



Karmaveer Bhaurao Patil University, Satara

Syllabus for

B. Sc. I Computer Science (Entire)

Under

Faculty of Science and Technology

(As per NEP 2020)

With effect from Academic Year 2024-2025

Syllabi for Bachelor of Science (B. Sc.) Part – I Computer Science (Entire)

Preamble:

This syllabus is framed to give sound knowledge with an understanding of Computer Science to undergraduate students in the first year of B.Sc. degree course. The Bachelor of Science (B.Sc.) in Computer Science (Entire) programme is designed to provide students with a strong foundation in the principles, theories and applications of Computer Science (Entire), enabling them to meet the evolving demands of the digital era. Aligned with the National Education Policy (NEP) 2020, the programme emphasizes multidisciplinary learning, skill development, critical thinking, innovation, and experiential education.

The curriculum integrates fundamental concepts of computing with emerging technologies, preparing students to analyse problems, design efficient solutions, and develop software systems using modern tools and programming languages. It encompasses core areas such as programming, data structures, algorithms, database management, operating systems, computer networks, web technologies, artificial intelligence, data science, cybersecurity, cloud computing, and software engineering, along with practical laboratory work, internships, projects, and research-oriented learning.

The programme aims to develop technical competence, analytical reasoning, creativity, ethical values, and effective communication skills among students. It encourages lifelong learning, entrepreneurship, interdisciplinary collaboration, and awareness of the societal, environmental, and professional responsibilities associated with computing technologies. On successful completion of the programme, graduates will possess the knowledge, practical skills, and professional competencies required for careers in the IT industry, software development, data analytics, research, academia, government organizations, and entrepreneurship, or for pursuing higher education and advanced research in Computer Science (Entire) and allied disciplines.

General Objectives of the Programme:

1. To develop capable and committed academicians and professionals with a strong foundation in Computer Science and related technologies.
2. To prepare a skilled workforce equipped with technical, analytical, and problem-solving abilities that meet the evolving needs of the IT industry and society.
3. To impart fundamental and advanced knowledge of Computer Science, including programming, algorithms, software development, data management, networking, and emerging technologies.
4. To develop practical skills in programming, software development, system design, laboratory work, project implementation, and the collection, analysis, and interpretation of computational data for research and innovation.
5. To encourage lifelong learning, adaptability, entrepreneurship, and continuous professional development in the rapidly evolving field of Computer Science.

6. To develop responsible, ethical, and informed citizens who can contribute positively to society through the effective use of computing and digital technologies.
7. To promote research aptitude, collaborative learning, and the ethical application of computing technologies for sustainable development and societal well-being.

General Outcomes of the Programme:

The students will be...

1. Demonstrate sound knowledge of Computer Science fundamentals, programming, software development, databases, networking, and emerging technologies.
2. Apply computational thinking and problem-solving skills to design, develop, and implement effective computing solutions for real-world problems.
3. Display ethical, professional, and social responsibility in the development and use of computing technologies.
4. Eligible to pursue higher education or research-oriented programmes in India and abroad.
5. Employable in the IT industry and related sectors, including software development, web and mobile application development, database administration, networking, cybersecurity, data analytics, and technical support.
6. Eligible to appear for competitive examinations conducted by government organizations, public sector undertakings, and other recruitment agencies.
7. Demonstrate lifelong learning abilities, adaptability, and entrepreneurial skills to keep pace with advancements in computing technologies and contribute effectively to society.

Program Specific Objectives:

1. The students are expected to understand the fundamentals, principles, mathematical, recent IT concepts and recent developments in the subject area.
2. To provide practical experience that complements the theory courses and strengthens students' understanding of fundamental concepts through hands-on experience.
3. It is expected to inspire and boost interest of the students towards Computer Science as the main subject.
4. To develop the power of appreciations, the achievements in Computer and role in nature and society.
5. To enhance student sense of enthusiasm towards IT and to involve them in an intellectually stimulating experience of learning in a supportive environment.

Program Specific Outcomes:

The students will acquire...

1. Knowledge of basics of Computer Science.
2. Knowledge to learn, design and perform experiments in the labs to demonstrate the concepts, principles and theories learned in the classrooms.
3. Knowledge to develop the ability to apply the knowledge acquired in the classroom and laboratories to specific problems in theoretical and experimental Computer Science.
4. Knowledge to identify their area of interest in academic, research and development.
5. Knowledge to perform job in various fields' like IT, science, engineering, education, banking, business and public service, etc. or be an entrepreneur with precision, analytical mind, innovative thinking, clarity of thought, expression, and systematic approach.

1. **TITLE:** Computer Science (Entire)
2. **YEAR OF IMPLEMENTATION:** From 2024-2025
3. **DURATION:** 01 year
4. **PATTERN:** Semester
5. **ELIGIBILITY OF STUDENTS:** 12th Pass with Science (Mathematics Compulsory), or equivalent. Any other eligibility prescribed by UGC, Government of Maharashtra, Karmaveer Bhaurao Patil University, Satara
6. **MEDIUM OF INSTRUCTION:** The medium of instructions shall be in English.
7. **BATCH SIZE:**
 B.Sc. I -20 students per batch
 B.Sc. II -16 students per batch
 B.Sc. III-12 students per batch
8. **ELIGIBILITY OF THE CORE FACULTY:**
 Assistant Professor: Master of Science with specialization in Computer Science and NET/ SET/ Ph.D.
 Associate Professor: Master of Science in Computer Science with NET/ SET/Ph.D.
 Professor: Master of Science in Computer Science with NET/ SET/Ph.D.
Eligibility for Professor of Practice or Professional Trainer:
 Any other eligibility as per the Guidelines and Regulations Passed by the Board of Concerned Studies, Academic Council of the College / University and Rules and Regulations of Karmaveer Bhaurao Patil University, Satara, Government of Maharashtra, and UGC norms.
Eligibility for Adjunct Professor of Practice or Professional Trainer:
 As per eligibility prescribed by UGC
9. **STRUCTURE OF COURSE:** As per NEP 2020

Sem (Level)	Courses			OE	AEC/ VEC/ IKS	Total Credits	Degree/ Cum. Cr. MEME
	Course I	Course II	Course III				
Sem I (4.5)	DSC I (2) DSC II (2) DSC P I (2)	DSC I (2) DSC II (2) DSC P I (2)	DSC I (2) DSC II (2) DSC P I (2)	OE I (2)	IKS I (2) (Generic)	22	UG Certificate: 44
Sem II (4.5)	DSC III (2) DSC IV (2) DSC P II (2)	DSC III (2) DSC IV (2) DSC P II (2)	DSC III (2) DSC IV (2) DSC P II (2)	OE II (2)	VEC I (2) DEGG and IIC	22	
Credits	12	12	12	04	04	44	Exit option: 4 Cr. NSQF/Inter nship/Skill Courses

10. COURSE TITLE**B.Sc. I SEM - I Computer Science (Entire)**

Sr. No.	Course	Course Specific Code	Course Code	Name of Course	Credits
1	Course-I	DSC -I	BCSET 111	C Programming-I	2
2		DSC-II	BCSET 112	DBMS	2
3		DSCP- I	BCSEP 113	Lab I Based on BCSET 111 and BCSET 112	2
4	Course-II	DSC -I	BCSET 114	Computational Mathematics I	2
5		DSC-II	BCSET 115	Computational Statistics I	2
6		DSCP- I	BCSEP 116	Lab II Based on BCSET 115 and BCSET 116	2
7	Course-III	DSC -I	BCSET 117	Computational Electronics I	2
8		DSC-II	BCSET 118	Computational Electronics II	2
9		DSCP- I	BCSEP 119	Lab III Based on BCSET 117 and BCSET 118	2
10		OE	BCSETOE 1	Open Elective	2
11		IKS	BCSETIKS 1	Indian Knowledge System	2

B.Sc. I SEM - II Computer Science (Entire)

Sr. No.	Course	Course Specific Code	Course Code	Name of Course	Credits
1	Course-I	DSC -I	BCSET 121	C Programming-II	2
2		DSC-II	BCSET 122	RDBMS	2
3		DSCP- I	BCSEP 123	Lab I Based on BCSET 121 and BCSET 122	2
4	Course-II	DSC -I	BCSET 124	Computational Mathematics II	2
5		DSC-II	BCSET 125	Computational Statistics II	2
6		DSCP- I	BCSEP 126	Lab II Based on BCSET 124 and BCSET 125	2
7	Course-III	DSC -I	BCSET 127	Computational Electronics III	2
8		DSC-II	BCSET 128	Computational Electronics IV	2
9		DSCP- I	BCSEP 129	Lab III Based on BCSET 127 and BCSET 128	2
10		OE	BCSETOE 2	Open Elective	2
11		VEC	BCSETVEC 1	Democracy, Election and Indian constitution	2

11. Evaluation Structure:

Course	Course Category	Course Code	Internal Evaluation (Best of Two CCE)			ESE	Total Marks	Credits
			CCE-I	CCE-II	CCE-III			
Course-I	T	BCSET 111	10	10	10	30	50	02
	T	BCSET 112	10	10	10	30	50	02
	P	BCSEP 113	20			30	50	02
Course-II	T	BCSET 114	10	10	10	30	50	02
	T	BCSET 115	10	10	10	30	50	02
	P	BCSEP 116	20			30	50	02
Course-III	T	BCSET 117	10	10	10	30	50	02
	T	BCSET 118	10	10	10	30	50	02
	P	BCSEP 119	20			30	50	02
OE	P	BCSEPOE 1	20			30	50	02
IKS	T	BCSETIKS 1	10	10	10	30	50	02
			Total				550	22

SEM II

Course	Course Category	Course Code	Internal Evaluation (Best of Two CCE)			ESE	Total Marks	Credits
			CCE-I	CCE-II	CCC-III			
Course-I	T	BCSET 121	10	10	10	30	50	02
	T	BCSET 122	10	10	10	30	50	02
	P	BCSEP 123	20			30	50	02
Course-II	T	BCSET 124	10	10	10	30	50	02
	T	BCSET 125	10	10	10	30	50	02
	P	BCSEP 126	20			30	50	02
Course-III	T	BCSET 127	10	10	10	30	50	02
	T	BCSET 128	10	10	10	30	50	02
	P	BCSEP 129	20			30	50	02
OE	P	BCSEPOE 2	20			30	50	02
VEC	T	BCSETVEC 2	10	10	10	30	50	02
			Total				550	22

Abbreviations: DSC: Discipline Specific Course; DSE: Discipline Specific Elective; CCE: Continuous Comprehensive Examination; IKS: Indian Knowledge System; OE: Open Elective; VEC: Value Educational Course; T: Theory; P: Practical ESE: End Semester Examination

INTERNAL EVALUATION STRUCTURE

- Internal evaluation of theory papers shall carry a weightage of 40%.
- Activity: For the internal evaluation of theory papers following activities will be adopted for CCE I & CCE II: class test/ open book test/ online course/ Industrial review/ Industrial visit/ e learning video creation/ assignment/seminar/ case study/ fieldwork/ project.
- CCE III shall consist of multiple-choice questions.
- Each CCE will carry 10 marks for 2-credit theory papers and 20 marks for 4-credit theory papers, and the best two scores will be considered for final score.
- Internal evaluation of practical papers shall carry a weightage of 40%.
- For practical examinations, internal evaluation will be based on student performance, attendance, journal records, and viva voce.

12. OTHER FEATURES:

A) LIBRARY:

Reference books, Textbooks and journals are available in Institute and Departmental Library. (Separate reference lists are attached along with the respective course syllabus)

B) EQUIPMENT:

1. Computers: 80 Desktop Computers
2. Installed Software: Turbo C, Oracle, Dev C++, Keil, Proteus
3. Smart Classroom Equipment: 2 Smart Digital Screen
4. Projector: 2
5. LED Screen: 3
6. Development Boards / Embedded Systems: Raspberry Pi, Arduino UNO,
7. Arduino Nano
8. Operating Systems Available Windows, Linux (Ubuntu)



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Science

Programme: B.Sc.

Semester – I

Type: DSC - I

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: C Programming I (BCSET 111)

Course Objectives: Student should be able to ...

- 1) learn a programming logic concept.
- 2) understand the basic principles of programming.
- 3) discover skills for writing programs using 'C'
- 4) study skill of Control structure and function concepts using 'C'.

Course Outcomes: Student will be able to ...

- 1) illustrate the flowchart and design an algorithm for a given problem and to develop solution.
- 2) develop conditional and unconditional statements to write c program.
- 3) exercise user defined functions to solve real time problems.
- 4) demonstrate simple C programs.

Module	Title and Contents	Hrs.
Module -1	Introduction to 'C'	07
	1.1 Basics of Linux Operating System (Ubuntu) and 'C' programming Language in Linux 1.2 History of 'C' 1.3 Characteristics of C Language 1.4 Algorithm and Flowcharts- (Definition, Symbol, features) 1.5 Character set and keywords 1.6 Structure of 'C' programming, Constant and its type 1.7 Compiling and debugging the program	
Module -2	Input-Output Statements	08
	2.1 Variable and its Data types in 'C' 2.2 Operators- Arithmetic, logical, relational, bitwise, increment, decrement, conditional, operator precedence 2.3 Formatted input-output- printf(), scanf() 2.4 Character input-output – getch(), getche(),getchar(),putchar() 2.5 String input-output - gets(), puts()	
Module -3	Control Structures	07
	3.1 Conditional control statements- if, if else, nested if, else if ladder, switch 3.2 Looping – for statements, nested for, while, do-while statements, nested while and do while, Infinite loop 3.3 Unconditional breaking control statements- break, continue, goto	
Module -4	Functions	08
	4.1 Definition and Declaration 4.2 Prototype of function 4.3 Local and global variable 4.4 User defined Functions, Recursion Function 4.5 Call by value and Call by reference 4.6 String functions (strcpy(), strcmp(), strcat(), strlen(), strrev())	

Reference Books:-

1. Y. Kanetkar, Let Us C: Authentic Guide to C Programming Language, BPB Publications, 17th ed., 2022
2. E. Balagurusamy, Programming in ANSI C, McGraw Hill Education Private Limited, 8th ed., 2019
3. K. R. Venugopal, and S. R. Prasad. Mastering C, McGraw Hill Education, 2nd ed., 2017.
4. P. Prinz and U. Kirch-Prinz, C in a Nutshell, O'Reilly Media, Inc., 2nd ed., 2015

Evaluation Pattern: 40:60**Total Marks: 50****Continuous Comprehensive Evaluation (20 Marks):**

- CCE - I: 10 Marks: Activity
 - CCE - II: 10 Marks: Activity
 - CCE - III: 10 Marks: MCQ Test
- (The Best of two will be considered for the final mark entry)

End Semester Examination (50 Marks):

- Question -1: Solve the following questions.
(Five questions of 2 Marks)
 - Question -2: Attempt any two questions.
(Three questions of 10 marks)
 - Question -3: Attempt any four questions.
(Six questions of 5 marks)
- (50 Marks converted to 30 marks)



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Science

Programme: B.Sc.

Semester – I

Type: DSC - II

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Database Management System (BCSET 112)

Course Objectives: Student should be able to ...

- 1) study the concepts and terminologies of DBMS
- 2) explain the concept of Normalization concepts
- 3) understand ER-Model
- 4) observe the different database systems.

Course Outcomes: Student will be able to ...

- 1) improve skill about data operation.
- 2) interpret to handle database.
- 3) design& develop proper database.
- 4) ability to design ER-model on case study

Module	Title and Contents	Hrs
Module - 1	Organization of Database System	08
	1.1 Introduction of file, file types 1.2 Organization of file- heap file organization, serial file organization, sequential, index sequential file, random access file (direct access file) 1.3 Definition of Database 1.4 Needs and features Database Management Systems (DBMS) 1.5 Components, comparison of file processing system with DBMS	
Module - 2	Database concepts	07
	2.1 Database System & Types: centralized database system, client-server system, distributed database system 2.2 Functions of DBMS, advantages and disadvantages of DBMS 2.3 Structure of DBMS 2.4 Services provided by DBMS 2.5 Schema, Subschema, data abstraction, data independence 2.6 Architecture of database system 2.7 Data dictionary, database administration, database manager	
Module - 3	Data Models	07
	3.1 Introduction, definition, features of data models 3.2 Object based data models- Entity Relationship Model, cardinality, Record based, Relational Model, Network Model, Hierarchical Model, Physical Data Models 3.3 Keys: Primary key; foreign key, candidate key, super key, unique key 3.4 Normalization: Concept of normalization, advantages, First NF, Second NF, Third NF, examples of normalizations	
Module - 4	Conceptual Design (E-R model)	08
	4.1 Overview of DB design 4.2 ER data model (entities, attributes, entity sets, relations, relationship sets) 4.3 Additional constraints (key constraints; participation constraints; weak entities; aggregation / generalization) 4.4 Conceptual design for small to large enterprises 4.5 Case Study: Design Database System for- Library management system; Bank management system; Inventory management system	

Reference Books:-

1. Coronel, Carlos, and S. Morris. Database Systems: Design, Implementation, and Management. Boston: Cengage Learning, 13th ed., 2022.
2. Silberschatz, Abraham, H. F. Korth, and S. Sudarshan. Database System Concepts, McGraw-Hill Education, 7th ed., 2019.
3. Elmasri, Ramez, and S. B. Navathe. Fundamentals of Database Systems. Boston: Pearson, 7th ed., 2017.
4. Connolly, Thomas, and C. Begg. Database Systems: A Practical Approach to Design, Implementation, and Management, Pearson Education, 4th ed., 2005.

Evaluation Pattern: 40:60**Total Marks: 50****Continuous Comprehensive Evaluation (20 Marks):**

- CCE - I: 10 Marks: Activity
 - CCE - II: 10 Marks: Activity
 - CCE - III: 10 Marks: MCQ Test
- (The Best of two will be considered for the final mark entry)

End Semester Examination (50 Marks):

- Question -1: Solve the following questions.
(Five questions of 2 Marks)
- Question -2: Attempt any two questions.
(Three questions of 10 marks)
- Question -3: Attempt any four questions.
(Six questions of 5 marks)
- (50 Marks converted to 30 marks)



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Faculty of Science and Technology

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Board of Studies in Computer Science

Programme: B.Sc.

Semester – I

Type: DSC P - I

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Practical I (BCSEP 113)

Course Objectives: Student should be able to ...

- 1) understand programming and its roles in problem solving.
- 2) learn programming skills using the fundamentals and basics of c language.
- 3) study the concepts and terminologies of DBMS.
- 4) describe the ER-model.

Course Outcomes: Student will be able to ...

- 1) exercise different Operators.
- 2) analyze basic Structure of the C-PROGRAMMING, declaration and usage of variables.
- 3) ability to design& develop proper database.
- 4) design ER-Model.

Sr. No.	List of Practical (Any 15)	Hrs.
1.	Write a program on arithmetic operator	60
2.	Write a Program to convert the Temperature in centigrade degree to the Fahrenheit degree.	
3.	Write a program to demonstrate whether given number is even or odd.	
4.	Write a program to find out First Fifty Prime numbers.	
5.	Write a program to display Fibonacci series.	
6.	Write a program to reverse the given number. Write a program which display following output- A B C D E A B C D A B C A B A	
7.		
8.	Write a program for string functions	
9.	Write a program to calculate area of circle using function	
10.	Write a program to read single character (getchar()) Create Employee detailed table with appropriate field to apply following constraint on field.	
11.	a. Primary Key b. Foreign Key c. Not null key d. Check constraint etc. Create student table with appropriate field and do.	
12.	a. Insert 5 appropriate records b. Update city as Mumbai whose Roll No is 2. c. Delete record Who live in Satara	
13.	Create Bank table with appropriate field and do. a. Insert 5 appropriate records b. Increment salary by 5000 whose EmpId id 101. c. Delete record Who Work in Satara City	

14.	Create Hospital table with appropriate field and do. a. Insert 5 appropriate records b. Change the size of Patient Name by 50 Char. c. Delete Column name DOB. d. Drop Table.	
15.	Case Study on Library Management System	
16.	Case Study on Railway Reservation System	
17.	Case Study on Bank Management System	
18.	Case Study on Inventory Management System	
19.	Case Study on Hospital Management System	
20.	Case Study on Student Course Registration System	

Reference Books: -

1. Y. Kanetkar, Let Us C: Authentic Guide to C Programming Language, BPB Publications, 17th ed., 2022
2. E. Balagurusamy, Programming in ANSI C, McGraw Hill Education Private Limited, 8th ed., 2019
3. Elmasri, Ramez, and S. B. Navathe. Fundamentals of Database Systems, Pearson, 7th ed. 2016.
4. Silberschatz, Abraham, H. F. Korth, and S. Sudarshan. Database System Concepts, McGraw-Hill Education, 7th ed. 2019.

Practical Evaluation Pattern: 40:60

Total Marks: 50

Internal Evaluation (20 Marks):

- Journal : 10 Marks
- Student's Performance: 05 Marks
- Viva: 05 Marks

Practical Exam Paper (30 Marks):

ESE = 30 Marks



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Board of Studies in Computer Science

Programme: B.Sc.

Semester – I

Type: DSC - I

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Computational Mathematics I (BCSET 114)

Course Objectives: Student should be able to ...

- 1) understand number system and their inter conversion.
- 2) learn concept of lattice & boolean algebra
- 3) describe the concept of graph & algorithms and tree graph
- 4) study the concept of directed graph, network and flow.

Course Outcomes: Student will be able to ...

- 1) apply addition and subtraction of Decimal, Binary, hexadecimal number systems and their conversions.
- 2) use the Boolean expression and Boolean functions.
- 3) evaluate the concept of graphs and various algorithms.
- 4) implement the types of directed graphs and their application.

Module	Title and Contents	Hrs.
Module -1	Number system 1.1 Decimal Number System 1.2 Binary Number System 1.3 Hexadecimal Number systems 1.4 inter conversion of Number Systems 1.5 Binary addition, subtraction, multiplication and division 1.6 signed and unsigned binary numbers 1.7 1's and 2's complement representation	07
Module -2	Boolean algebra 2.1 Partial Order Set 2.2 Hasse diagram 2.3 Lattice: Definition, Properties 2.4 Principle of duality 2.5 Bounded, Distributive and Complemented lattice 2.6 Boolean algebra, Boolean expressions and Boolean functions 2.7 Disjunctive and conjunctive normal forms and examples 2.8 Simplification of switching circuit	08
Module -3	Graphs and Trees 3.1 Definition and Types of graphs 3.2 concept of degree of vertex, Hand-Shaking Lemma 3.3 Matrix representation of graphs: Adjacency matrix and Incidence matrix 3.4 Trails, Paths and Circuits 3.5 Connected and disconnected graph 3.6 Dijkstra's shortest path algorithm 3.7 Definitions and examples of trees, rooted trees, binary trees and their properties, spanning trees 3.8 Kruskal's algorithm	07
Module -4	Directed Graphs	

4.1 Definition, types of directed graphs 4.2 directed paths and cycles 4.3 connectivity and strongly connected digraphs 4.4 Directed (rooted) trees, arborescence and Polish notation 4.5 Network and flows: Definition, examples, Maximal flow algorithm	08
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Reference Books: -

1. K. H. Rosen, Discrete Mathematics and Its Applications, McGraw Hill Education, 8th ed. 2019.
2. Lipschutz, Seymour, and M. Lipson, Schaum's Outline of Discrete Mathematics, McGraw-Hill Education, 3rd ed. 2017.
3. S. S. Epp, Discrete Mathematics with Applications, Brooks/Cole, Cengage Learning, 4th ed., 2011
4. U. Langote, Discrete Mathematics, Tech-Max Publications, 1st Ed., 2009
5. K. H. Rosen, Discrete Mathematics and Its Applications, McGraw-Hill, 5th Ed. 2002

Evaluation Pattern: 40:60

Total Marks: 50

Continuous Comprehensive Evaluation (20 Marks):

- CCE - I: 10 Marks: Activity
 - CCE - II: 10 Marks: Activity
 - CCE - III: 10 Marks: MCQ Test
- (The Best of two will be considered for the final mark entry)

End Semester Examination (50 Marks):

- Question -1: Solve the following questions. (Five questions of 2 Marks)
 - Question -2: Attempt any two questions. (Three questions of 10 marks)
 - Question -3: Attempt any four questions. (Six questions of 5 marks)
- (50 Marks converted to 30 marks)



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Faculty of Science and Technology

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Board of Studies in Computer Science

Programme : B.Sc.

Semester – I

Type: DSC - II

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Computational Statistics I (BCSET 115)

Course Objectives: Student should be able to ...

- 1) understand the basic concepts of statistics
- 2) study frequency distribution and data presentation
- 3) compute various measures of central tendency and dispersion
- 4) learn various moments, skewness and kurtosis

Course Outcomes: Student will be able to ...

- 1) apply various types of sampling methods to data collection
- 2) create and interpret frequency tables
- 3) display data graphically and interpret graphs
- 4) recognize, describe, and calculate the measures of central tendency and dispersion

Module	Title and Contents	Hrs.
Module -1	Data Condensation and Graphical Methods	08
	1.1 Definition, importance, scope and limitations of statistics w.r.to computer science 1.2 Data Condensation: Raw data, Attributes and variables, discrete and continuous variables 1.3 Scales of measurement: Nominal, Ordinal, Interval and Ratio classification and construction of frequency distribution 1.4 Graphical Representation: Histogram, Frequency polygon, Frequency curve, Ogive Curves and their uses, Box-Plot, Examples	
Module -2	Measures of central tendency	07
	2.1 Concept of central tendency, Criteria for good measures of central tendency 2.2 Arithmetic mean: Definition, computation for ungrouped and grouped data, combined mean, weighted mean, merits and demerits 2.3 Median: Definition, formula for computation for ungrouped and grouped data graphical method, merits and demerits 2.4 Mode: Definition, formula for computing for ungrouped and grouped data, merits and demerits 2.5 Quantiles: Definition, formula for computation for ungrouped and grouped data, graphical method, Numerical problems	
Module -3	Measures of Dispersion	07
	3.1 Concept of dispersion and measures of dispersion, absolute and relative measures of dispersion 3.2 Range and Quartile Deviation: definition for ungrouped and grouped data and their coefficients 3.3 merits and demerits, Mean Deviation: definition for ungrouped and grouped data 3.4 minimal property (statement only), Standard deviation and Variance: definition for ungrouped and grouped data 3.5 coefficient of variation, combined variance and s.d. for two groups, merits and demerits, Numerical problems	
Module -4	Moments	

	4.1 Raw and central moments: definition for ungrouped and grouped data (only first four moments) 4.2 relation between central and raw moments (statement only) 4.3 Sheppard's Correction, Measures of skewness: Types of skewness, Pearson's and Bowley's coefficient of skewness 4.4 Measures of skewness based on moments 4.5 Measures of Kurtosis: Types of kurtosis, Measures of kurtosis based on moments, Numerical problems	08
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Reference Books: -

1. S. P. Gupta. Statistical Methods, Sultan Chand and Sons, 48th ed, 2022.
2. S. C. Gupta and V. K. Kapoor Fundamental of Mathematical Statistics, Sultan Chand and Sons Publication, 12th ed., 2020.
3. S. C. Gupta. Fundamental of Statistics, Himalaya Publishing House, 7th ed., 2018.
4. A.M. Mood, F.A. Graybill and D. C. Boes, Introduction to the Theory of Statistics, Tata McGraw-Hill Pub. Co. Ltd., 3rd ed., 2017.
5. A. M. Goon, M. K. Gupta, and B. Dasgupta. Fundamentals of Statistics. Vol. 1., The World Press Pvt. Ltd., 8th ed. 2016.

Evaluation Pattern: 40:60

Total Marks: 50

Continuous Comprehensive Evaluation (20 Marks):

- CCE - I: 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test
(The Best of two will be considered for the final mark entry)

End Semester Examination (50 Marks):

- Question -1: Solve the following questions.
(Five questions of 2 Marks)
- Question -2: Attempt any two questions.
(Three questions of 10 marks)
- Question -3: Attempt any four questions.
(Six questions of 5 marks)
(50 Marks converted to 30 marks)



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Science

Programme: B.Sc.

Semester – I

Type: DSC P- I

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Practical II (BCSEP 116)

Course Objectives: Student should be able to ...

- 1) understand decimal, binary and hexadecimal number systems
- 2) study various algorithms of graph and directed graph
- 3) learn various measures of central tendency and dispersion
- 4) compute moments, skewness and kurtosis

Course Outcomes: Student will be able to ...

- 1) apply addition and subtraction of Decimal, Binary, hexadecimal number systems and their conversions
- 2) use the Boolean expression and Boolean functions
- 3) compute various measures of Central Tendency and Dispersion
- 4) implement the Moment, Skewness and Kurtosis and identify the shape of distribution

Sr. No.	List of Practical (Any 15)	Hrs.
1.	Interconversion of a Number system to another number system.	60
2.	1's and 2's complement with an example.	
3.	Representation of lattice with an example.	
4.	Disjunctive and Conjunctive normal forms of Boolean expression.	
5.	Switching Circuit with an example.	
6.	Dijkstra's shortest path algorithm.	
7.	Kruskal's algorithm to find shortest spanning tree.	
8.	Maximal flow algorithm.	
9.	Directed Graph.	
10.	Boolean Expression.	
11.	Construction of Discrete frequency distributions.	
12.	Construction of Continuous frequency distributions.	
13.	Graphical Representation.	
14.	Diagrammatic Representation.	
15.	Measures of Central Tendency (Ungrouped data).	
16.	Measures of Central Tendency (Grouped data).	
17.	Measures of dispersion (Ungrouped data).	
18.	Measures of dispersion (Grouped data).	
19.	Moments, Skewness and Kurtosis (Ungrouped data).	
20.	Moments, Skewness and Kurtosis (Grouped data).	

Reference Books: -

1. S. S. Sastry, Engineering Mathematics. Vol. 1. New Delhi, PHI Learning Pvt. Ltd., 5th ed., 2019.
2. A.M. Mood, F.A. Graybill and D.C.Boes, Introduction to the Theory of Statistics, Tata McGraw-Hill Pub. Co. Ltd., 3rd ed., 2017.
3. A. M. Goon, M. K. Gupta, B. D. Gupta. Fundamentals of Statistics, The World Press Private Ltd., 9th ed., 2017.
4. B. L. Agarwal Basic Statistics, New Age International Private Ltd., 6th ed., 2013.
5. S. S. Epp, Discrete Mathematics with Applications, Brooks/Cole, Cengage Learning, 4th ed., 2011

Practical Evaluation Pattern: 40:60

Total Marks: 50

Internal Evaluation (20 Marks):

- Journal: 10 Marks

Practical Exam Paper (30 Marks):

- Students' Performance: 05 Marks
- Viva: 05 Marks

ESE = 30 Marks



Karmaveer Bhaurao Patil University, Satara

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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Science

Programme: B.Sc.

Semester – I

Type: DSC - I

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Computational Electronics I (BCSET 117)

Course Objectives: - Student should be able to ...

1. learn the principle of circuit analysis and design.
2. study the basic concepts and characteristics of electronic devices and circuits.
3. understand ac sources, dc sources and their concept.
4. describe the theoretical concept through laboratory experiment.

Course Outcomes: Student will be able to ...

1. categorize the basic electronic components.
2. examine electronic circuits using network theorems.
3. build various oscillators circuits.
4. construct multivibrators for electronic applications.

Module	Title and Contents	Hrs.
Module - 1	Basic components and Network Theorems	09
	1.1 AC Sources 1.2 DC Sources 1.3 Concept of Single Phase and Three phase 1.4 Power Supplies 1.5 Active, Passive Components, Resistor, Capacitor, Inductor, Transformer 1.6 (Qualitative Idea) Ohm's Law, Kirchhoff's Law, Thevenin's theorem, Norton Theorem, Superposition Theorem	
Module - 2	Semiconductor Device	07
	2.1 Diode 2.2 P-N junction Diode 2.3 Characteristics 2.4 Clipper and Clamper 2.5 LED 2.6 Photodiode 2.7 BJT 2.8 Modes of Transistor	
Module - 3	Amplifiers and Oscillators	07
	3.1 Transistor Amplifiers 3.2 Introduction of Oscillator 3.3 Phase Shift Oscillator 3.4 Wein Bridge Oscillator 3.5 Hartley Oscillator 3.6 Colpitts Oscillator 3.7 Crystal Oscillator	
Module - 4	Multivibrators	07
	4.1 UJT as sweep generator 4.2 Transistor as Astable, Bistable and Monostable Multivibrator 4.3 Using IC 555 as Astable and Monostable Multivibrator	

Reference Books:-

1. V. K. Mehta, and R. Mehta. Principles of Electronics, S. Chand Publishing, 11th ed. 2019.
2. N. N. Bhargava, D. C. Kulshreshtha, S. C. Gupta, Basic Electronics and Linear Circuits, Tata McGraw-Hill Education, 2nd ed., 2013.
3. R. L. Boylestad, Electronic Devices and Circuit Theory, Pearson Education (Indian Edition), 5th ed., 2013.
4. D. A. Bell, Electronic Devices and Circuits, Oxford University Press (formerly Reston Publishing), 2008.
5. R. S. Sedha, A Textbook of Applied Electronics, S. Chand & Company Ltd., 2nd ed., 2000.

Evaluation Pattern: 40:60**Total Marks: 50****Continuous Comprehensive Evaluation (20 Marks):**

- CCE - I: 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test
(The Best of two will be considered for the final mark entry)

End Semester Examination (50 Marks):

- Question -1: Solve the following questions.
(Five questions of 2 Marks)
- Question -2: Attempt any two questions.
(Three questions of 10 marks)
- Question -3: Attempt any four questions.
(Six questions of 5 marks)
(50 Marks converted to 30 marks)



Karmaveer Bhaurao Patil University, Satara

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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Science

Programme: B.Sc.

Semester – I

Type: DSC - II

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Computational Electronics II (BCSET 118)

Course Objectives: Student should be able to ...

1. understand Logic gates and it's inter conversion.
2. learn Boolean Laws and solve K-Map.
3. describe designing and analyzing attitude about sequential circuits.
4. study designing and analyzing attitude about Combinational circuits.

Course Outcomes: Student will be able to ...

1. design and construct logic gates.
2. implement and solve the k-map.
3. apply and analyze sequential and combinational circuits.
4. analyze the computer system.

Module	Title and Contents	Hrs
Module - 1	Logic Gates 1.2 AND, OR, NOT, NOR, NAND, EX-OR (Symbol, Expression and Truth Table) 1.2 Universality of Logic Gates 1.3 ASCII Code 1.4 De Morgan's theorem 1.5 SOP and POS 1.6 Boolean Laws and rules 1.7 K-map 1.8 Introduction to logic families: TTL NAND Gate	08
Module - 2	Sequential circuits 2.1 Latch 2.2 Flip Flops-RS Flip flop, Clocked RS Flip flop, D Flip flop, JK Flip flop, T Flip flop 2.3 Counters- 3 bit asynchronous, 3bit Synchronous 2.4 Shift registers: SISO, SIPO, PISO, PIPO	08
Module - 3	Combinational Circuits 3.1 Half adder 3.2 Full adder 3.3 Parallel adder 3.4 Half Subtractor 3.5 Full Subtractor 3.6 Encoder 3.7 Decoder 3.8 Multiplexer and De-Multiplexer	06
Module - 4	Memory Organization & I/O Devices 4.1 Introduction of Computer 4.2 Concept of Bus 4.3 Computer I/O devices 4.4 Memory: RAM, SRAM, DRAM, ROM, PROM, EPROM, EEPROM, FLASH 4.5 Arithmetic logic unit	08

Reference Books: -

1. A. P. Malvino, and D. J. Bates. Electronic Principles, McGraw-Hill Education, 8th ed. 2016.
2. M. M. Mano, Digital Design (also published as Digital System Design in some curricula), Pearson Education Asia, 3rd ed., 2002.
3. T. L. Floyd, Digital Fundamentals, Pearson Education Asia, 5th ed., 1994.
4. A. P. Malvino, D. P. Leach, Digital Principles and Applications, Tata McGraw-Hill, 4th ed., 1992.
5. C. F. Strangio, Digital Electronics, Prentice Hall of India, 1st ed., 1986.

Evaluation Pattern: 40:60**Total Marks: 50****Continuous Comprehensive Evaluation (20 Marks):**

- CCE - I: 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test
(The Best of two will be considered for the final mark entry)

End Semester Examination (50 Marks):

- Question -1: Solve the following questions.
(Five questions of 2 Marks)
- Question -2: Attempt any two questions.
(Three questions of 10 marks)
- Question -3: Attempt any four questions.
(Six questions of 5 marks)
(50 Marks converted to 30 marks)



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Science

Programme: B.Sc.

Semester – I

Type: DSC P- I

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Practical III (BCSEP 119)

Course Objectives: Student should be able to...

1. learn basic electronic circuits and operations of Multimeter, CRO, function generator, power supplies.
2. study Laws and theorem and the characteristics of P-N Diode, FWR etc.
3. describe logic gates and verify De-Morgan's theorem.
4. understand the concept of Flip-Flops, adders, multiplexer, and De-multiplexer.

Course Outcomes: Student will be able to ...

1. design and analyze basic electronics components and circuit.
2. analyze the operations of multi-meter (analog & digital), function generator, power supply and cro.
3. design and analyze sequential logic circuits.
4. apply and analyze combinational logic circuits.

Sr. No.	List of Practical (Any 15)	Hrs.
1.	Study of Electronics components.	60
2.	Study of CRO.	
3.	Verification of Kirchhoff's Law.	
4.	Verification of Thevenin's Theorem.	
5.	Study of I-V characteristics of PN junction Diode.	
6.	Study of Half wave Rectifier.	
7.	Study of Full wave Rectifier.	
8.	Study of Astable multivibrator using BJT/555.	
9.	Study of Monostable multivibrator using BJT/555.	
10.	Study of the Phase shift Oscillator using transistor.a. Primary Key	
11.	Study of Logic Gates.	
12.	Basic gates using NAND gate.	
13.	Basic gates using NOR gate.	
14.	Study and Verify De-Morgan's Theorem.	
15.	Study of Half Adder.	
16.	Study of Full Adder.	
17.	Study of Multiplexer using IC 74153.	
18.	Study of RS Flip-Flop.	
19.	Study of JK Flip-Flop.	
20.	Study of CPU and I/O devices	

Reference Books: -

1. R. L. Boylestad, and L. Nashelsky. Electronic Devices and Circuit Theory. Noida, Pearson India, 11th ed. 2015.
2. N. N. Bhargava, D. C. Kulshreshtha, S. C. Gupta, Basic Electronics and Linear Circuits, Tata McGraw-Hill Education, 2nd ed., 2013.
3. M. M. Mano, Digital Design (also published as Digital System Design in some curricula), Pearson Education Asia, 3rd ed., 2002.
4. A. P. Malvino, D. P. Leach, Digital Principles and Applications, Tata McGraw-Hill, 4th ed., 1992.

Practical Evaluation Pattern: 40:60

Total Marks: 50

Internal Evaluation (20 Marks):

Practical Exam Paper (30 Marks):

- Journal: 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

ESE= 30 Marks

Semester II



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Science

Programme: B.Sc.

Semester – II

Type: DSC - III

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: C Programming – II (BCSET 121)

Course Objectives: Students should be able to ...

1. learn a Programming logic.
2. study basic principles of programming.
3. describe skills for writing programs using 'C'.
4. understand arrays, pointers, structures, union.

Course Outcomes: Student will be able to ...

1. explain different basic concepts arrays in C.
2. describe the different concepts of operations on Pointers.
3. discuss the concepts of Structure and Union.
4. implement File handling in C

Module	Title and Contents	Hrs.
Module - 1	Arrays	08
	1.1 Definition and declaration of array	
	1.2 Features of Array, Initialization of array	
	1.3 Memory representation of array	
	1.4 Types of Arrays-Single Dimensional Array; Two-Dimensional Array; Multi-Dimensional Array	
	1.5 Addition of array; multiplication of arrays	
Module - 2	Pointers	07
	2.1 Definition and declaration	
	2.2 Pointer initialization; Operations on pointer, Use of Pointer in Function	
	2.3 Array of Pointer	
	2.4 Pointer of pointer	
	2.5 Dynamic memory allocation	
Module - 3	Structures and Union	07
	3.1 Definition and declaration	
	3.2 Array of structures	
	3.3 Passing structure to function, Pointer to structure, Nested structure, self-referential structure	
	3.4 Sizeof() and typedef()	
	3.5 Definition of Union and declaration	
	3.6 Difference between structure and Union	
Module - 4	File Handling	08
	4.1 Concept of File; Text and binary files	
	4.2 Opening and closing files	
	4.3 File opening mode- (read, write, append)	
	4.4 Character and integer handling (getc(), putc(), getw(), putw())	
	4.5 Formatted input-[(scanf(), sscanf(), fscanf(), fread())]	
	4.6 Formatted output- (printf(), sprintf(), fprintf(), fwrite())	
	4.7 Functions-[fseek(), ftell(), fflush(), fclose(), fopen(), rewind()]	

Reference Books:-

1. Y. Kanetkar, Let Us C, BPB Publications, 18th ed., 2021
2. E. Balagurusamy, Programming In ANSI C, McGraw Hill, 7th ed., 2013

3. B. Kernighan and D. Ritchie, The C Programming Language, Prentice Hall, 1st ed., 1978
4. H. Schildt, C: The Complete Reference, Osborne/McGraw-Hill, 1st Edition, 1987

Evaluation Pattern: 40:60

Total Marks: 50

Continuous Comprehensive Evaluation (20 Marks):

- CCE - I: 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test
(The Best of two will be considered for the final mark entry)

End Semester Examination (50 Marks):

- Question -1: Solve the following questions.
(Five questions of 2 Marks)
- Question -2: Attempt any two questions.
(Three questions of 10 marks)
- Question -3: Attempt any four questions.
(Six questions of 5 marks)
- (50 Marks converted to 30 marks)



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Science

Programme: B.Sc.

Semester – II

Type: DSC - IV

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Relational Database Management System (BCSET 122)

Course Objectives: Student should be able to ...

1. study the concepts and terminologies of RDBMS.
2. learn SQL concepts.
3. describe mysql Concepts.
4. understand PL/SQL.

Course Outcomes: Student will be able to ...

1. explain concept of RDBMS.
2. handle SQL.
3. implement mysql.
4. discuss basics of PL-SQL.

Module	Title and Contents	Hrs
Module - 1	Introduction to RDBMS 1.1 Data; Database; DBMS, RDBMS 1.2 Concepts of Data Models object based 1.3 Record based (Network; Hierarchical; Relational), Physical 1.4 Concept of RDBMS Terminologies: relation; attribute; domain; tuple; entities 1.5 DBA and Responsibilities of DBA 1.6 Relational Model: Structure of Relational Database; Relational Algebra	08
Module - 2	Structured Query Language (SQL) 2.1 SQL: Data types-fixed length; variable length; ex 2.2 Data Constraints-Primary key; Foreign key; Null; Check 2.3 Default Clauses- (select, where, group by, order by) 2.4 SQL Operators: Logical, Relational, Special-In; Between 2.5 Like Sub Queries and Join-Sub queries and Nesting sub queries 2.6 Join: Equijoin; Simple join; Outer join; self-join 2.7 Views, Indexes, Sequence	07
Module - 3	Introduction to MySQL 3.1 Basic Concepts; Difference between SQL and MySQL 3.2 Creating a Database and Tables 3.3 Inserting; Selecting; Ordering; Limiting; Grouping; Analyzing and Manipulating Data; Changing; Deleting; Searching; Database and Table 3.4 Schema Statements; Data Manipulation Statements and Functions, Table; Statements and Functions 3.5 Replication Statements and Functions 3.6 Aggregate Clauses; Aggregate; Functions, String Functions; Date and Time Functions; Mathematical Functions	07
Module - 4	Introduction to PL-SQL 4.1 Comparison between SQL & PL-SQL 4.2 Structure of PL-SQL block 4.3 Benefits of PL/SQL over SQL 4.4 Control structure: if statement; case statement; Loops-Simple looping; For; While 4.5 Need of Iterative and; looping statements in data handling	08

Reference Books: -

1. R. Elmasri, and S. B. Navathe. Fundamentals of Database Systems, Pearson, 7th ed. 2017.
2. S. K. Singh, Database Systems Concepts, Designs and Application, Pearson Education, 2nd ed., 2011
3. C. J. Date, A. Kannan, and S. Swamynathan, An Introduction to Database Systems, Pearson Education, 8th ed., 2009.
4. P. Rob and C. Coronel, Database Systems Design, Implementation and Management, Thomson Learning-Course Technology, 7th ed., 2007.
5. A. Silberschatz, H. F. Korth and S. Sudarshan, Database System Concepts, McGraw-Hill Education (Asia), 8th ed., 2006.

Evaluation Pattern: 40:60**Total Marks: 50****Continuous Comprehensive Evaluation (20 Marks):**

- CCE - I: 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test
(The Best of two will be considered for the final mark entry)

End Semester Examination (50 Marks):

- Question -1: Solve the following questions.
(Five questions of 2 Marks)
- Question -2: Attempt any two questions.
(Three questions of 10 marks)
- Question -3: Attempt any four questions.
(Six questions of 5 marks)
- (50 Marks converted to 30 marks)



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Science

Programme: B.Sc.

Semester – II

Type: DSC P- II

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Practical IV (BCSEP 123)

Course Objectives: Student should be able to ...

1. study a Programming logic.
2. learn skills for writing programs using 'C'.
3. describe concepts and terminologies of RDBMS
4. understand SQL concepts

Course Outcomes: Student will be able to ...

1. use different basic concepts arrays in C
2. apply the different concepts of operations on Pointers
3. implement mysql.
4. analyze concepts of PL-SQL.

Sr. No.	List of Practical (Any 15)	Hrs.
1.	Write a program to calculate sum and average of given n numbers using array.	60
2.	Write a program to add two Matrices; Use Two-Dimensional array.	
3.	Write a program to multiplication of two Matrices.	
4.	Student should explain program to reverse string using Pointer.	
5.	Write a program to perform Operation on Pointer.	
6.	Student should demonstrate a program that accepts the Roll No, Name, Marks obtained in three tests of 'N' students & display the total and Average in tabular format.	
7.	Write a program to create Union for 5 records of Student.	
8.	Write a program of Pointer to structure.	
9.	Student should Write a program to separate even and odd numbers available in input file.	
10.	Write a program to Create emp.txt file and save 5 records of Employee Create Database Railway System with appropriate Constraints	
11.	a) Insert any 5 records b) Show the employee record who work in TC Department (using Group By Clause) Create Database Library with appropriate Constraints	
12.	a) Insert any 5 records b) Show the record of Books using Join Create Database School with appropriate Constraints	
13.	a) Insert any 5 records b) Show the record of Student with Topper, Lowest, Average, Total Create table Stock Details in Computer Department.	
14.	a) Insert any 5 records b) Create Procedure to display record in the month of August 2021 Create Database shop with appropriate Constraints	
15.	a) Insert five records b) Show the record of shop with Highest Price thing , Average profit, Total profit	
16.	Write SQL queries to retrieve records from a table using SELECT, WHERE, ORDER BY, GROUP BY,	
17.	Write SQL queries to retrieve records from a table using SQL operators such as AND, OR, NOT, IN, BETWEEN, and LIKE.	

18.	Write PL/SQL programs to demonstrate the following: a) IF–ELSE statement. b) CASE statement. c) FOR LOOP and WHILE LOOP.	
19.	Create Database Library with appropriate constraints. a) Insert any 5 records. b) Display the details of books using ORDER BY (ascending and descending).	
20.	Create Database Online Shopping with appropriate constraints. a) Insert any 5 records. b) Display the order details using GROUP BY and HAVING clauses.	

Reference Books: -

1. Y. Kanetkar, Let Us C, BPB Publications, 18th ed., 2021
2. E. Balagurusamy, Programming In ANSI C, mcgraw Hill, 7th ed., 2013
3. C. J. Date, A. Kannan, and S. Swaminathan, An Introduction to Database Systems, Pearson Education, 8th ed., 2009.
4. K. N. King, C Programming: A Modern Approach, W. W. Norton & Company, 2nd ed. 2008.
5. A. S. Schatz, H. F. Korth and S. Sudarshan, Database System Concepts, mcgraw- Hill Education (Asia), 5th ed., 2006.

Practical Evaluation Pattern: 40:60

Total Marks: 50

Internal Evaluation (20 Marks):

- Journal: 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

Practical Exam Paper (30 Marks):

ESE = 30 Marks



Karmaveer Bhaurao Patil University, Satara

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Faculty of Science and Technology

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Board of Studies in Computer Science

Programme: B.Sc.

Semester – II

Type: DSC - III

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Computational Mathematics II (BCSET 124)

Course Objectives: Students should be able to...

1. understand recursive techniques to count elements of set.
2. apply the concept of number theory.
3. learn concept of relation and function
4. analyze the concept of recurrence relation.

Course Outcomes: Students will be able to ...

1. demonstrate mathematical skills, analytical and critical mathematical thinking abilities.
2. implement the types of relations and functions.
3. apply and demonstrate properties of divisibility of positive integers.
4. construct and solve recurrence relations

Module	Title and Contents	Hrs.
Module - 1	Counting Principles	08
	1.1 Counting: Addition & Multiplication principle 1.2 Permutation and Combination 1.3 Cardinality of finite set 1.4 Cardinality of union of sets (Addition principle) 1.5 Principle of Inclusion and Exclusion Examples 1.6 Combinatorial Arguments 1.7 Pigeonhole Principle (Statement only) Examples	
Module - 2	Divisibility of integers & Groups	08
	2.1 Divisibility: Definition and properties 2.2 Division algorithm (with proof) 2.3 Greatest Common Divisor (G.C.D.) 2.4 Least Common Multiple (L.C.M.) 2.5 Euclidean algorithm (Statement only & examples) 2.6 Binary operation 2.7 Group: Definition and examples.: -Simple properties of groups 2.8 Sub – Group, Semi group and Monoids: Definition and examples	
Module - 3	Relation and Functions	07
	3.1 Ordered pairs, Cartesian product, Relations 3.2 Types of relations 3.3 Equivalence relation 3.4 Partial ordering, Digraphs of relations 3.5 Matrix representation and composition of relations 3.6 Transitive closure, Warshall's algorithm 3.7 Equivalence class 3.8 Partition of a set Functions: Definition, Types of mapping, Injective, Surjective & Bijective functions 3.9 Inverse function, Composition of functions	
Module - 4	Recurrence Relations	07
	4.1 Introduction, Recurrence relation: Definition formula Example 4.2 Linear Recurrence relation with constant coefficient 4.3 Homogeneous solutions, Particular and Total solution 4.4 Factorial Representation, Fibonacci number	

Reference Books: -

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th ed. 2021
2. O. Levin, Discrete Mathematics: An Open Introduction, University of Northern Colorado Press, 1st ed. 2013
3. K. Levasseur and AI Doerr, Applied Discrete Structures, Pearson Education Inc., 1st ed., 2012
4. D. Malik, Discrete Mathematics, Indian Binding House, 1st ed., 2009
5. S. Y. Yan, Number Theory for Computing, Springer, 2nd ed., 2002

Evaluation Pattern: 40:60**Total Marks: 50****Continuous Comprehensive Evaluation (20 Marks):**

- CCE - I: 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test
(The Best of two will be considered for the final mark entry)

End Semester Examination (50 Marks):

- Question -1: Solve the following questions.
(Five questions of 2 Marks)
- Question -2: Attempt any two questions.
(Three questions of 10 marks)
- Question -3: Attempt any four questions.
(Six questions of 5 marks)
- (50 Marks converted to 30 marks)



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Science

Programme: B.Sc.

Semester – II

Type: DSC - IV

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Computational Statistics II (BCSET 125)

Course Objectives: Students should be able to...

1. understand the basic concepts of probability
2. compute various discrete and continuous probability distributions
3. study various test in real life examples
4. earn the data and interpret the results.

Course Outcomes: Students will be able to...

1. use probability and conditional probabilities.
2. check for independence of events.
3. perform probability calculations relating to discrete probability distributions.
4. apply various distributions to solve real life problems.

Module	Title and Contents	Hrs.
Module - 1	Probability 1.1 Idea of permutation and combination 1.2 Concept of experiments and random experiments 1.3 Definitions: sample space, discrete sample space, continuous sample space, events, types of events, power set (sample space consisting at most 3 sample points), Illustrative examples 1.4 Classical (apriori) definition of probability of an event, equiprobable sample space, simple examples of probability of an events based on permutations and combinations, axiomatic definition of probability 1.5 Theorems on probability: i) $P(\Phi) = 0$ ii) $P(A') = 1 - P(A)$ iii) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ iv) If $A \subseteq B$, $P(A) \leq P(B)$ v) $0 \leq P(A \cap B) \leq P(A) \leq P(A \cup B) \leq P(A) + P(B)$, Illustrative examples	08
Module - 2	Conditional probability and independence of events 2.1 Definition of conditional probability of an event 2.2 Partition of sample space, Baye's theorem (only statement), concept of prior and posterior probability 2.3 Concept of independence of two events, Proof of the result that if A and B are independent events then i) A and B' ii) A' and B iii) A' and B' are also independent 2.4 Pairwise and complete independence of three events, examples	07
Module - 3	Univariate probability distributions 3.1 Definitions: discrete random variable, probability massfunction (p.m.f.) 3.2 Cumulative distribution function (c.d.f.), properties of c.d.f., median, mode, p.g.f. 3.3 Definition of expectation of a random variable, expectation of a function of random variable 3.4 Variance Results on expectation: i) $E(c) = c$, where c is constant, ii) $E(aX + b) = aE(X) + b$, where a and b are the constants, iii) $V(c) = 0$, where c is constant, ii) $V(aX + b) = a^2 V(X)$, where a and b are the constants, Examples	07
Module - 4	Some standard discrete probability distributions 4.1 Discrete uniform distribution: p.m.f., mean and variance 4.2 Binomial distribution: p.m.f., mean and variance, additive property of binomial variates 4.3 Recurrence relation for probabilities, Poisson distribution: p.m.f., mean and variance, additive property	08

	4.4 Recurrence relation for probabilities, Poisson distribution as a limiting case of binomial distribution (without proof), examples	
Reference Books: -		
1. S. P. Gupta, Statistical Methods, Sultan Chand & Sons, 46th ed. 2021. 2. S.C. Gupta and V. K. Kapoor Fundamental of Mathematical Statistics, Sultan Chand and Sons Publication, 12th ed., 2020. 3. A.M. Mood, F.A. Graybill and D.C.Boes, Introduction to the Theory of Statistics, Tata McGraw-Hill Pub. Co.Ltd., 3rd ed., 2017. 4. B. R. Bhat, Modern Probability Theory- An Introductory Textbook, New Age International Publishers, 4th ed., 2016. 5. V. K. Rohatgi and M. E. Saleh, An Introduction to Probability and Statistics, John Wiley and Sons Inc., 3rd ed., 2015.		
Evaluation Pattern: 40:60		
Total Marks: 50		
Continuous Comprehensive Evaluation (20 Marks): • CCE - I: 10 Marks: Activity • CCE - II: 10 Marks: Activity • CCE - III: 10 Marks: MCQ Test (The Best of two will be considered for the final mark entry)		End Semester Examination (50 Marks): • Question -1: Solve the following questions. (Five questions of 2 Marks) • Question -2: Attempt any two questions. (Three questions of 10 marks) • Question -3: Attempt any four questions. (Six questions of 5 marks) • (50 Marks converted to 30 marks)



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Science

Programme: B.Sc.

Semester – II

Type: DSC P- II

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Practical V (BCSEP 126)

Course Objectives: Students should be able to...

1. learn closure by using Warshall's algorithm.
2. study and model various continuous probability distributions.
3. understand large and small sample test
4. study association between two variables.

Course Outcomes: Students will be able to...

1. use different algorithms.
2. apply warshall's algorithm for transitive closure.
3. implement fitting various discrete probability distributions
4. check model sampling for various discrete probability distributions

Sr. No.	List of Practical (Any 15)	Hrs.
1.	Permutation	60
2.	Combination	
3.	Inclusion and Exclusion Principle	
4.	Division Algorithm	
5.	Euclidean Algorithm	
6.	Transitive Closure by using Warshall's algorithm	
7.	Group	
8.	Function	
9.	Representation of relation by matrix and diagraph.	
10.	Recurrence Relation With an example.	
11.	Probability	
12.	Conditional Probability	
13.	Probability for Independence and Mutually Exclusive events	
14.	Baye's Theorem	
15.	Fitting of Discrete Uniform distribution	
16.	Fitting of Binomial distribution	
17.	Fitting of Poisson distribution	
18.	Model Sampling of Discrete Uniform distribution	
19.	Model Sampling of Binomial distribution	
20.	Model Sampling of Poisson distribution.	

Reference Books: -

1. S. Kumar. A Textbook of Discrete Mathematics, S. Chand Publishing, 5th ed., 2019.
2. R. C. Busby, and S. C. Ross. Discrete Mathematical Structures, Pearson India, 6th ed., 2018.
3. J.E. Freund, Mathematical Statistics with Applications, Pearson Publication, 8th ed., 2014.
4. O. Levin, Discrete Mathematics: An Open Introduction, University of Northern Colorado Press, 1st ed., 2013.

Practical Evaluation Pattern: 40:60

Total Marks: 50

Internal Evaluation (20 Marks):

- Journal: 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

Practical Exam Paper (30 Marks):

ESE = 30 Marks



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Board of Studies in Computer Science

Programme: B.Sc.

Semester – II

Type: DSC - III

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Computational Electronics III (BCSET 127)

Course Objectives: - Students should be able to...

1. learn the instructions of 8085 microprocessor.
2. study memory organization.
3. describe architecture and instruction set of 8051 microcontrollers.
4. understand interfacing of microcontroller.

Course Outcomes: Students will be able to...

1. design and develop programs based on 8085 microprocessors
2. elaborate microprocessor memory organization.
3. design and develop programs based on 8051 microcontrollers.
4. apply interface with LED, LCD and Steeper motor using 8051

Module	Title and Contents	Hrs.
Module - 1	Introduction to Microprocessor 8085	08
	1.1 Introduction and Evolution of Microprocessor 1.2 Microprocessor Development w.r.t. CISC/ RISC families 1.3 Intel, Power PC, CPU 1.4 Registers- Arithmetic and Logic Unit, GPR's and SPR's, Stack 1.5 Addressing Modes Instruction formats, and categories 1.6 Instruction Set – Data transfer, Arithmetic, Logical, Branch operations	
Module - 2	Microprocessor Memory Organizations	08
	2.1 Memory Management, data and Code memory 2.2 Interfacing memory with microprocessor 2.3 Computer Peripherals and Interfacing (Peripheral Control Signals) 2.4 Peripheral Mapping- Memory Mapped, I/O Mapped 2.5 Ports- Parallel and Series	
Module - 3	Introduction to Microcontroller 8051	07
	3.1 Introduction and Evolution of Microcontroller 3.2 Architecture of 8051: Block Diagram of 8051 and Study of Internal Blocks 3.3 Reset and Clock, Registers 3.4 Flags and Internal Memory 3.5 Special Function Registers, I/O Ports	
Module - 4	Interfacing of microcontroller	07
	4.1 Study of 8051 Instruction Set and Addressing Modes 4.2 Timer and Counter, Time delay generation 4.3 Serial Ports 4.4 Interfacing LED, LCD, 7- Segment display, Stepper Motor	

Reference Books: -

1. S. K. Singh, Computer-Based Numerical and Statistical Techniques, S. Chand Publishing, 2018.
2. M. A. Mazidi, J. G. Mazidi, R. D. McKinlay, The 8051 Microcontroller and Embedded Systems, Pearson India Education Services Pvt. Ltd., 17th ed., 2017.
3. B. Ram, Fundamentals of Microprocessor and Microcontroller, Dhanpat Rai Publications Ltd., 8th ed., 2016.
4. R. S. Gaonkar, Microprocessor Architecture, Programming and Applications with 8085, PenRam International Publishing Pvt. Ltd., 5th ed., 2009.

Evaluation Pattern: 40:60

Total Marks: 50

Continuous Comprehensive Evaluation (20 Marks):

- CCE - I: 10 Marks: Activity
- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test
(The Best of two will be considered for the final mark entry)

End Semester Examination (50 Marks):

- Question -1: Solve the following questions.
(Five questions of 2 Marks)
- Question -2: Attempt any two questions.
(Three questions of 10 marks)
- Question -3: Attempt any four questions.
(Six questions of 5 marks)
- (50 Marks converted to 30 marks)



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Board of Studies in Computer Science

Programme: B.Sc.

Semester – II

Type: DSC - IV

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Computational Electronics IV (BCSET 128)

Course Objectives: Students should be able to...

1. introduce basic concepts of computer peripheral devices
2. study the computer applications in medical industries
3. learn computer networks
4. understand Network Components

Course Outcomes: Students will be able to...

1. analyze basic concepts of computer peripheral devices
2. implement the computer applications in medical industries
3. apply computer networks
4. demonstrate Network Components

Module	Title and Content	Hrs
Module - 1	Basic Study of Computer Peripheral	08
	1.1 Printers- Dot matrix, Inject, LASER, Line Printer	
	1.2 Scanners- Hand belt, Flat belt	
	1.3 Web Camera, CCTV, IPCamera	
	1.4 Input Peripherals- Keyboard, Mouse, Touch Screen, Joystick	
Module - 2	Computer Applications in Industries	06
	2.1 Automobiles, Consumer Electronics	
	2.2 Education, Research Industries	
	2.3 Healthcare, Banking	
	2.4 Entertainment, Finance, Business	
Module - 3	Fundamentals of Computer Networking	08
	3.1 Need of Computer Network	
	3.2 Network types- LAN, MAN, WAN, Internet	
	3.3 Network Topology and OSIReferences model	
Module - 4	Network Components	08
	4.1 Internet, Bridge, Router, Sever, Switch, Fire wound	
	4.2 Communication medium- Cables, Twisted pair, SingleTwisted pair, Co-axial Cable, Fiber Optic Cable	
	4.3 Wireless Communication medium- Wi-Fi, Bluetooth	

Reference Books:-

1. B. A. Forouzan, and F. Mosharraf. Computer Networks: A Top-Down Approach, McGraw-Hill Education, 2nd ed., 2022.
2. Kurose, James F., and Keith W. Ross. Computer Networking: A Top-Down Approach, Pearson, 8th ed. 2021.
3. Tanenbaum, Andrew S., and David J. Wetherall. Computer Networks, Pearson, 5th ed., 2019.
4. Stallings, William. Data and Computer Communications, Boston: Pearson, 10th ed., 2013.

Evaluation Pattern: 40:60

Total Marks: 50

Continuous Comprehensive Evaluation (20 Marks):

- CCE - I: 10 Marks: Activity

End Semester Examination (50 Marks):

- Question -1: Solve the following questions.

- CCE - II: 10 Marks: Activity
- CCE - III: 10 Marks: MCQ Test
(The Best of two will be considered for the final mark entry)

- (Five questions of 2 Marks)
- Question -2: Attempt any two questions.
(Three questions of 10 marks)
- Question -3: Attempt any four questions.
(Six questions of 5 marks)
(50 Marks converted to 30 marks)



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Computer Science

Programme: B.Sc.

Semester – II

Type: DSC P- II

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course and Code: Practical IV (BCSEP 129)

Course Objectives: Students should be able to...

1. learn the instructions of 8085 microprocessor.
2. understand memory organization.
3. describe computer networks
4. study network Components

Course Outcomes: Students will be able to...

1. design and develop programs based on 8085 microprocessor
2. elaborate microprocessor memory organization.
3. apply computer networks
4. implement Network Components

Sr. No.	List of Practical (Any 15)	Hrs.
1.	Arithmetical operation using 8085 microprocessors.	60
2.	Shifting of data 8-bit numbers using 8085 microprocessors.	
3.	To find smallest and largest number from the given series in 8085 microprocessor.	
4.	Write assembly language code in 8085 microprocessors to find factorial of a given number.	
5.	Write assembly language code in 8085 microprocessors to implement stack instruction.	
6.	Arithmetical operation using 8051	
7.	Logical operation using 8051	
8.	Time Delay generation using timers 8051.	
9.	Stack operation in 8051 microcontrollers.	
10.	Interfacing of LED using 8051 microcontrollers.	
11.	Write specification of latest Desktop	
12.	Write specification of latest laptop	
13.	Printer Installation and Servicing	
14.	Printer installation and Trouble Shooting	
15.	Install and Configure Scanner	
16.	Install and Configure Web Cam Devices with System	
17.	Trouble shooting Problem of Web Cam	
18.	Familiarization with network Component and devices.	
19.	Familiarization With LAN Adapter Switches and Router	
20.	Understanding communication Medium	

Reference Books: -

1. B. A. Forouzan, and F. Mosharraf. Computer Networks: A Top-Down Approach, McGraw-Hill Education, 2nd ed., 2022.
2. A. S. Tanenbaum, and D. J. Wetherall. Computer Networks. Boston: Pearson, 5th ed., 2019.
3. M. A. Mazidi, J. G. Mazidi, R. D. McKinlay, The 8051 Microcontroller and Embedded Systems, Pearson India Education Services Pvt. Ltd., 17th ed, 2017.
4. B. Ram, Fundamentals of Microprocessor and Microcontroller, Dhanpat Rai Publications Ltd., New Delhi, 8th ed., 2016.
5. A. K. Ray, and K. M. Bhurchandi. Advanced Microprocessors and Peripherals., India: McGraw Hill Education, 3rd ed., 2012.

Practical Evaluation Pattern: 40:60

Total Marks: 50

Internal Evaluation (20 Marks):

- Journal: 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

Practical Exam Paper (30 Marks):

ESE = 30 Marks