I</u>

Basic Concepts – Data, Information, Records and files. Traditional file – based Systems-File Based Approach-Limitations of File Based Approach, Database Approach-Characteristics of Database Approach, Database Management System (DBMS), Components of DBMS Environment, DBMS Functions, Advantages and Disadvantages of DBMS. Classification of Database Management System. Roles in the Database Environment Data and Database Administrator.

<u>UNIT – II</u>

Centralized and Client Server architecture to DBMS. Database System Architecture – Three Levels of Architecture, External, Conceptual and Internal Levels, Schemas, Mappings and Instances.

Data Independence: Logical and Physical Data Independence. Data Models: Records- based Data Models, Object-based Data Models, Physical Data Models and Conceptual Modeling. Hierarchical, network and Relational model

<u>UNIT – III</u>

Entity-Relationship Model – Entity Types, Entity Sets, Attributes and keys, Relationship, relationship sets, Role name & recursive relationship and structural constraints, Conceptual design using E-R Diagrams. **Relational Data Model**:-Introduction, Properties of Relations, Keys, Integrity Constraints over Relations, Views.

Relational Database Design: Functional Dependencies, Normalization:1st to 3rd Normal Form, BCNF, Lossless Join and Dependency preserving decomposition.

<u>UNIT – IV</u>

SQL: Types & components of SQL, Data Definition and data types, Data definition commands, Data manipulation commands, Data Control Commands Specifying Constraints (Primary Constraint. Foreign key, Unique, Not Null) in SQL, Schema, Basic Queries in SQL, Insert, Delete and Update operations. In-built Date, String functions. Commit, Rollback, save points. Views: Introduction, Advantages of creating views, Features, Destroying/ Altering table & Views.



Course Outcomes:

- Understand fundamental concepts of database.
- Understand user requirements and frame it in data model.
- Ability in creations, manipulation and querying of data in databases.
- Ability to solve real world problems using appropriate set, function, and relational models.
- Ability to design E-R Model for given requirements and convert the same into database tables.

Suggested Readings:

- 1. Elmasri & Navathe, "Fundamentals of Database Systems", 5th edition, Pearson Education.
- 2. Thomas Connolly Carolyn Begg, "Database Systems", 3/e, Pearson Education
- 3. C. J. Date, "An Introduction to Database Systems", 8th edition, Addison Wesley N. Delhi.
- 4. Raghurama Krishnan: Database Management Systems, Johannes Gehrke, TMH.
- 5. Siberschatz, Korth: Database System Concepts, McGRaw Hill, latest Edition
- 6.C.J Date: An Introduction to Date base Systems. VoI & II, Addison Wesley,
- 7.J.D Ullman, Principal of Date base systems, Golgotha, New Delhi.
- 8. Wiederhold, Date base Design, Mc Grew Hill
- 9.R. Elmasri, and S.B. Nava the, Fundamentals of database Systems, Pearson Education Asia.
- 10.R. Ramakrishna. J. Gemke, Date base Management Systems, Mc Graw-Hill



B.Sc. Computer Science Curriculum and Scheme (w.e.f. July, 2022) B.Sc. Computer Science 5th Semester

Paper Code: CSC – 301B

Operating System

 $\begin{array}{c} \mathbf{L} - \mathbf{T} - \mathbf{P} \\ \mathbf{3} \quad \cdots \quad \cdots \end{array}$

Time-3Hrs

Total Credits: 03 External Marks: 40 Internal Marks: 10

Note: Examiner will be required to set 9 questions in all. Question Number 1 will consist of total 4 parts (shortanswer type questions) covering the entire syllabus and will carry 8 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 8 marks. Student will be required to attempt 5 questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Course Objective:

- To understand basic concepts of operating system and its types.
- To understand the knowledge of different functions of operating systems.

<u>UNIT- I</u>

Introduction: Introductory Concepts: Operating system functions and characteristics, historical evolution of operating systems, types of Operating System: Real time, Multiprogramming, Multiprocessing, Batch processing, O/S service system calls, system programs.

<u>UNIT – II</u>

Process Management: Process concepts, operations on processes, Process states and Process Control Block. CPU Scheduling: Scheduling criteria, Levels of Scheduling, Scheduling algorithms, Multiple processor scheduling. Deadlocks: Deadlock characterization, Deadlock prevention and Avoidance.

<u>UNIT – III</u>

Concurrent Processes: Critical section problem, Semaphores, Classical process co-ordination problems and their solutions, Inter-process Communications. Storage Management:memory management of single-user and multi-user operating system, partitioning, swapping, paging and segmentation, Thrashing.

UNIT-IV

Memory Management: Mapping address space to memory space, memory allocation strategies, fixed partition, variable partition, segmentation

File management: File Systems: Functions of the system, File access methods, allocation methods Contiguous, allocation, and linked, indexed allocation.

Course Outcomes:

• Understand the role of operating system as System software.



- Able to compare the various algorithms and comment about performance of various algorithms used for management of memory, CPU scheduling, File handling and I/O operations.
- Understand various concept related with Deadlock to solve problems related with Resources allocation, after checking system in Safe state or not.
- To understand role of Process synchronization towards increasing throughput of system.

Suggested Readings:

1. Deitel, H.M., "Operating Systems", Addison- Wesley Publishing Company, New York.

2. Tanenbaum, A.S., "Operating System- Design and Implementation", Prentice Hall of India, New Delhi.

3. Silberschatz A., Galvin P.B., and Gagne G., "Operating System Concepts", John Wiley & Sons, Inc., New York.

4. Godbole, A.S., "Operating Systems", Tata McGraw-Hill Publishing Company, New Delhi.

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Paper Code: CSP – 301	Data Base Management System Lab.	
$\mathbf{L} - \mathbf{T} - \mathbf{P}$	Total Credits: 02	
4	Total Marks: 50	
Time-3Hrs		
External Marks: 40		
Internal Marks: 10		

Note: Practical (Oracle and SQL queries)

Internal Assessment Marks (For Theory Papers)

Sr.No.	Criteria	Marks
1	One mid term exam	5
2	Seminar/Assignment	2.5
3	Attendance	2.5
	Total	10

Internal Assessment Marks (For Practical)

Sr.No.	Criteria	Marks
1	Practical Sheet/Program Execution	5
2	Practical File/Viva-Voce	2.5
3	Lab Attendance	2.5
	Total	10

Course Outcome:

- To use SQL- the standard language of relational databases.
- Able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
- Able to identify and analyse user needs and take them into account in the selection, creation, evaluation and administration of computer-based.
- Students will able to write and execute simple and nested queries.



B.Sc. Computer Science Curriculum and Scheme (w.e.f. July,2022) B.Sc. Computer Science 6th Semester

Visual Basic Programming

Total Credits: 3

External Marks: 40 Internal Marks: 10

 $\begin{array}{c} \mathbf{L} - \mathbf{T} - \mathbf{P} \\ \mathbf{3} \quad \dots \quad \dots \end{array}$

Paper Code: CSC – 302A

Time-3Hrs

Note: Examiner will be required to set 09 questions in all. Question Number 1 will consist of total 4 parts (short-answer type questions) covering the entire syllabus and will carry 8 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 8 marks. Student will be required to attempt 5 questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Course Objective:

- To understand basic concepts of Visual Programing.
- To understand the knowledge of multiple controls and their properties, methods.

<u>Unit I</u>

Introduction to VB: Visual & Non-visual programming, Procedural, Object-oriented and event- driven Programming languages, The VB environment: Menu bar, Toolbar, Project explorer, Toolbox, Properties Window, Form designer, Form layout, immediate window. Event driven programming.

<u>Unit II</u>

Textboxes, command buttons, frames, check Boxes, Option Buttons, Images, Setting a Border & Styles, the Shape Control, The line Control, Working with multiple controls and their properties. Designing the user Interface, Keyboard access, Val function.

<u>Unit III</u>

Basics of Programming: Variables: Declaration, Types of variables, Converting variables types, User defined data types, Scope & lifetime of variables. Constants: Named & intrinsic. **Operators:** Arithmetic, Relational & Logical operators. I/O in VB: Various controls for I/O in VB, Message box, Input Box, Print statement.

<u>Unit IV</u>

Programming with VB: Decisions and conditions: If statement, If-then-else, Select-case. Looping statements: Do-loops, for-next, While-wend, Exit statement. Nested control structures. Arrays: Declaring and using arrays, one-dimensional and multi-dimensional arrays, Static & dynamic arrays, Arrays of array.

Course Outcome:

- To learn basic concepts of Program building block control statements and the basic concepts of function and procedure of Visual Basics, IDE, and event driven programming
- To implement the designing of multiple commands and controls, Val function.
- To implement the basics of programming, data type, variables message box etc.
- Describe the functionality and properties of GUI based ActiveX Control with example programs.



36

- Discuss about graphics handling related control and properties.
- To implement programming with Visual basic decision and conditions: if statement, looping, arrays.

Suggested Readings:

- (1) Programming in VB 6 by Julia case Bradley, Anita C, Millspaugh, TMH
- (2) Visual Basic 6.0 Programming by Content Development Group, TMH
- (3) The Complete Reference Visual basic 6 by Noel Jerke, TMH

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B.Sc. Computer Science Curriculum and Scheme (w.e.f. July,2022) B.Sc. Computer Science 6th Semester

Paper Code: CSC – 302B

Software Engineering

 $\begin{array}{c} \mathbf{L} - \mathbf{T} - \mathbf{P} \\ \mathbf{3} \quad \cdots \quad \cdots \end{array}$

Time-3Hrs

Note: Examiner will be required to set 9 questions in all. Question Number 1 will consist of total 4 parts (shortanswer type questions) covering the entire syllabus and will carry 8 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 8 marks. Student will be required to attempt 5 questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Course Objective:

- To understand basic concepts of software engineering, SDLC, SRS, DFD, SQA.
- To understand the knowledge of different size and cost metrics.

<u>Unit 1</u>

Software and software engineering: Software characteristics, Software Processes, software crisis, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models, software engineering paradigms, goals and principles of software engineering.

Unit 2

Software requirement analysis – Structured analysis, object-oriented analysis and data modeling, software requirement specification, validation. Software requirements Analysis and Specifications: Requirement engineering, requirements analysis using DFD, Data Dictionaries and E-R Diagram, requirement documentation, nature of SRS, characteristics and organization of SRS.

<u>Unit3</u>

Size Metrics, Function point analysis, phases process models, Software process, Software Quality, role of metrics & measurement.

Cost estimation COCOMO model, Project Scheduling Software Quality Assurance, Project monitoring plans

<u>Unit 4</u>

Design and implementation of software- Software design fundamentals, software design principles, Cohesion and Coupling, Classification of Cohesion and Coupling, Function oriented design, and object oriented Design, design verification, monitoring and control.Concept of Software reliability & Availability. Safety of the software, Error, Fault & Failure of software. Reliability Models & limitations.

Course Outcome:

- Able to design and conduct experiments, as well as to analyse and interpret data.
- Able to identify, formulate, and solve engineering problems.



Total Credits: 3 External Marks: 40 Internal Marks: 10

- Able to analyse, design, verify, validate, implement, apply, and maintain software systems.
- Able to understand different phases of SDLC.

Suggested Readings:

- 1) Software Engineering By Nasib Singh Gill, Khanna Publication
- 2) Software Engg:- Metrics, testing and faults, Rajender Singh Chhillar, Excel Books new Delhi.
- 3) Software Engg:- Roger, S, Pressman, Mc-Graw hill
- 4) An Integrated Approach to Software Engg. Pankaj Jolote. Narose
- 5) Software Runaways, Glass, R.L. Prentice Hall
- 6) Risk Management Economics Bohem B.IEEE Computer Society Press.
- 7) Software Engineering Economics Bohem B.IEEE Computer Society Press.
- 8) Software Engineering By Sommerville.



B.Sc. Computer Science Curriculum and Scheme (w.e.f. July,2022) B.Sc. Computer Science 6th Semester

Credits: 2
Iarks: 50
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Note: Practical (Visual Basic Programming)

Internal Assessment Marks (For Theory Papers)

Sr.No.	Criteria	Marks
1	One mid term exam	5
2	Seminar/Assignment	2.5
3	Attendance	2.5
	Total	10

Internal Assessment Marks (For Practical)

Sr.No.	Criteria	Marks
1	Practical Sheet/Program Execution	5
2	Practical File/Viva-Voce	2.5
3	Lab Attendance	2.5
	Total	10

Course Outcome:

- To implement the designing of multiple commands and controls, Val function.
- To implement the basics of programming, data type, variables message box etc.
- To implement programming with Visual basic decision and conditions: if statement, looping, arrays.

