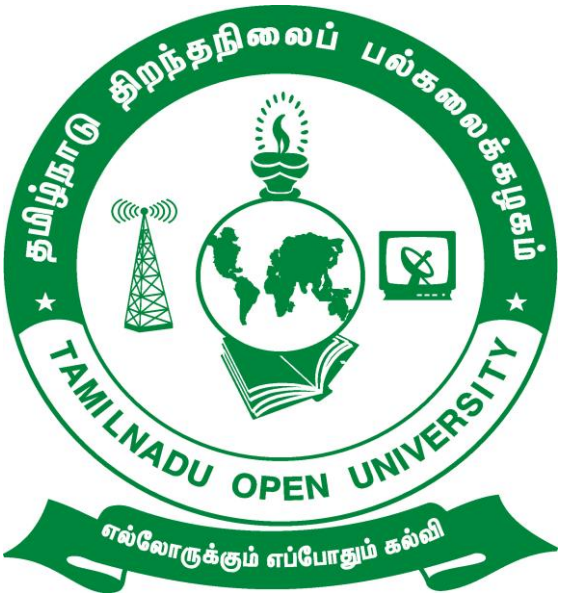
Tamil Nadu Open University

Regulations and Overview for

Bachelor of Science in Computer Science (Semester)

[w.e.f. Academic Year 2022-2023]



Department of Computer Science

School of Computer Science

Tamil Nadu Open University

Chennai - 600 015.

School of Computer Science Board of Studies (BoS) members list

1. Dr. H. Khanna Nehemiah, — Chairman
   Professor,
   Ramanujan Computing Centre,
   Anna University, Chennai-600 025.

2. Dr. N. Sivashanmugam, — Member
   Director i/c,
   School of Computer Science,
   Tamil Nadu Open University,
   Chennai-600 015.

3. Dr. R. Kalaiarasi, — Member
   Assistant Professor,
   School of Computer Science,
   Tamil Nadu Open University,
   Chennai-600 015.

4. Dr. S. Gopinathan, — Member
   Professor,
   Department of Computer Science,
   University of Madras,
   Chennai-600 005.

5. Dr. S. Sasikala, — Member
   Associate Professor,
   Department of Computer Science,
   Institute of Distance Education,
   University of Madras, Chennai-600 005.

6. Dr. M. Nandhini, — Member
   Associate Professor,
   Department of Computer Science,
   Pondicherry University,
   Pondicherry- 605 014.

7. Mr. V. Niresh, — Member
   Trimble Information technology India Pvt. Ltd.
   5th Floor, Tidel Park, Taramani,
   Chennai - 600 113.

8. Mr. Naren Krishnan, — Member
   Senior IT Architect,
   IBM india Pvt. Ltd. Block1A, DLF IT Park, Ramapuram,
   Chennai - 600 089.

9. Ms. T .Gayathri Devi, — Member
   M.Sc. Computer Science,
   NO.30/2, Ayyappan Nagar, Periyar Pathai, Chennai- 600 094.

Bachelor of Science in Computer Science- (B.Sc. CS)

Regulations

1. Programme Objectives:

- To train the students to understand the basics of Computer Science
- To improve the ability to solve problems, think independently and to understand the role of Computer Science in Information technology
- To realize the significance of software development.
- To use appropriate theory, practices and tools to design, implement, test and evaluate systems to solve problems in Computer Science and other fields
- To provide Employment Opportunity to the Unemployed in Rural / Urban areas.

2. Programme Outcomes (POs):

- Communication: Students will be able to communicate in written and oral forms in such a way as to demonstrate their ability to present information clearly, logically, and critically.
- Mathematics and Theory: Students will be able to apply mathematical and computing theoretical concepts in solution of common computing applications, such as computing the order of an algorithm.
- Programming: Students will be able to complete successfully be able to program small-to-mid-size programs on their own. Sufficient programming skills will require use of good practice, e.g., good variable names, good use of computational units, appropriate commenting strategies.
- Systems Design and Engineering: Students will be able to use appropriately system design notations and apply system design engineering process in order to design, plan, and implement software systems
- Depth of Knowledge: In a self-selected area of depth in Computing, students will demonstrate a depth of knowledge appropriate to graduate study and/or lifelong learning in that area. Students should be able to read for understanding materials in that area beyond those assigned in coursework.
- Preparation for Career and/or Graduate Study: Students will be prepared for a career in an information technology oriented business or industry, or for graduate study in computer science or other scientific or technical fields.

3. Programme Specific Outcomes (PSOs):

A graduate with a B.Sc. in Computer Science will have the ability to

- Demonstrate in the following core knowledge areas like Data Structures and Programming Languages, Databases, Software Engineering and Development, Computer Hardware and Architecture, Testing, Web technology, Management studies etc.
- Apply problem-solving skills and the knowledge of computer science to solve real world problems.
- Develop technical project reports and present them orally among the users.

4. **Eligibility for Admission:** Candidates should have passed the Higher Secondary Examination (10+2 pattern) conducted by the Board of Higher Secondary Education, Government of Tamilnadu or any other examination (10+3 pattern) accepted by Syndicate, as equivalent thereto.

5. **Medium:** English

6. **Duration of the course:**

The course for the degree of Bachelor of Science in Computer Science shall consist of three years (Six Semester).

7. **Admission:**

The candidate's admission for the degree of Bachelor of Science in Computer Science will be taken in Academic year and Calendar year.

8. **Course of Study:**

The course of study shall comprise instruction in the following subjects according to the syllabus.

First Year	
First Semester	1. Tamil/Other languages 2. Foundation in English 3. Mathematics-I 4. Problem Solving 5. Fundamentals of Computing 6. Office Automation Laboratory
Second Semester	1. Tamil/Other languages 2. Foundation in English 3. C Programming 4. Digital Electronics 5. Principles of Programming Languages 6. C Programming Laboratory
Second Year	
Third Semester	1. Tamil/Other languages 2. Foundation in English 3. Mathematics-II 4. Programming Using C++ 5. Data Structures 6. C++ & Data Structures – Laboratory
Fourth Semester	1. Tamil/Other languages 2. Foundation in English 3. Statistics 4. Operating Systems 5. Database Management Systems 6. Database Management Systems Laboratory 7. Environmental Studies
Third Year	

Fifth Semester	1. Software Engineering 2. Computer Networks 3. Java Programming 4. Web Designing 5. Web Designing Laboratory (HTML / DHTML/ CSS) 6. Java Programming Laboratory
Sixth Semester	1. Programming in Python 2. Mobile Computing 3. Elective I 4. Elective II 5. Python Programming Laboratory 6. Project Work

9. Examinations:

The examination for the B.Sc. Degree programme shall consist of theory, practical and Project papers.

(i) Theory Examinations: The theory examinations shall be of three hours duration to each paper and conducted at the end of each year. The candidates who failing in any subject(s) will be permitted to appear for each failed subject(s) in the subsequent examinations.

(ii) Practical Examinations: The practical examinations shall be of three hours duration to each practical and conducted at the end of each year. The candidates who failing in any practical(s) will be permitted to appear for each failed practical(s) in the subsequent examinations.

(iii) Project Examinations: The project examinations shall be of three hours duration to each the project and conducted at the end of each year. The candidates who failing in the project examinations will be permitted to appear in the subsequent examinations.

10. Scheme of Examinations:

The scheme of examinations of different year shall be as follows:

S.No.	Course Code	Course Name	Category	TEE + CIA	Total Marks	Min. Pass Mark	Credits
First Semester							
1.	BFTMS-11	Tamil/Other languages	**GE**	**70+30**	**100**	**40**	**3**
2.	BFEGS-11	Foundation in English	**AECC**	**70+30**	**100**	**40**	**3**
3.	BMSS-A1	Mathematics-I	**GE**	**70+30**	**100**	**40**	**3**
4.	BSCSS-11	Problem Solving	**CC**	**70+30**	**100**	**40**	**3**
5.	BSCSS-12	Fundamentals of Computing	**CC**	**70+30**	**100**	**40**	**3**
6.	BSCSS -	Office Automation	**SEC**	**70+30**	**100**	**40**	**2**

	P1	Laboratory					
Second Semester							
7.	BFTM-21	Tamil/Other languages	**GE**	**70+30**	**100**	**40**	**3**
8.	BFEG-21	Foundation in English	**AECC**	**70+30**	**100**	**40**	**3**
9.	BSCSS-21	C Programming	**CC**	**70+30**	**100**	**40**	**3**
10.	BSCSS-22	Digital Electronics	**CC**	**70+30**	**100**	**40**	**3**
11.	BSCSS-23	Principles of Programming Languages	**CC**	**70+30**	**100**	**40**	**3**
12.	BSCSS - P2	C Programming Laboratory	**SEC**	**70+30**	**100**	**40**	**2**
Third Semester							
13.	BFTMS-31	Tamil/Other languages	**GE**	**70+30**	**100**	**40**	**3**
14.	BFEGS-31	Foundation in English	**AECC**	**70+30**	**100**	**40**	**3**
15.	BMSSS-A2	Mathematics-II	**GE**	**70+30**	**100**	**40**	**3**
16.	BSCSS-31	Programming Using C++	**CC**	**70+30**	**100**	**40**	**3**
17.	BSCSS-32	Data Structures	**CC**	**70+30**	**100**	**40**	**3**
18.	BSCSS -P3	C++ & Data Structures Laboratory	**SEC**	**70+30**	**100**	**40**	**3**
Fourth Semester							
19.	BFTMS-41	Tamil/Other languages	**DSE**	**70+30**	**100**	**40**	**3**
20.	BFEGS-41	Foundation in English	**CC**	**70+30**	**100**	**40**	**3**
21.	BSCSS-41	Statistics	**CC**	**70+30**	**100**	**40**	**3**
22.	BSCSS-42	Operating Systems	**CC**	**70+30**	**100**	**40**	**3**
23.	BSCSS-43	Database Management Systems	**SEC**	**70+30**	**100**	**40**	**2**
24.	BSCSS –P4	Database Management Systems Laboratory	**SEC**	**70+30**	**100**	**40**	**2**
25.	CCES	Environmental Studies	**AECC**	**70+30**	**100**	**40**	**2**
Fifth Semester							
26.	BSCSS-51	Software Engineering	**CC**	**70+30**	**100**	**40**	**3**
27.	BSCSS-52	Computer Networks	**CC**	**70+30**	**100**	**40**	**3**
28.	BSCSS-53	Java Programming	**CC**	**70+30**	**100**	**40**	**3**
29.	BSCSS-54	Web Designing	**CC**	**70+30**	**100**	**40**	**3**
30.	BSCSS –P5	Java Programming Laboratory	**SEC**	**70+30**	**100**	**40**	**2**
31.	BSCSS –P6	Web Designing Laboratory (HTML / DHTML/ CSS)	**SEC**	**70+30**	**100**	**40**	**2**
Sixth Semester							

32.	BSCSS-61	Programming in Python	**SEC**	**70+30**	**100**	**40**	**3**
33.	BSCSS-62	Mobile Computing	**CC**	**70+30**	**100**	**40**	**3**
34.		Elective I	**DSE**	**70+30**	**100**	**40**	**3**
35.		Elective II	**GE**	**70+30**	**100**	**40**	**3**
36.	BSCSS – P7	Python Programming Laboratory	**SEC**	**70+30**	**100**	**40**	**2**
37.	BSCSS-P8	Project Work	**DSE**	**-**	**100**	**40**	**4**
						Total Credits	**100**

CC- Core Course,
DSE- Discipline Specific,
SEC – Skill Enhancement Course,
GE-Generic Elective,
AECC- Ability Enhancement Compulsory Course.
CIA- Continuous Internal Assessment
TEE- Term End Examination

LIST OF ELECTIVES

S.No.	Course Code	Course Name
	ELECTIVE – I (Select any one Course)	
1.	BSCSS-63	Software Testing
2.	BSCSS-64	E - Learning
3.	BSCSS-65	E-Commerce
7.	BSCSS-66	Data Mining
9.	BSCSS-67	Constitution of India
	ELECTIVE – II	
1	Any one UG Course Offered from Other Departments of TNOU	

11. Question Pattern for Theory Examinations:

Tamil Nadu Open University
Examination Section – SRE-1
Term End Examination_____
B.A. / B.Sc. / BBA / BCA Degree Examination
(Batch CY 2020 Onwards)

Course: XXXX Course Code: XXXX
Max. Marks: 70 Time: 3 hours

PART - A (5 × 2 = 10 marks)

Answer all FIVE questions in 50 words

[All questions carry equal marks]

1. From Block - I
2. From Block – II
3. From Block - III
4. From Block - IV
5. From Block- V

PART - B (4 × 5 = 20 marks)

Answer any FOUR questions out of Seven questions in 150 words

All questions carry equal marks

6. From Block - I
7. From Block - II
8. From Block - III
9. From Block - IV
10. From Block- V
11. From any Block
12. From any Block

PART - C (4 × 10 = 40 marks)

Answer any FOUR questions out of Seven questions in 400 words

[All questions carry equal marks]

13. From Block - I
14. From Block - II
15. From Block - III
16. From Block - IV
17. From Block - V
18. From any Block
19. From any Block

12. Passing Minimum:

i) For theory examination: The candidate shall be declared to have passed the examination if the candidate secures not less than 25 marks in the Term End Examinations (TEE) in each theory paper and secures not less than 13 marks in the Continuous Internal Assessment (CIA) and overall aggregated marks is 40 marks in both external and internal taken together.

Continuous Internal Assessment (CIA)		Term End Examination (TEE)		Overall Aggregated Marks	Maximum Marks
Minimum	Maximum	Minimum	Maximum	CIA + TEE	

Pass Mark	Mark	Pass Mark	Mark		
13	30	25	70	40	100

ii) For practical examination: The candidate shall be declared to have passed the examination if the candidate secures not less than 30 marks in the External Practical Examinations and secures not less than 10 marks in the Continuous Internal Assessment (CIA) (Record Marks + Practical Counselling Class Attendance) and overall aggregated marks is 40 marks in both external and internal taken together. However submission of record notebook is a must.

iii) Project work: The project course code will be evaluated for 100 marks. The 100 marks is awarded for Evaluation of the Project. The passing minimum in the project work is 40% of the total mark. i.e. the student should get minimum 40 marks out of 100 marks in the project evaluation.

13. Awarding of marks for Practical examinations.

The following pattern is prescribed for practical courses for Bachelor of Science in Computer Science B.Sc.,(CS) in distance mode

SNO	Activities	Marks
1	Writing the Program	20
2	Compiling Program	20
3	Running Program	10
4	Record Work	10
5	Viva	10
	Total	**70**

14. Awarding of marks for Project examinations.

SNO	Activities	Marks
1	Design and Analysis	50
2	Coding	25
3	Organization of Report	25
	Total	**100**

15. Classification of Successful Candidates:

Candidates who pass all the courses prescribed and who secure 60% and above in the aggregate of marks in Core courses will be placed in the First Class. Those securing 50% and above but below 60% in the aggregated will be placed in the Second Class. All other successful candidates will be placed in the Third Class.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – I Semester (Distance Mode)

COURSE TITLE : Problem Solving
COURSE CODE : BSCSS-11
COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the Problem Solving, the student shall be able to:

- Understand the Basic Principles of Algorithm Design
- Understand the Role of Abstraction in Problem Solving
- Acquire Knowledge about Algorithms that Involve a Simple Repetitive Process
- Understand the Need for Problem Decomposition
- Gain Knowledge on the Principle of Mathematical Induction for Problem Solving

COURSE OUTCOMES

After completion of the Problem Solving, the student will be able to:

- Identify needed information and/or eliminate extraneous information towards solving contextual problems.
- Recognize proportional relationships from verbal, graphical, symbolic or numerical scenarios.
- Use proportionality to solve and analyze a variety of multi-step contextual problems.

Block-1

Invariants – Chocolate-bar Problem – Empty-box Problem – Tumbler Problem – Tetrominoes – Goat-cabbage-wolf Problem – Brute-force Search – State-space Explosion – Abstraction – Nervous-couples Problem – Denoting States and Transitions – Rule of Sequential Composition – Bridge Problem – Conditional Statements.

Block-2

Games – Matchstick Game – Winning Strategies – Subtraction-set Games – Sums of Games – Knights and Knaves – Logic Puzzles – Calculational Logic – Equivalence and Continued Equalities – Negation.

Block-3

Induction – Black and White Colouring – Cutting the Plane – Triomino Problem – Looking for Patterns – The Need for Proof – From Verification to Construction.

Block-4

Fake-Coin Detection – Problem Formulation – Problem Solution – Tower of Hanoi Problem – Specification and Solution –Inductive Solution – Iterative Solution –Principles of Algorithm Design – Iteration. Invariants and Making Progress – Sam Loyd's Chicken-Chasing Problem.

Block-5

Bridge Problem – Lower and Upper Bounds – Outline Strategy – Regular Sequences – Sequencing Forward Trips – Choosing Settlers and Nomads – Knight's Circuit – Straight-Move Circuits – Super Squares – Partitioning the Board.

Reference book:

1. Roland Backhouse, "Algorithmic Problem Solving", 2011 John Wiley & Sons Ltd.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – I Semester (Distance Mode)

COURSE TITLE : Fundamentals of Computing

COURSE CODE : BSCSS -12

COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the Fundamentals of Computing, the student shall be able to:

- to introduce IT in a simple language to all undergraduate students, regardless of their specialization.
- to pursue specialized programs leading to technical and professional careers and certifications in the IT industry.
- focus of the subject is on introducing skills relating to IT basics, computer applications, programming, interactive medias, Internet basics etc.

COURSE OUTCOMES

After completion of the Fundamentals of Computing, the student will be able to:

- Understand basic concepts and terminology of information technology.
- Have a basic understanding of personal computers and their operations.
- Be able to identify issues related to information security.

Block 1: Introduction to Computers: Introduction, Definition, .Characteristics of computer, Evolution of Computer, Block Diagram Of a computer, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations of computer.

Block 2: Basic Computer Organization: Role of I/O devices in a computer system. Input Units: Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, Output Units: Monitors and its types. Printers: Impact Printers and its types. Non Impact Printers and its types, Plotters, types of plotters, Sound cards, Speakers.

Block 3: Storage Fundamentals: Primary Vs Secondary Storage, Data storage & retrieval methods. Primary Storage: RAM ROM, PROM, EPROM, EEPROM. Secondary Storage: Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives.

Block 4: Software: Software and its needs, Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. Application S/W and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS s/w. Operating System: Functions, Measuring System Performance, Assemblers, Compilers and Interpreters. Batch Processing, Multiprogramming, Multi Tasking, Multiprocessing, Time Sharing, DOS, Windows, Unix/Linux.

Block 5: Data Communication: Communication Process, Data Transmission speed, Communication Types (modes), Data Transmission Medias, Modem and its working, characteristics, Types of Networks, LAN Topologies, Computer Protocols, Concepts relating to networking.

Reference Books:

1. Computer Fundamentals by Pradeep.K.Sinha, Priti Sinha, sixth edition, 2004.
2. Fundamentals of Computers by Rajaraman V , Adabala N, 2014
3. Computer Fundamentals, by Goel , 2010.
4. Fundamentals of Computers by E Balagurusamy, 2009.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – I Semester (Distance Mode)

COURSE TITLE	**:**	**Office Automation Laboratory**
COURSE CODE	**:**	**BSCS-P1**
COURSE CREDIT	**:**	**02**

COURSE OBJECTIVES

While studying the Office Automation Laboratory, the student shall be able to:

- To acquire knowledge on editor, spread sheet, slide preparation
- To improve creative thinking in presentation software

COURSE OUTCOMES

After completion of the Office Automation Laboratory, the student will be able to:

• To perform documentation
• To perform accounting operations
• To perform presentation skills

Exercises:

1. Introduction to open office/MS office/Libre office
2. Word Processing: Formatting Text, Pages, Lists, Tables
3. Spreadsheets: Worksheets, Formatting data, creating charts and graphs, using formulas and functions, macros, Pivot Table.
4. Presentation Tools: Adding and formatting text, pictures, graphic objects, including charts, objects, formatting slides, notes, hand-outs, slide shows, using transitions, animations

Reference book:

1. Sushila Madan , Introduction to Essential tools,JBA,2009.
2. Anita Goel, Computer Fundamentals, Pearson, 2012

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – II Semester (Distance Mode)

COURSE TITLE : PROGRAMMING IN C

COURSE CODE : BSCSS-21

COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the Programming in C, the student shall be able to:

- To develop programming skills using the fundamentals and basics of C language
- To develop programs using the basic elements like control statements, Arrays and Strings

COURSE OUTCOMES

After completion of the Programming in C, the student will be able to:

- Solve simple programming problems.
- Describe and employ strategies that are useful in debugging.
- Design, implement, test and debug programs that use calculations and selections.
- Design, implement, test and debug programs that use loops and arrays.

Block 1:

C fundamentals Character set - Identifier and keywords - data types - constants - Variables - Declarations - Expressions - Statements - Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators - Library functions.

Block 2:

Data input output functions - Simple C programs - Flow of control - if, if-else, while, do-while, for loop, Nested control structures - Switch, break and continue, go to statements - Comma operator.

Block 3:

Functions -Definition - proto-types - Passing arguments - Recursions. Storage Classes - Automatic, External, Static, Register Variables - Multi-file programs.

Block 4:

Arrays - Defining and Processing - Passing arrays to functions - Multi-dimension arrays - Arrays and String. Structures - User defined data types - Passing structures to functions - Self-referential structures - Unions - Bit wise operations.

Block 5:

Pointers - Declarations - Passing pointers to Functions - Operation in Pointers - Pointer and Arrays - Arrays of Pointers - Structures and Pointers - Files: Creating Processing, Opening and Closing a data file.

Reference Books:

1. E.Balagurusamy, “Programming in ANSI C”, Eigth Edition, Tata McGraw Hill, 2019.
2. B.W. Kernighan and D M.Ritchie, “The C Programming Language”, 2nd Edition, PHI, 1988.
3. H. Schildt, “C: The Complete Reference”, 4th Edition. TMH Edition, 2000.
4. Gottfried B.S, “Programming with C”, Second Edition, TMH Pub. Co. Ltd., New Delhi 1996.
5. Kanetkar Y., “Let us C”, BPB Pub., New Delhi, 1999.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – II Semester (Distance Mode)

COURSE TITLE	**:**	**Digital Electronics**
COURSE CODE	**:**	**BSCSS-22**
COURSE CREDIT	**:**	**03**

COURSE OBJECTIVES

While studying the Digital Electronics, the student shall be able to:

- To present the Digital fundamentals, Boolean algebra and its applications in digital systems
- To familiarize with the design of various combinational digital circuits using logic gates.
- To introduce the analysis and design procedures for synchronous and asynchronous sequential circuits
- To explain the various semiconductor memories and related technology
- To introduce the electronic circuits involved in the making of logic gates

COURSE OUTCOMES

After completion of the Digital Electronics, the student will be able to:

- Use digital electronics in the present contemporary world
- Design various combinational digital circuits using logic gates
- Do the analysis and design procedures for synchronous and asynchronous sequential circuits
- Use the semiconductor memories and related technology
- Use electronic circuits involved in the design of logic gates

Block 1 DIGITAL FUNDAMENTAL:

Number Systems – Decimal, Binary, Octal, Hexadecimal, 1‘s and 2‘s complements, Codes – Binary, BCD, Excess 3, Gray, Alphanumeric codes, Boolean theorems, Logic gates, Universal gates, Sum of products and product of sums, Minterms and Maxterms, Karnaugh map Minimization and Quine-McCluskey method of minimization.

Block 2 COMBINATIONAL CIRCUIT DESIGN:

Design of Half and Full Adders, Half and Full Subtractors, Binary Parallel Adder – Carry look ahead Adder, BCD Adder, Multiplexer, Demultiplexer, Magnitude Comparator, Decoder, Encoder, Priority Encoder.

Block 3 SYNCHRONOUS SEQUENTIAL CIRCUITS:

Flip flops – SR, JK, T, D, Master/Slave FF – operation and excitation tables, Triggering of FF, Analysis and design of clocked sequential circuits – Design – Moore/Mealy models, state

minimization, state assignment, circuit implementation – Design of Counters- Ripple Counters, Ring Counters, Shift registers, Universal Shift Register.

Block 4 ASYNCHRONOUS SEQUENTIAL CIRCUITS

Stable and Unstable states, output specifications, cycles and races, state reduction, race free assignments, Hazards, Essential Hazards, Pulse mode sequential circuits, Design of Hazard free circuits.

Block 5 MEMORY DEVICES AND DIGITAL INTEGRATED CIRCUITS:

Basic memory structure – ROM -PROM – EPROM – EEPROM –EAPROM, RAM – Static and dynamic RAM – Programmable Logic Devices – Programmable Logic Array (PLA) – Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA) – Implementation of combinational logic circuits using PLA, PAL. Digital integrated circuits: Logic levels, propagation delay, power dissipation, fan-out and fan-in, noise margin, logic families and their characteristics-RTL, TTL, ECL, CMOS

Reference books:

1. M. Morris Mano and Michael D. Ciletti, ―Digital Design‖, 5th Edition, Pearson, 2014.
2. Charles H.Roth. ―Fundamentals of Logic Design‖, 6th Edition, Thomson Learning, 2013.
3. Thomas L. Floyd, ―Digital Fundamentals‖, 10th Edition, Pearson Education Inc, 2011
4. S.Salivahanan and S.Arivazhagan―Digital Electronics‖, Ist Edition, Vikas Publishing House pvt Ltd, 2012.
5. Anil K.Maini ―Digital Electronics‖, Wiley, 2014.
6. A.Anand Kumar ―Fundamentals of Digital Circuits‖, 4th Edition, PHI Learning Private Limited, 2016.
7. Soumitra Kumar Mandal ― Digital Electronics‖, McGraw Hill Education Private Limited, 2016

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – II Semester (Distance Mode)

COURSE TITLE : Principles of Programming Languages

COURSE CODE : BSCSS-23

COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the Principles of Programming Languages, the student shall be able to:

- To understand and describe syntax and semantics of programming languages.
- To understand Data, Data types, and Bindings.
- To learn the concepts of functional and logical programming.
- To explore the knowledge about concurrent Programming paradigms.

COURSE OUTCOMES

After completion of the Principles of Programming Languages, the student will be able to:

- Describe syntax and semantics of programming languages
- Explain data, data types, and basic statements of programming languages
- Design and implement subprogram constructs, Apply object - oriented, concurrency, pro and event handling programming constructs
- Develop programs in LISP, ML, and Prolog.

Block 1 ELEMENTS OF PROGRAMMING LANGUAGES

Reasons for studying, concepts of programming languages, Language Evaluation Criteria, influences on Language design, Language categories. Programming Language Implementation – Compilation, Hybrid Implementation, Pure Interpretation and Virtual Machines. Describing Syntax and Semantics -Introduction - The General Problem of Describing Syntax-Formal Methods of Describing Syntax - Attribute Grammars - Describing the Meanings of Programs: Dynamic Semantics.

Block 2 DATA TYPES-ABSTRACTION

Introduction - Primitive Data Types- Character String Types- User-Defined Ordinal Types- Array types- Associative Arrays-Record Types- Tuple Types-List Types -Union Types - Pointer and Reference Types -Type Checking- Strong Typing -Type Equivalence - Theory and Data Types-Variables-The Concept of Binding -Scope - Scope and Lifetime - Referencing Environments - Named Constants- The Concept of Abstraction- Parameterized Abstract Data Types- Encapsulation Constructs- Naming Encapsulations

Block 3 FUNCTIONAL PROGRAMMING

Introduction- Mathematical Functions- Fundamentals of Functional Programming Languages- The First Functional Programming Language: LISP- An Introduction to Scheme- Common LISP- Haskell-F# - ML : Implicit Types- Data Types- Exception Handling in ML. Functional Programming with Lists- Scheme, a Dialect of Lisp- The Structure of Lists- List Manipulation- A Motivating Example: Differentiation- Simplification of Expressions- Storage Allocation for Lists.

Block 4 LOGIC PROGRAMMING

Relational Logic Programming- Syntax- Basics- Facts- Rules- Syntax- Operational Semantics- Relational logic programs and SQL operations- Logic Programming- Syntax- Operational semantics- Data Structures-Meta-tools: Backtracking optimization (cuts); Unify; Meta-circular interpreters- The Origins of Prolog- Elements- of Prolog-Deficiencies of Prolog- Applications of Logic Programming.

Block 5 CONCURRENT PROGRAMMING

Parallelism in Hardware- Streams: Implicit Synchronization-Concurrency as Interleaving- Liveness Properties- Safe Access to Shared Data- Concurrency in Ada- Synchronized Access to Shared Variables- Synthesized Attributes- Attribute Grammars- Natural Semantics- Denotational Semantics -A Calculator in Scheme-Lexically Scoped Lambda Expressions- An Interpreter-Recursive Functions.

Reference books:

1. Ghezzi, ―Programming Languages‖, 3rd Edition, John Wiley, 2008
2. John C. Mitchell, ―Concepts in Programming Languages‖, Cambridge University Press, 2004.
3. Louden, ―Programming Languages‖, 3rd Edition, 2012.
4. Ravi Sethi, ―Programming Languages: Concepts and Constructs‖, 2nd Edition, Addison Wesley, 1996.
5. Robert .W. Sebesta, ―Concepts of Programming Languages‖, 10th Edition, Pearson Education, 2002.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – II Semester (Distance Mode)

COURSE TITLE	**:**	**C Programming Laboratory**
COURSE CODE	**:**	**BSCSS-P2**
COURSE CREDIT	**:**	**03**

COURSE OBJECTIVES

While studying the C Programming Laboratory, the student shall be able to:

- It aims to train the student to the basic concepts of the C-programming language
- To improve the programming skills through C language

COURSE OUTCOMES

After completion of the C Programming Laboratory, the student will be able to:

• Read, understand and trace the execution of programs written in C language.

• develop the C code for a given algorithm.

• Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.

• develop programs that perform operations using derived data types.

Exercises:

1. program to determine whether a number is ‘odd’ or ‘even’ and print the message
2. Program to accept a character and check whether the char is vowel or not!
3. Program to find out the factorial of given Number.
4. program to check the given string is Palindrome (ex) “LIRIL” or NOT,
5. Program to find out the Max No, Min No of specified three Numbers.
6. Program for bubble sort?
7. program to display fibonacci of a numbers
8. Program to find whether the number is an Armstrong number or not.
9. Program to read the decimal number, round them off to the nearest integer and print out the results in integer form.
10. Program to read the price of an item in decimal form and print the output in paise.
11. Program to find the number of digits in a number.
12. A positive number is entered through a keyboard write a function to obtain the prime factor of this numbers.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – III Semester (Distance Mode)

COURSE TITLE : Programming Using C++

COURSE CODE : BSCSS-31

COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the Programming Using C++, the student shall be able to:

- Understand the basic concepts of the Object-Oriented Programming Paradigm.
- Gain Knowledge on Functions in C++ and the different types of Constructors in C++.
- Gain Knowledge on Operator Overloading.
- Understand the different types of Inheritance.
- Gain Knowledge on Stream Classes and Files.

COURSE OUTCOMES

After completion of the Programming Using C++, the student will be able to:

- Get clear idea about the C++ fundamentals
- Understand t6he Programming constructs
- Get knowledge of Data structures
- Implement the Structured and Object oriented programming

Block – 1

Object-Oriented Programming (OOP) Paradigm – Basic Concepts of OOP – Benefits of OOP – Tokens – Keywords – Identifiers and Constants – Basic Data Types – User-Defined Data Types – Storage Classes – Derived Data Types – Symbolic Constants – Type Compatibility – Declaration of Variables – Dynamic Initialization of Variables – Reference Variables – Operators in C++ – Scope Resolution Operator – Member Dereferencing Operators – Memory Management Operators – Manipulators – Type Cast Operator – Expressions and Their Types – Special Assignment Expressions – Implicit Conversions – Operator Overloading – Operator Precedence – Control Structures.

Block – 2

Functions in C++ – The Main Function – Function Prototyping – Call By Reference – Return by Reference – Inline Functions – Default Arguments – ‘const’ Arguments – Recursion – Function Overloading – Friend and Virtual functions – Math Library Functions – Classes and Objects – Specifying a Class – Defining Member Functions – Making an Outside Function Inline – Nesting of Member Functions – Private Member Functions – Arrays within a Class – Memory Allocation for Objects – Static Data Members – Static Member Functions – Array of Objects – Objects as Function Arguments – Friendly Functions – Returning Objects – ‘const’ Member Functions – Pointers to Members – Local Classes.

Block – 3

Constructors – Parameterized Constructors – Multiple Constructors in a Class – Constructors with Default Arguments – Dynamic Initialization of Objects – Copy Constructors – Dynamic Constructors – Constructing Two-Dimensional Arrays – 'const' Objects – Destructors – Operator Overloading – Rules for Overloading Operators – Overloading Unary Operators – Overloading Binary Operators – Overloading Binary Operators Using Friends – Manipulation of Strings Using Operators – Type Conversions.

Block – 4

Inheritance – Single Inheritance – Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes – Abstract Classes – Constructors in Derived Class – Nesting of Classes – Pointers – Pointers to Objects – 'this' Pointer – Pointers to Derived Classes – Virtual Functions – Pure Virtual Functions – Virtual Constructors and Destructors.

Block – 5

C++ Streams – C++ Stream Classes – Unformatted I/O Operations – Formatted Console I/O operations – Managing Output with Manipulators –Files – Classes for File Stream Operations – Opening and Closing a File – Detecting End-of-File – Open () File Modes – File Pointers and their Manipulators – Sequential Files – Random Access Files – Error Handling during File Operations – Command-Line Arguments.

Reference Books:

1. E Balagurusamy, "Object Oriented Programming with C++", Sixth Edition, McGraw Hill Education (India) Private Limited, 2013.
2. Herbert Schildt, "C++: The Complete Reference", Fifth Edition, McGraw-Hill Education, 2012.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – III Semester (Distance Mode)

COURSE TITLE	**:**	**Data structures**
COURSE CODE	**:**	**BSCSS-32**
COURSE CREDIT	**:**	**03**

COURSE OBJECTIVES

While studying the Data structures, the student shall be able to:

- Understand how to perform Matrix Operations using Two-Dimensional Arrays.
- Gain Knowledge on Linked Lists and Linear Data Structures namely Stacks and Queues.
- Gain Knowledge on Non Linear Data Structures namely Trees and Graphs.
- Understand how to perform Search Operations using Linear Search, Binary Search and Hashing.
- To familiarize Sorting techniques namely Selection Sort, Insertion Sort, Bubble Sort, Quick Sort, Merge Sort and Bucket Sort.

COURSE OUTCOMES

After completion of the Data structures, the student will be able to:

- Implement abstract data types for linear data structures.
- Apply the different linear and non-linear data structures to problem solutions.
- Critically analyze the various sorting algorithms.

Block – 1

Introduction to Data Structures–Linear and Non Linear Data Structures–Arrays–Types of Arrays–Representation of One-Dimensional Array in Memory–Array Traversal–Insertion and Deletion–Realizing Matrices using Two-Dimensional Arrays– Matrix Operations–Addition–Subtraction–Multiplication–Transpose–Linked Lists–Representation of Linked Lists–Advantages and Disadvantages of Linked List–Linked List Node Declaration–Linked List Operations–Linked List Implementation–Circular Linked List Operations–Circular Linked List Implementation–Doubly Linked List Node Declaration–Doubly Linked List Operations–Doubly Linked List Implementation.

Block – 2

Stacks–Stack Representation in Memory–Arrays vs. Stacks–Stack Operations–Array Implementation of Stacks–Linked Implementation of Stacks–Queues–Logical Representation of Queues–Queue Operations–Array Implementation of Queues–Linked Implementation of Queues–Circular Queues–Priority Queues–Double-Ended Queues.

Block – 3

Trees–Tree Terminology–Binary Tree–Array representation of Binary Tree–Linked

Representation of Binary Tree–Binary Tree Traversal–Binary Search Tree–Insert, Delete, and Search Operations on a Binary Tree and Binary Search Tree–Expression Trees.

Block – 4

Graphs –Graph Terminology–Implementing Graphs Using Adjacency Matrix, Path Matrix and Adjacency List–Shortest Path Algorithm–Breadth First Search and Depth First Search Traversal of a Graph –Searching –Linear Search –Binary Search –Hashing.

Block – 5

Sorting–Selection Sort–Insertion Sort–Bubble Sort–Quick Sort–Merge Sort–Bucket Sort.

Reference books:

1. E Balagurusamy, “Data Structures”, McGraw Hill Education (India) Private Limited, 2019.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++”, Third Edition, Pearson Education, 2007.
3. Reema Thareja, ―Data Structures Using C‖, Second Edition , Oxford University Press, 2011
4. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, ―Fundamentals of Data Structures in C‖, Second Edition, University Press, 2008

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – III Semester (Distance Mode)

COURSE TITLE	**:**	**C++ Programming & Data Structure Laboratory**
COURSE CODE	**:**	**BSCSS-P3**
COURSE CREDIT	**:**	**02**

COURSE OBJECTIVES

While studying the C++ Programming Laboratory, the student shall be able to:

- It aims to train the student to the basic concepts of the C++-programming language
- To improve the programming skills through C++ language
- Impart the basic concepts of data structures and algorithms
- Understand concepts about searching and sorting techniques
- Understand basic concepts about stacks, queues, lists, trees and graphs
- Understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures

COURSE OUTCOMES

After completion of the C++ Programming Laboratory, the student will be able to:

- Read, understand and trace the execution of programs written in C++ language.
- Develop the C code for a given algorithm.
- Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.
- Create programs that perform operations using derived data types.
- Analyse algorithms and a algorithm correctness.
- Summarize searching and sorting techniques
- Describe stack, queue and linked list operation.
- Have knowledge of tree and graphs concepts.

Exercises: C++ Programming

1. C++ program to calculate average marks scored by a student for 3 subjects.
2. C++ program to find the area and perimeter of a circle and rectangle.
3. C++ program to swap two numbers.
4. C++ program to find largest of three numbers.
5. C++ program to find the maximum number among three numbers.
6. C++ program to generate Fibonacci series.
7. C++ program to perform string manipulation.

8. Find the length of a string. Compare two strings, Concatenate two strings, Reverse a string, Copy a string to another location.
9. C++ program to find quotient and remainder of 2 numbers.
10. C++ program to manipulate the class account using classes and function. A user should be able to perform the following functions. a. Deposit money. b. Withdraw money, c. Calculate the interest d. Check the total balance in his account.
11. C++ program to generate Prime numbers between 1 and 50.
12. C++ program to perform matrix addition and multiplication.
13. C++ program to check whether the given matrix is a sparse matrix or not.
14. C++ program to overload unary minus operator.

Exercises: Data Structures

1. Array implementation of Stack and Queue ADTs
2. Array implementation of List ADT
3. Linked list implementation of Stack, Queue and List ADTs
4. Applications of List, Stack and Queue ADTs
5. Implementation of Binary Trees and operations of Binary Trees
6. Implementation of Binary Search Trees
7. Implementation of AVL Trees
8. Implementation of Heaps using Priority Queues.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – IV Semester (Distance Mode)

COURSE TITLE : Statistics

COURSE CODE : BSCSS-41

COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the Statistics, the student shall be able to:

- To understand the applications of various correlation methods
- To study and model the sampling concepts
- To acquire knowledge on Hypotheses test

COURSE OUTCOMES

After completion of the Statistics, the student will be able to:

- Get clear idea about the Correlation and Regression Analysis,
- Describe the features of Probability Distribution and mathematical Expectation,
- Analyze the Sampling and Sampling Distributions,
- Get knowledge about Statistical Inference- Estimation and Testing of Hypothesis

Block-1: Correlation

Definition of Correlation- Scatter Diagram- Kari Pearson's Coefficient of Linear Correlation- Coefficient of Correlation and Probable Error of r- Coefficient of Determination - Merits and Limitations of Coefficient of Correlation- Spearman's Rank Correlation.

Block-2: Regression Analysis

Regression and Correlation(Intro)- Difference between Correlation and Regression Analysis- Linear Regression Equations -Least Square Method- Regression Lines- Properties of Regression Coefficients- Standard Error of Estimate.

Block-3: Probability Distribution and mathematical Expectation

Random Variable- Defined - Probability Distribution a Random Variable- Expectation of Random Variable- Properties of Expected Value and Variance.

Block-4: Sampling and Sampling Distributions

Data Collection- Sampling and Non-Sampling Errors – Principles of Sampling-- Merits and Limitations of Sampling- Methods of Sampling- Parameter and Statistic- Sampling Distribution of a Statistic- Examples of Sampling Distributions- Standard Normal, Student's t, Chi-Square (x^2) and Snedecor's F- Distributions.

Block-5: Statistical Inference- Estimation and Testing of Hypothesis

Statistical Inference- Estimation- Point and interval- Confidence interval using normal, t and

x^2Distributions- Testing of Hypothesis- Significance of a mean - Using *t* Distribution.

Reference Books:

1. K.L. Sehgal, "Quantitative Techniques and Statistics", First Edition, Himalaya Publishing House, 2011.
2. N. P. Bali, P. N. Gupta, C. P. Gandhi, "A Textbook of Quantitative Techniques", First Edition, Laxmi Publications, 2008.
3. U. K. Srivastava, G. V. Shenoy, S. C. Sharma, "Quantitative Techniques for Managerial Decisions", Second Edition, New Age International Publishers, 2005.
4. David Makinson, "Sets, Logic and Maths for Computing", Springer, 2011.
5. Christopher Chatfield,"Statistics for Technology- A Course in Applied Statistics, Third Edition", CRC Press, 2015.

Tamil Nadu Open University
Name of the School
Chennai – 15

B.Sc Computer Science - Syllabus – IV Semester (Distance Mode)

COURSE TITLE	**:**	**Operating Systems**
COURSE CODE	**:**	**BSCSS-42**
COURSE CREDIT	**:**	**03**

COURSE OBJECTIVES

While studying the Operating Systems, the student shall be able to:

- Understand the need for Operating Systems
- Acquire Knowledge on Inter Process Communication
- Gain Knowledge on CPU Scheduling Algorithms
- Understand the need for Memory Management
- Acquire Knowledge on File Systems

COURSE OUTCOMES

After completion of the Operating Systems**,** the student will be able to:

- Know the Fundamentals of Operating systems and process management
- Clear knowledge of Inter-process communications and various scheduling techniques
- Understand the Deadlocks concepts
- Get clear idea about the Memory management and file management

Block-1

Introduction– Types of Operating System –Operating-System Operations–Resource Management –Security and Protection –Virtualization –Distributed Systems–Operating-System Services – User and Operating-System Interface –System Calls –System Services –Linkers and Loaders–Operating-System Structure –Building and Booting an Operating System.

Block-2

Process Management –Process Concept –Process Scheduling –Operations on Processes – Interprocess Communication –IPC in Shared-Memory Systems –IPC in Message-Passing Systems–Examples of IPC Systems –Communication in Client–Server Systems–Threads and Concurrency–Multicore Programming –Multithreading Models –Thread Libraries –Implicit Threading –Threading Issues.

Block-3

CPU Scheduling–Basic Concepts –Scheduling Criteria –Scheduling Algorithms –Thread Scheduling –Multi-Processor Scheduling – Real-Time CPU Scheduling– Process Synchronization –The Critical-Section Problem –Peterson's Solution –Hardware Support for Synchronization –Mutex Locks –Semaphores–Monitors–Deadlocks–System Model –Deadlock in Multithreaded Applications –Deadlock Characterization –Methods for Handling Deadlocks – Deadlock Prevention–Deadlock Avoidance –Deadlock Detection –Recovery from Deadlock.

Block-4

Memory Management – Contiguous Memory Allocation –Paging –Structure of the Page Table –Swapping –Virtual Memory–Demand Paging –Copy-on-Write–Page Replacement –Allocation of Frames –Thrashing –Memory Compression–Allocating Kernel Memory.

Block-5

File-System Implementation–File-System Structure –File-System Operations –Directory Implementation –Allocation Methods –Free-Space Management –Efficiency and Performance– Recovery –The WAFL File System–File-System Internals–File-System Mounting –Partitions and Mounting–File Sharing –Virtual File Systems –Remote File Systems–Consistency Semantics –Network File Systems.

Reference Books:

1. Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne “Operating System Concepts”, Tenth Edition, Wiley, 2018.
2. Andrew S. Tanenbaum, and Herbert Bos, “Modern Operating Systems”, Fourth Edition, Pearson Education Limited, 2015.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – IV Semester (Distance Mode)

COURSE TITLE : Database Management Systems

COURSE CODE : BSCSS-43

COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the Database Management Systems, the student shall be able to:

- Understand the need for Database Management Systems
- Develop conceptual models for any real world application
- To design databases for any real world application using the Relational Data Model and retrieve data.
- Understand the need for Database Normalization
- Gain Basic Understanding on NOSQL Databases and Big Data

COURSE OUTCOMES

After completion of the Database Management Systems, the student will be able to:

- To get basics of Databases
- To describe the Conceptual Data Modeling and Database Desig
- To get clear idea about Relational Data Model, Relational Algebra and SQL
- To get knowledge of Relational Database Design, NOSQL Databases and Big Data

Block – 1 Introduction to Databases:

Introduction – Example – Characteristics of the Database Approach – Actors on the Scene – Workers behind the Scene – Advantages of Using the DBMS Approach – Database Applications – When Not to Use a DBMS – Data Models – Schemas – Instances – Three Schema Architecture – Data Independence – Database Languages and Interfaces – Database System Environment – Architectures for DBMSs – Classification of DBMSs.

Block –2 Conceptual Data Modeling and Database Design

Entity Relationship Model – Entity Types – Entity Sets – Attributes – Keys – Relationship Types – Relationship Sets – Roles – Structural Constraints – Strong Entity Types – Weak Entity Types – Enhanced Entity Relationship Model – Specialization and Generalization – Constraints and Characterization of Specialization and Generalization Hierarchies.

Block – 3 Relational Data Model, Relational Algebra and SQL

Relational Model Concepts – Super Key – Candidate Key – Primary Key – Alternate Key – Foreign Key – Relation Model Constraints and Relational Database Schemas – Update Operations – Transactions and Dealing with Constraint Violations – Unary and Binary Relational Operations in Relational Algebra – Queries in Relational Algebra – Basic SQL –

SQL Data Definition and Data Types – Specifying Constraints in SQL – Basic Retrieval Queries in SQL – Insert, Delete and Update Statements in SQL – Views in SQL.

Block – 4 Relational Database Design

Mapping Entity Relationship Model to Relations – Mapping Enhance Entity Relationship Model to Relations – Database Normalization – Functional Dependencies – First Normal Form – Second Normal Form and Third Normal Form.

Block – 5 NOSQL Databases and Big Data

Introduction – CAP Theorem – Document Based NOSQL Systems and MongoDB – NOSQL Key Value Stores – Column Based NOSQL Systems – NOSQL Graph Databases – Neo4j – Big Data – Characteristics of Big Data – Introduction to MapReduce and Hadoop – Hadoop Distributed File System.

Reference book:

1. Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Seventh Edition, Pearson Education, 2017.
2. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Sixth Edition, Tata McGraw Hill, 2014.
3. C. J. Date, A. Kannan, S. Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – IV Semester (Distance Mode)

COURSE TITLE : DBMS Laboratory

COURSE CODE : BSCSS-P4

COURSE CREDIT : 02

COURSE OBJECTIVES

While studying the DBMS Laboratory, the student shall be able to:

- To explain basic database concepts, applications, data models, schemas and instances.
- To demonstrate the use of constraints and relational algebra operations.
- Describe the basics of SQL and construct queries using SQL.
- To emphasize the importance of normalization in databases.
- To facilitate students in Database design
- To familiarize issues of concurrency control and transaction management

COURSE OUTCOMES

After completion of the DBMS Laboratory, the student will be able to:

- Get hands on experience in creation of Database and writing queries
- Manipulate database activities
- Create of procedures and knowledge of PL/SQL

Exercises:

1. Creation of a database and writing SQL queries to retrieve information from the database.
2. Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.
3. Creation of Views, Synonyms, Sequence, Indexes, save point.
4. Creating an Employee database to set various constraints.
5. Creating a relationship between the databases.
6. Study of PL/SQL Block.
7. Develop a PL/SQL Block to satisfy some conditions by accepting input from the user.
8. Develop a PL/SQL Block that handles all types of exceptions.
9. Creation of Procedures.
10. Creation of database triggers and functions

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – V Semester (Distance Mode)

COURSE TITLE : Software Engineering

COURSE CODE : BSCSS-51

COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the Software Engineering, the student shall be able to:

- Understand the Fundamentals of Software Engineering and Umbrella Activities in Software Engineering.
- Gain Knowledge on Process Models.
- Gain Knowledge on Requirements Engineering
- Understand Analysis and Design Methods.
- Gain Knowledge on Software Testing Strategies and Software Configuration Management.

COURSE OUTCOMES

After completion of the Software Engineering, the student will be able to:

- Get clear idea about the Software engineering concepts and software process models
- Get knowledge of Project management concepts
- Understand the concepts of Project scheduling and tracking, software quality assurance
- Get the ability for Software analysis, design and testing.

Block 1:

The Nature of Software –Defining Software –Software Application Domains –Legacy Software –The Changing Nature of Software –WebApps –Mobile Applications –Cloud Computing –Product Line Software –Defining the Discipline –The Software Process –The Process Framework –Umbrella Activities –Process Adaptation –Software Engineering Practice –The Essence of Practice –General Principles –Software Development Myths –Software Process Structure –A Generic Process Model –Defining a Framework Activity –Identifying a Task Set –Process Patterns –Process Assessment and Improvement.

Block 2:

Prescriptive Process Models –The Waterfall Model – Incremental Process Models –Evolutionary Process Models –Concurrent Models –A Final Word on Evolutionary Processes –Specialized Process Models –Component-Based Development –The Formal Methods Model –Aspect-Oriented Software Development –The Unified Process –Phases of the Unified Process –Personal and Team Process Models – Personal Software Process –Team Software Process –Process Technology –Product and Process – Agility –Agility and the Cost of Change –Agile Process –Agility Principles –The Politics of Agile Development –Extreme Programming –The XP Process –Industrial XP –Other Agile Process Models –Scrum –Dynamic Systems Development Method –Agile Modeling –Agile Unified Process.

Block 3:

Modeling –Principles That Guide Process, Practice and Each Framework Activity – Communication, Planning, Modeling, Construction and Deployment Principles –Requirements Engineering –Establishing the Groundwork –Identifying Stakeholders –Recognizing Multiple Viewpoints –Working toward Collaboration –Asking the First Questions –Nonfunctional Requirements –Traceability –Eliciting Requirements –Collaborative Requirements Gathering – Quality Function Deployment –Usage Scenarios –Elicitation Work Products –Agile Requirements Elicitation –Service-Oriented Methods –Developing Use Cases –Building the Analysis Model –Elements of the Analysis Model –Analysis Patterns –Agile Requirements Engineering –Requirements for Self-Adaptive Systems –Negotiating Requirements – Requirements Monitoring –Validating Requirements –Avoiding Common Mistakes– Requirements Analysis –Overall Objectives and Philosophy –Analysis Rules of Thumb – Domain Analysis –Requirements Modeling Approaches –Scenario-Based Modeling –Creating a Preliminary Use Case –Refining a Preliminary Use Case –Writing a Formal Use Case –UML Models That Supplement the Use Case –Developing an Activity Diagram –Swimlane Diagrams –Requirements Modeling: Class-Based Methods –Identifying Analysis Classes –Specifying Attributes –Defining Operations –Class-Responsibility-Collaborator Modeling –Associations and Dependencies –Analysis Packages.

Block 4:

Software Design – Design within the Context of Software Engineering – The Design Process – Software Quality Guidelines and Attributes – The Evolution of Software Design – Design Concepts – Abstraction – Architecture – Patterns – Separation of Concerns – Modularity – Information Hiding – Functional Independence – Refinement – Aspects – Refactoring – Object-Oriented Design Concepts – Design Classes – Dependency Inversion – Design for Test – Design Model – Data Design Elements – Architectural Design Elements – Interface Design Elements – Component-Level Design Elements – Deployment-Level Design Elements – Designing Class-Based Components – Basic Design Principles – Component-Level Design Guidelines – Cohesion – Coupling.

Block 5:

Software Testing Strategies – A Strategic Approach to Software Testing – Verification and Validation – Organizing for Software Testing – Software Testing Strategy– Criteria for Completion of Testing – Strategic Issues – Test Strategies for Conventional Software– Unit Testing – Integration Testing – Test Strategies for Object-Oriented Software–Unit Testing in the OO Context –Integration Testing in the OO Context – Test Strategies for WebApps – Test Strategies for MobileApps – Validation Testing –Validation-Test Criteria – Configuration Review – Alpha and Beta Testing – System Testing – Recovery Testing – Security Testing – Stress Testing – Performance Testing – Deployment Testing – The Art of Debugging – The Debugging Process –Psychological Considerations – Debugging Strategies – Correcting the Error – White-Box Testing – Basis Path Testing –Flow Graph Notation – Independent Program Paths – Deriving Test Cases – Graph Matrices – Control Structure Testing –Black-Box Testing – Graph-Based Testing Methods – Equivalence Partitioning – Boundary Value Analysis – Orthogonal Array Testing – Model-Based Testing – Software Configuration Management – Elements of a Configuration Management System –Baselines – Software Configuration Items – Management of Dependencies and Changes.

Reference Books:

1. Roger S. Pressman and Bruce R. Maxim, “Software Engineering”, A Practitioner’s Approach, Eighth Edition, McGraw-Hill Education, 2015.
2. Ian Sommerville, “Software Engineering”, Tenth Edition, Pearson 2016.
3. Ian Sommerville, “Engineering Software Products”, Pearson 2019.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – V Semester (Distance Mode)

COURSE TITLE : Computer Networks

COURSE CODE : BSCSS-52

COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the Computer Networks, the student shall be able to:

- To understand the concept of Computer network
- To impart knowledge about networking and inter networking devices

COURSE OUTCOMES

After completion of the Computer Networks, the student will be able to:

- Describe the basics of computer networks,
- Get clear idea about the Wireless Transmission and Elementary Data Link Protocols,
- Understand the Network Layer and Transport Layer concepts.

Block-1:

Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP Models – Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer – Theoretical Basis for Data Communication - Guided Transmission Media

Block-2:

Wireless Transmission - Communication Satellites – Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues – Error Detection and Correction.

Block-3:

Elementary Data Link Protocols - Sliding Window Protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols – Bluetooth.

Block-4:

Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms – IP Protocol – IP Addresses – Internet Control Protocols.

Block-5:

Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection – Simple Transport Protocol – Internet Transport Protocols (ITP) - Network Security: Cryptography.

Reference Books:

1. A. S. Tanenbaum, “Computer Networks”, 4th Edition, Prentice-Hall of India, 2008.
2. B. A. Forouzan, “Data Communications and Networking”, Tata McGraw Hill, 4th Edition, 2007.
3. F. Halsall, “Data Communications, Computer Networks and Open Systems”, Pearson Education, 2008.
4. D. Bertsekas and R. Gallagher, “Data Networks”, 2nd Edition, PHI, 2008.
5. Lamarca, “Communication Networks”, Tata McGraw- Hill, 2002

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – V Semester (Distance Mode)

COURSE TITLE	**:**	**Java Programming**
COURSE CODE	**:**	**BSCSS-53**
COURSE CREDIT	**:**	**03**

COURSE OBJECTIVES

While studying the Java Programming, the student shall be able to:

- Gain Knowledge on the Object Oriented features supported by Java.
- Understand the use of Constructors in Java.
- Exploring Class Hierarchy using Inheritance and implementing Interfaces.
- Gain Knowledge on Creating, Accessing and Using a Package.
- Acquire Knowledge on Exception Handling.

COURSE OUTCOMES

After completion of the Java Programming, the student will be able to:

- Know the Basics of Java programming concepts
- Get the functions of Constructs and arrays
- Get clear knowledge of Sub classing and Exception handling
- Understand the concepts of Packages and interfaces

Block – 1

Java Features – Comparison of C++ and Java –Java Virtual Machine – Constants –Variables – Data Types – Scope of Variables – Type Casting – Java Program Structure–Operatorsand Expressions –Arithmetic – Logical – Relational –Assignment – Increment and Decrement – Conditional – Bitwise – Special Operators –Arithmetic Expressions – Evaluation of Expressions – Type Conversion in Expressions – Operator Precedence and Associativity – Mathematical Functions.

Block – 2

Decision Making, Branching and Looping – If Statement – If … Else Statement – Nesting of If … Else Statements – Else If Ladder – Switch Statement – The ?: Operator– While Statement – Do Statement – For Statement – Jumps in Loops – Return Statement – Labeled Loops – Classes, Objects and Methods – Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing Class Members – Constructors – Method Overloading– Static Members – Nesting of Methods –Inheritance – Overriding Methods – Abstract Methods and Classes.

Block – 3

Arrays, Strings and Vectors – One Dimensional Arrays – Creating an Array – Two Dimensional Arrays – Strings – Vectors – Wrapper Classes – Enumerated Types – Annotations – Interfaces – Defining Interfaces – Implementing Interfaces – Accessing Interface Variables.

Block – 4

Packages – Java API Packages – Using System Packages – Naming Conventions – Creating Packages – Accessing a Package – Using a Packages – Adding a Class to a Package – Hiding Classes – Static Import.

Block – 5

Managing Errors and Exceptions – Types of Exceptions – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing Our Own Exception – Using Exceptions for Debugging.

Reference Books:

1. E Balagurusamy, "Programming with Java", Sixth Edition, McGraw Hill Education (India) Private Limited, 2019.
2. Herbert Schildt, "Java: The Complete Reference", Ninth Edition, McGraw Hill Professional, 2014.
3. Sagayaraj, Denis, Karthik and Gajalakshmi, "JAVA Programming for Core and Advanced Learners", 2018

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – IV Semester (Distance Mode)

COURSE TITLE : Web Designing

COURSE CODE : BSCSS-54

COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the Web Designing, the student shall be able to:

- Understand the principles of creating an effective web page, including an in-depth consideration of information architecture.
- Become familiar with graphic design principles that relate to web design and learn how to implement theories into practice.
- Develop skills in analyzing the usability of a web site.
- Understand how to plan and conduct user research related to web usability.
- Learn the language of the web: HTML and CSS.
- Learn techniques of responsive web design, including media queries.

COURSE OUTCOMES

After completion of the Web Designing, the student will be able to:

- Get the knowledge of Definitions and fundamentals of web programming
- Implement the Connection between servers and Remote Method invocations
- Understand the Advanced swing and AWT concepts.
- Get clear idea about Database connectivity and servlets
- Obtain the knowledge of Javabeans and their applications

Block - 1: INTRODUCTION

Introduction to applet –lifecycle of applet- servlet and its life cycle – HTML fundamentals-JSP fundamentals-variables-control structures, Applet to servlet communications. Servlets – deployment of simple servlets-web server (Java web server/Tomcat sever/Web logic)- HTTP GET and POST request-Session tracking-cookied-JDBC-Simple Web application-multi tier applications.

Block - 2: NETWORKING AND RMI

Connecting to a Server - Implementing Servers - Advanced Socket Programming: InetAddress - URL Connections. Remote Method Invocations: Setting Up Remote Method Invocation - Parameter Passing in Remote Methods.

Block - 3: ADVANCED SWING AND AWT

Lists – Trees – Tables - Styled Text Components - Component Organizers – Shapes - Images.

Block - 4: DATABASE CONNECTIVITY and Servlet

The Design of JDBC - Basic Concepts - Executing Queries - Result Sets – Metadata - Transactions, Servlets.

Block -5 : JAVABEANS

The Bean-Writing Process - Using Beans to Build an Application - Bean Property Types - Customizers.

Reference books:

1. Cay S. Horstmann, Gary Cornell, *Core Java™ 2: Volume II–Advanced Features*, Prentice Hall, 2008.
2. Patrick Naughton & Herbert Schildt, *The Complete Reference: Java 2*, Tata McGraw Hill, 8 th Edition 2011.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – V Semester (Distance Mode)

COURSE TITLE : Java Programming Laboratory

COURSE CODE : BSCSS-P5

COURSE CREDIT : 02

COURSE OBJECTIVES

While studying the Java Programming Laboratory, the student shall be able to:

- To be knowledgeable enough about basic Java language syntax and semantics to be able to successfully read and write Java computer programs;
- To implement interfaces, inheritance, and polymorphism as programming techniques and apply exceptions handling.

COURSE OUTCOMES

After completion of the Java Programming Laboratory, the student will be able to:

- Program in java platform such as multithreading, exception handling, stacks, queues, lists for various real time application

Exercises:

1. Converting Temperature in Fahrenheit into Temperature in Celsius.
2. Program for student Mark-List preparation
3. Program for reverse and finding sum of individual digits of a given number
4. Program to generate Fibonacci series
5. Program for finding Factorial of a given number
6. Program for find whether a given number is prime or not.
7. Program for sorting the given numbers in Ascending and Descending order.
8. Program for Matrix Multiplication
9. Program for finding roots of the given quadratic equation
10. Program for finding volume of a sphere (Concept: Class and Object)
11. Program for preparing Employee salary Report (Concept : Array of Objects)
12. Program for implementing stack Operations (Concept : Constructor)
13. Program for checking whether a given number is palindrome or not (Concept : Abstract Class).
14. Program for Electricity charge calculation (Concept : Implementing Multiple Inheritance).
15. Program to find area of Triangle and Rectangle (Concept : Package , Interface).
16. Program for queue implementation (Concept : Exception Handling; User defined Exception).
17. Program to implement Multi- Threading (Concept: Multi- Threading by extending Thread class).
18. Program for simple Railway Reservation System (Concept : IO Streams: DataInput Stream & DataOutputStream).
19. Program to display graphical components (Concept : Graphics class)
20. Program to display an image (Concept : Pixel Grabber Class : Getting pixels of an image)

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – V Semester (Distance Mode)

COURSE TITLE	**:**	**Web Designing Laboratory**
COURSE CODE	**:**	**BSCSS-P6**
COURSE CREDIT	**:**	**02**

COURSE OBJECTIVES

While studying the Web Designing Laboratory, the student shall be able to:

- To develop an ability to design and implement static and dynamic website

COURSE OUTCOMES

After completion of the Web Designing Laboratory, the student will be able to:

- Understand the concepts of HTML Servlet, Applet and JSP
- Working with Enterprise JavaBeans,
- Working with Java Database Connectivity,
- Creating Web services with RMI, To Implement RMI program to perform arithmetic functions,
- Develop a simple application to insert and retrieve data from database and Design a color bean.

Exercises:

1. HTML to Servlet Applications
2. Applet to Servlet Communication
3. Designing online applications with JSP
4. Creating JSP program using JavaBeans
5. Working with Enterprise JavaBeans
6. Working with Java Database Connectivity.
7. Creating Web services with RMI.
8. To Implement RMI program to perform arithmetic functions.
9. Develop a simple application to insert and retrieve data from database.
10. Design a color bean.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – VI Semester (Distance Mode)

COURSE TITLE : Programming In Python
COURSE CODE : BSCSS-61
COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the Programming in Python, the student shall be able to:

- To understand the basic components of computer programming using the Python language
- To demonstrate significant experience with the Python program development environment

COURSE OUTCOMES

After completion of the Programming in Python, the student will be able to:

- Understand the basic concepts of Python and their control structures
- Get knowledge about File Handling
- Get clear idea about Graphics programming
- Describe the Version Control Systems

Block-1:

Introduction to Python - Why Python - Installing in various Operating Systems - Executing Python Programs - Basic Programming concepts - Variables, expressions and statements - Input/ Output – Operators.

Block-2:

Conditions - Functions - Arguments - Return values - Iteration - Loops - Strings -Data Structures - Lists - Dictionaries - Tuples - Sequences - Exception Handling.

Block-3:

File Handling - Modules - Regular Expressions - Text handling - **O**bject Oriented Programming - Classes - Objects - Inheritance - Overloading - Polymorphism Interacting with Databases - Introduction to MySQL - interacting with MySQL - Building a address book with add/edit/delete/search features.

Block-4:

Introduction to Graphics programming - Introduction to GTK - PyGTK - Developing GUI applications using pyGTK - Scientific Programming using NumPy / SciPy - Image Processing - Processing multimedia files -Network Programming, Web services using SOAP, Introduction to Graphics programming - PyGame.

Block-5:

Introduction to Version Control Systems - Subversion/Git, Writing **Block** Tests, Creating Documentation, Contributing to Open Source Projects.

Reference Books:

1. Allen B. Downey,"Think Python: How to Think Like a Computer Scientist",1st Edition 2012, O'Reilly.
2. Jeff McNeil ,"Python 2.6 Text Processing: Beginners Guide", 2010 ,Packet Publications
3. Mark Pilgrim ,"Dive Into Python " , 2nd edition 2009, Apress.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus –VI Semester (Distance Mode)

COURSE TITLE	**:**	**Mobile Computing**
COURSE CODE	**:**	**BSCSS-62**
COURSE CREDIT	**:**	**03**

COURSE OBJECTIVES

While studying the Mobile Computing, the student shall be able to:

- To understand of mobile computer systems particularly in the context of wireless network systems
- To emphasises how to interface hardware to mobile computing devices

COURSE OUTCOMES

After completion of the Mobile Computing, the student will be able to:

- Define the basics of mobile computing like devices, architecture and services
- Describe the Mobile computing through Internet, understand the Synchronization and SMS architecture
- Get the concepts of the Mobile communication like wired and wireless transmission devices and systems
- Knowledge of Adhoc Wireless network and their features
- Get clear idea about the Wireless sensor network architecture and energy models

Block-1: Mobile computing:

Components of wireless environment- Challenges in Mobile environment- Mobile devices - Middleware and gateways - Wireless Internet - Smart clients - Three-tier Architecture- Design considerations for mobile computing-– Mobility and Location based services – Active transactions - Device Technology – Device Connectivity – Voice technology – Personal digital assistant.

Block-2:

Mobile computing through Internet- Mobile-enabled Applications - Developing Mobile GUIs – VUIs and Mobile Applications – Multichannel and Multi modal user interfaces – Synchronization and replication of Mobile Data - SMS architecture - Java card – GPRS – Mobile Computing through Telephony - Synchronization protocol - Context-aware applications.

Block-3: Mobile Communication:

Wireless Transmission – Medium Access Control – Telecommunication Systems – Satellite Systems – Broadcast system – Wireless LAN – Mobile IP – Mobile TCP.

Block-4: ADHOC Wireless Network:

Ad Hoc Wireless Network –MAC protocol – Routing protocols - Transport Layer Protocol - QOS – Energy Management.

Block-5: Wireless Sensor Network:

Architecture and Design – Medium Access Control – Routing – Transport Layer – Energy model.

Reference Books:

1. Jochen Schiller, Mobile Communications, Second Edition, Revised 2008.
2. William Stallings,"Wireless Communications & Networks", Pearson Education, 2005.
3. C.Siva Ram Murthy, B.S. Manoj, "Ad Hoc Wireless Networks – Architectures and Protocols", 2nd Edition, Pearson Education. 2004
4. Ashok K Talukder, Roopa R Yavagal, "Mobile Computing", Tata McGraw Hill, 2005.
5. Jochen Burkhardt Dr.Horst Henn, Klaus Rintdoff,Thomas Schack, "Pervasive Computing", Pearson, 2009.
6. Fei Hu , Xiaojun Cao, " Wireless Sensor Networks Principles and Practice " CRC Press, 2010.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – VI Semester (Distance Mode)

COURSE TITLE : Python Programming Laboratory

COURSE CODE : BSCSS-P7

COURSE CREDIT : 02

COURSE OBJECTIVES

While studying the Python Programming Laboratory, the student shall be able to:

- To understand the programming basics in Python Programming
- To understand the object-oriented program design and development in Python Programming

COURSE OUTCOMES

After completion of the Python Programming Laboratory, the student will be able to:

- Program the basic of python
- Create and connect Query languages
- Write GUI programming

Exercises:

1. Create a simple calculator to do all the arithmetic operations
2. Program to use control flow tools like if.
3. Program to use for loop
4. Data structures
   use list as stack
   use list as queue
   tuple, sequence
5. Create new module for mathematical operations and use in your program
6. Program to read and write files, create and delete directories
7. Program with exception handling
8. Program using classes
9. Connect with MySQL and create address book
10. Program using string handling and regular expressions
11. Program to parse apache log file
12. Create a GUI program using pygtk

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – VI Semester (Distance Mode)

COURSE TITLE	**:**	**Project**
COURSE CODE	**:**	**BSCSS-P8**
COURSE CREDIT	**:**	**04**

COURSE OBJECTIVES

While completing the project, the student shall be able to:

The objective of the Project Course is to help the students to study, analyze and design software or utility for research problems focused in the recent journals or application of such software related to problems in the area of Computer Science. The development of algorithms and derivation with respect to theoretical Computer Science in relevance to performance comparison, which will improve the skills of software development of the students, will be another objective of the mini project course.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – ELECTIVE I (Distance Mode)

COURSE TITLE : Software Testing

COURSE CODE : BSCSS-63

COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the Software Testing, the student shall be able to:

- To study various Software techniques
- To study fundamental concepts in software testing

COURSE OUTCOMES

After completion of the Software Testing, the student will be able to:

- Get the Basics of software quality assurance
- Know the Introduction to software testing
- Get knowledge of Different testing techniques
- Understand the Automated testing concepts

Block 1: Software Quality Assurance: software challenge - Software Quality – Software Quality factors – Software Quality Models- Software quality measurement and metrics – Software Quality Architecture.

Block 2: Introduction to Software Testing: Overview- Purpose of testing – Objectives – Inspection and Testing – Testing and debugging – Debugging process – Software testing life cycle – Responsibility of test team leader.

Block 3: Testing techniques: The V-Model – Testing techniques: Functional testing techniques – Non-functional testing techniques- Test metrics- Risk based testing – Extreme testing.

Block 4: Automated testing: Introduction – process - Types of automated test – Code auditing – Coverage Monitoring – functional test – Load test – Test Management - Advantages and Disadvantages of Automated test - Alpha and Beta site testing programs.

Block 5: Test Maturity Model: Human Issues and Challenges in testing.

Reference Books:

1. Software Quality Assurance, Nina S Godbole, Narosa Publishing House, 2008.
2. Software Quality Assurance, From Theory to Implementation, Daniel Galin, Pearson Education, 2004.
3. Software Quality Complete and Practices, R A Khan, K. Mustafa, SI Ahson , Narosa Publishing House, 2008.
4. Software Testing principles and Practices, Srinivasan Desikan, Gopalswamy Ramesh, Pearson Education, 2006.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – ELECTIVE I (Distance Mode)

COURSE TITLE	**:**	**E-Learning**
COURSE CODE	**:**	**BSCSS-64**
COURSE CREDIT	**:**	**03**

COURSE OBJECTIVES

While studying the E-Learning, the student shall be able to:

To analyze and compare different on-line E-Learning tools, design course content for a specific subject from different perspective, plan and design the instruction and support needs of learners of various backgrounds, levels and situations based on different learning methodologies, outline the various tasks of a typical online course facilitator, and Design and Implement an E-Learning Course Content for a complete online course

COURSE OUTCOMES

After completion of the E-Learning, the student will be able to:

- Get clear idea about the basics of e-learning.
- Understand strategy of e-learning.
- Get knowledge about the principles, design and implementation of e-learning.

Block 1 INTRODUCTION

E-Learning - E-Learning cycle - E-Learning types - challenges and support Blockies – cognitive presence –Approaches to design E-Learning - E-Learning framework - 6C framework - E-Learning Tools

Block 2 E-LEARNING STRATEGY

Role of tutor - E-Learning strategy - Blended E-Learning – M-Learning- problem based learning- Enterprise learning- Corporate Learning- Web based Learning - Pod casting -Learning Management systems – Content development process – E-Learning standards- SCORM standard- managing e-learning quality - case studies

Block 3 PRINCIPLES OF E-LEARNING

Philosophy of E-Learning – theory of learning – Applying principles of multimedia - Applying principles of contiguity - Applying principles of modality - Applying principles of redundancy - Applying principles of coherency - Applying principles of personalization- web-based learning comm. Blockies - knowledge sharing and Knowledge management in e-learning- social networks and social media in e-learning

Block 4 DESIGN

On line E-Learning technologies – visual communication techniques- Computer-based technologies - Computer-mediated communication (CMC) - Assessment and evaluation- Organizing and designing learning sequences, Characteristics of Interactive Online Learning Media

Block 5 IMPLEMENTATION

Leverages example in E-Learning – collaborative E-Learning- Learner control in E-Learning- guidelines to solve issues in E-Learning – Implementation of an E-Learning Course Content for a complete online course, Research in content retrieval and generation for E-Learning, Role of cloud and semantic Grid in E-Learning

Reference book:

1. D.Randy Garrison "E-Learning in the 21st century a framework for research and practice", 2nd edition, Taylor and Francis, 2011.
2. Robin Mason, "E-Learning : the key concepts", Routledge, 2007.
3. William Horton, "E-Learning by Design", Pfeiffer Wiley, 2006.
4. John Gardner, Bryn Holems, "E-Learning : Concepts and practice" SAGE Publications, 2006.
5. R.C.Clark and R.E.Mayer, "E-Learning and the science of instruction", Pfeiffer Wiley, 2011.
6. Mark J Rosenberg, "E-Learning: strategies for delivering knowledge in the Digital Age", McGraw- Hill, 2001.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – ELECTIVE I (Distance Mode)

COURSE TITLE : Electronic Commerce

COURSE CODE : BSCSS-65

COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the Electronic Commerce, the student shall be able to:

- Understand concept of Ecommerce and its types
- Study the various online payment and marketing on Web
- Understand various E-business Strategies.

COURSE OUTCOMES

After completion of the Electronic Commerce, the student will be able to:

- Get clear idea about the fundamentals of Electronic commerce
- Derive the internet security and marketing
- Get knowledge about data exchange and their features.

Block 1

An introduction to Electronic commerce: What is E-Commerce (Introduction And Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of ECommerce, Electronic Commerce Applications, 9 Electronic Commerce and Electronic Business(C2C)(C2G,G2G, B2G, B2P, B2A, P2P, B2A, C2A, B2B, B2C)

Block 2

The Internet and WWW: Evolution of Internet, Domain Names and Internet Organization (.edu, .com, .mil, .gov, .net etc.) , Types of Network, Internet Service Provider, World Wide Web, Internet & Extranet, Role of Internet in B2B Application, building own website, Cost, Time, Reach, Registering a Domain Name, Web promotion, Target email, Baner, Exchange, Shopping Bots

Block 3

Internet Security: Secure Transaction, Computer Monitoring, Privacy on Internet, Corporate Email privacy, Computer Crime(Laws , Types of Crimes), Threats, Attack on Computer System, Software Packages for privacy, Hacking, Computer Virus(How it spreads, Virus problem, virus protection, Encryption and Decryption, Secret key Cryptography, DES, Public Key Encryption, RSA, Authorisation and Authentication, Firewall, Digital Signature(How it Works)

Block 4

Electronic Data Exchange: Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model, Electronic Payment System: Introduction, Types of Electronic Payment System, Payment Types, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash Planning for Electronic Commerce: Planning Electronic Commerce initiates, Linking objectives to business strategies, Measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites

Block 5

Internet Marketing: The PROS and CONS of online shopping, The cons of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce.

Reference book:

1. G.S.V.Murthy, E-Commerce Concepts, Models, Strategies- :- Himalaya Publishing House, 2011.
2. Kamlesh K Bajaj and Debjani Nag , E- Commerce , 2005.
3. Gray P. Schneider , Electronic commerce, International Student Edition, 2011,
4. Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang E-Commerce, Fundamentals And Applications, Wiely Student Edition,

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – ELECTIVE I (Distance Mode)

COURSE TITLE : Data Mining

COURSE CODE : BSCSS-66

COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the Data Mining, the student shall be able to:

- Understand the need for Knowledge Discovery and Gain Insight on the Techniques for Data Preprocessing.
- Gain Knowledge on Schemas of a Data Warehouse, OLAP and Cube Technology.
- Understand the Methods for Mining Frequent Patterns, Associations and Correlations.
- Gain Knowledge on the Basic Concepts and Methods for Classification.
- Gain Knowledge on the Basic Concepts and Methods for Data Clustering.

COURSE OUTCOMES

After completion of the Data Mining, the student will be able to:

- Brief the introduction about the data warehousing their architecture.
- Get clear idea about the Knowledge discovery from Databases
- Get the concepts of Data mining functionalities and mining rules
- Describe the Classification and prediction and propagations
- Understand the Clustering analysis and their concepts

Block 1:

Introduction – Kinds of Data and Patterns That Can Be Mined – Technologies Used – Kinds of Applications Targeted – Major Issues in Data Mining – Data Objects and Attribute Types – Basic Statistical Description of Data – Data Visualization – Measuring Data Similarity and Dissimilarity.

Block 2:

Data Preprocessing – Data Cleaning – Data Integration – Data Reduction – Data Transformation and Data Discretization.

Block 3:

Data warehouse – Basic Concepts – Operational Database Systems and Data Warehouses – Architecture of a Data Warehouse – Extract, Transform and Load – Metadata – Data Cube and OLAP – Multidimensional Data Model – Star Schema – Snowflake Schema – Starflake Schema – Fact Constellation Schema – Dimensions – Measures – OLAP Operations – Starnet Query Model for Querying MultidimensionalDatabases – Data Warehouse Design and Usage – Data Warehouse Implementation – ROLAP – MOLAP– HOLAP– Data Generalization by Attribute-Oriented Induction.

Block 4:

Mining Frequent Patterns, Associations, and Correlations –Basic Concepts –Market Basket Analysis – Frequent Itemsets, Closed Itemsets, and Association Rules – Frequent Itemset Mining Methods – Apriori Algorithm–Finding Frequent Itemsets by ConfinedCandidate Generation – Generating Association Rules from Frequent Itemsets – Improving the Efficiency of Apriori –Pattern-Growth Approach for Mining Frequent Itemsets – Mining Frequent Itemsets Using Vertical Data – Mining Closed and Max Patterns –Pattern EvaluationMethods – Association Analysis to Correlation Analysis –Comparison of Pattern Evaluation Measures.

Block 5:

Classification– General Approach to Classification –Decision Tree Induction – Attribute Selection Measures –Tree Pruning –Scalability and Decision Tree Induction – Visual Mining for Decision Tree Induction –Bayes Classification Methods –Bayes' Theorem – Naïve Bayesian Classification – Rule-Based Classification – Using IF-THEN Rules for Classification – Rule Extraction from a Decision Tree – Rule Induction Using a Sequential Covering Algorithm – Cluster Analysis – Requirements for Cluster Analysis – Overview of Basic Clustering Methods –Partitioning Methods –*k*-Means: A Centroid-Based Technique – *k*-Medoids: A Representative Object-Based Technique –Hierarchical Methods –Agglomerative versus Divisive Hierarchical Clustering –Distance Measures in Algorithmic Methods – BIRCH: Multiphase Hierarchical Clustering Using ClusteringFeature Trees – Chameleon: Multiphase Hierarchical Clustering Using DynamicModeling – Probabilistic Hierarchical Clustering.

Reference books:

1. Jiawei Han, Micheline Kamber, Jian Pei, "Data Mining: Concepts and Techniques", Third Edition, Morgan Kaufmann Publishers, 2011.
2. Arun K Pujari, "Data Mining Techniques", Fourth Edition, Orient BlackSwan, 2016.

Tamil Nadu Open University
School of Computer Science
Chennai – 15

B.Sc Computer Science - Syllabus – ELECTIVE I (Distance Mode)

COURSE TITLE : Constitution of India

COURSE CODE : BSCSS-67

COURSE CREDIT : 03

COURSE OBJECTIVES

While studying the **Constitution of India**, the student shall be able to:

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional Role and entitlement to civil and economic rights as well as the emergence nation hood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolutionin1917and its impact on the initial drafting of the Indian Constitution.

COURSE OUTCOMES

After completion of the **Constitution of India**, the student will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party[CSP]under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- Discuss the passage of the Hindu Code Bill of 1956.

Block 1 HISTORY OF MAKING OF THE INDIAN CONSTITUTION
History, Drafting Committee, (Composition & Working), Philosophy of the Indian Constitution: Preamble, Salient Features.

Block 2 CONTOURS OF CONSTITUTIONAL RIGHTS AND DUTIES
Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy, Fundamental Duties.

Block 3 ORGANS OF GOVERNANCE
Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions.
Block 4 LOCAL ADMINISTRATION

District's Administration head: Role and Importance Municipalities: Introduction, Mayor and role of Elected Representative, CEO, Municipal Corporation. Pachayati raj: Introduction, PRI: Zila Pachayat. Elected officials and their roles, CEO Zila Pachayat: Position and role. Block level: Organizational Hierarchy(Different departments), Village level:Role of Elected and Appointed officials, Importance of grass root democracy.

Block 5 ELECTION COMMISSION

Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners - Institute and Bodies for the welfare of SC/ST/OBC and women.

Reference books:

1. The Constitution of India,1950(Bare Act),Government Publication.
2. Dr.S.N.Busi, Dr.B. R.Ambedkar framing of Indian Constitution,1st Edition, 2015.
3. M.P. Jain, Indian Constitution Law, 7 th Edn., Lexis Nexis,2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.