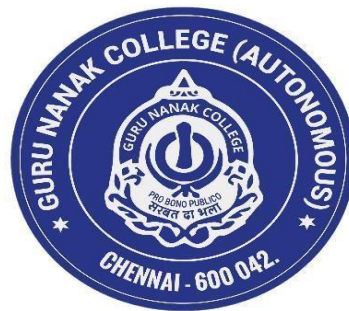


GURU NANAK COLLEGE (AUTONOMOUS)

(Affiliated to University of Madras and Accredited at 'A++' Grade by NAAC)

Guru Nanak Salai, Velachery, Chennai - 600042



SCHOOL OF INFORMATION TECHNOLOGY BACHELOR OF COMPUTER APPLICATIONS (BCA)

LEARNING OUTCOME BASED CURRICULUM FRAMEWORK

(For the UG batch of 2024-27 and thereafter)

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LEARNING OUTCOME BASED CURRICULUM FRAMEWORK

(For the UG batch of 2024-27 and thereafter)

Preamble

Bachelor of Computer Applications (BCA) is a 3 Year - undergraduate programme spread over six semesters. By incorporating the most recent developments into the curriculum and providing students with a thorough understanding within a structured framework, this course is intended to bridge the gap between IT industries and Academic institutions.

The corporate landscape is rapidly changing as a result of a number of innovative technologies that have emerged in the IT industry. The difficulties facing the IT industry now differ greatly from those of past few years. Students who want to pursue careers in information technology need to be well-versed in the newest advances due to the ever-changing technological landscape.

The BCA curriculum is specifically created to meet the knowledge and skill demands of the modern industry. It includes theoretical and practical training sessions that can provide students with the skills they need for the lucrative occupations of the future. This course aids students in pursuing further computer science education as well as building a successful career in the field.

Vision

To impart essential knowledge in Information technology to the student community, enhance their ability to apply the knowledge gained and be successful in their professional and social life and thrive for the upliftment of the society.

Mission

1. Inculcate students and equip them with global technological skills in Information Technology, that enhance them to be innovative, have lateral thinking and be good at problem-solving.
2. Increase Industry - Institute Interaction to enlighten the students about the required skills to be successful in their career.
3. Train and develop the students as IT professionals with confidence, competence, commitment and character

Program Educational Outcomes

PEO 1: Values of Life, Ethics & Social Concern

The graduates exhibit truth, loyalty, and love as integral moral principles, thereby contributing to a society characterized by enhanced well-being and fundamental goodness in behavior.

PEO 2: Employability & Entrepreneurship

The graduates apply analytical, logical, and critical problem-solving skills in professional contexts, elevating employability and cultivating entrepreneurial capabilities through upskilling.

PEO 3: Regional/National/Global Relevance & Competency

The graduates foster advanced analytical skills and a heightened appreciation for current Regional/National/Global perspectives, enabling informed and sustainable decision-making in a dynamic environment.

PEO 4: Skill Enhancement, Self-Directed & Lifelong Learning

The graduates independently engage in skill-based learning, utilizing infrastructure and opportunities for continuous upskilling, enabling self-evaluation and lifelong excellence attainment.

PEO 5: Research Skills & Innovation

The graduates proficiently apply scientific reasoning, fostering creativity, strategic thinking, and effective problem-solving skills. They demonstrate a core competency in generating innovative ideas for advancements and inventions.

Program Outcomes

PO 1: Having the ability to develop software that aids society to minimize the effort.

PO 2: Having the ability to employ techniques, skills, and modern hardware and software tools necessary to meet the current demand of the IT Industry.

PO 3: Having Regional/National/Global Competency and being employable.

PO 4: Have the ability to independently engage in Self-directed learning and an inclination to life- long learning and upskilling.

PO 5: Demonstrate competency in generating innovative ideas for advancements and inventions.

Program Specific Outcomes

PSO 1: Proficiently applying theoretical knowledge to solve practical problems, showcasing a comprehensive understanding of key computer science areas.

PSO 2: Effectively identifying and analyzing user requirements through scientific reasoning, experts in this field can specialized in crafting reliable software systems.

PSO 3: Skillfully employing advanced techniques and utilizing modern tools ensures successful outcomes, meets the dynamic demands of evolving IT industry.

PSO 4: Apprise in-depth expertise and sustainable learning that contributes to multi-disciplinary creativity permutation, modernization and study to address global interest.

PSO 5: Being capable of pursuing self-employment opportunities in global software market enabling proficiency for successful entrepreneurial ventures.

PEO – PO mapping

	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
PO 1	1	3	3	3	3
PO 2	2	3	3	3	2
PO 3	1	3	3	3	2
PO 4	2	3	3	3	3
PO 5	3	3	3	3	3

PO – PSO mapping

	PO 1	PO2	PO3	PO4	PO5
PSO 1	3	3	3	3	3
PSO 2	3	3	3	3	3
PSO 3	1	3	3	3	2
PSO 4	2	3	3	3	3
PSO 5	2	3	3	3	3

CHOICE BASED CREDIT SYSTEM (CBCS)

The College follows the CBCS with Grades under the Semester pattern. Each course is provided with a credit point based on the quantum of subject matter, complexity of the content and the hours of teaching allotted. This is done after a thorough analysis of the content of each subject paper by the members of the Board of Studies and with the approval of the Academic Council. Students are also offered a variety of Job oriented Elective, Multidisciplinary skill-based courses as part of the curriculum. Students can earn extra credits by opting for Massive Open Online Courses (MOOCs) and Certificate Courses.

The evaluation method under CBCS involves a more acceptable grading system that reflects the personality of the student. This is represented as Cumulative Grade Point Average (CGPA) and Grade Point Average (GPA) which are indicators of the Academic Performance of the student. It provides students with a scope for horizontal mobility and empowers them with the flexibility of learning at their convenience.

ELIGIBILITY FOR ADMISSION

Candidates admitted to the first year of the UG programme should have passed the higher Secondary Examinations (Academic or Vocational Stream) conducted by the Government of Tamil Nadu or an examination accepted as equivalent thereof by the Syndicate of the University of Madras. Students applying for the PG programme should have taken the UG degree in the relevant subject from a recognized university as per the norms of the University of Madras.

For B.Com. (Hons): Candidates admitted to the first year of the B.Com. (Hons.) programme should have passed the higher secondary examinations conducted by the Government of Tamil Nadu or an examination accepted as equivalent thereof by the Syndicate of the University of Madras with 75 % cut-off in Commerce/Business studies, Accountancy, Economics and Business Mathematics/ Mathematics.

For MBA: The basic requirement for admission to the MBA programme is a Bachelor's degree in any discipline with a minimum of 50% marks in aggregate and satisfactory test score in MAT Entrance Test conducted by AIMA, New Delhi / TANCET for MBA conducted by Government of Tamil Nadu / CAT / XAT or any other approved MBA Entrance Tests.

For MCA: Only those candidates who have passed B.C.A/B.Sc. in Computer Science or any other equivalent degree OR passed B.Sc./B.Com/BA with Mathematics at 10 + 2 level or at graduation level (with Optional bridge course in Mathematics), provided they have undergone the course under 10+2+3 pattern and obtained at least 50% of marks (45 % marks in case of candidates belonging to reserved category) in the qualifying examination shall be eligible for admission to the M.C.A. Programme.

DURATION OF THE COURSE

The UG programme is of three years duration with six semesters and the PG programme is of two years duration with four semesters. The period from June to November is termed as the odd semester and the period from December to April is referred to as the even semester. Each semester must compulsorily have 90 working days before the students appear for the final End Semester Exam.

COURSE OF STUDY

The main course of study for the Bachelor's Degree shall consist of the following:

FOUNDATION COURSES

PART - I: Tamil/ Hindi /Sanskrit/French

PART - II: English

CORE COURSES

PART - III: Consisting of (a) Main subject (b) Allied Subjects (c) Elective subjects related to the main subject of study and project work.

PART – IV: Those who have not studied Tamil up to XII standard and have taken a non-Tamil language under Part – I, shall opt for Basic Tamil in the first two semesters.

Those who have studied Tamil up to XII standard, and taken a non -Tamil language under Part – I, shall opt for Advanced Tamil in the first two semesters.

Others, who do not come under either of the clauses mentioned above, can choose a Non-Major Elective (NME) in the first two semesters.

Soft Skills (I, II, III & IV Semesters)

Self-Study (Compulsory) Course (III Semester)

Environmental Studies (IV Semester)

Value Education (V Semester)

Summer Internship (After IV Semester)

PART - V: Compulsory Extension Services

A Student shall be awarded one credit for compulsory extension service. A student must enroll in NSS / NCC /Sports & Games/ Citizen Consumer Club / Enviro Club or any other service organization in the College and should put in compulsory minimum attendance of 40 hours, which shall be duly certified by the Principal of the College. If a student lacks 40 hours compulsory minimum attendance in the extension services in any Semester, s/he shall have to compensate the same, during the subsequent Semesters.

COURSE STRUCTURE

The UG programme consists of 15-19 Core courses with 3-4 credits for each paper, 3 Elective courses and 4 Allied courses with 4-5 credits for each paper in addition to 4 Soft Skill courses with two credits each. Internship as a compulsory component carries 2 credits. The B.Com. (Hons) course has 31 core courses of 4 credits each and project with 8 credits.

The MBA programme has 15 core courses including project work with 4 credits, 6 elective courses with 3 credits, 2 extra disciplinary courses with 3 credits, Four Soft Skill courses with two credits each.

The MCA programme has 15 core courses of 2-4 credits, 5 Elective courses of 3 credits, 2 Extra- disciplinary courses of 3 credits and a project work of 17 credits.

Internship training is a compulsory component for all the UG & PG programmes.

The details of the course structure are given in the following table:

Bachelor of Computer Applications (BCA)

Credit distribution for each semester

Semester I		Subject	Hrs/Week	Credit	Marks		Total
Course Component					Internals	Externals	
Part I	Language				Language – I	6	
Part II	English	English – I	4	3	50	50	100
Part III	Core - I	Programming in C & C++	5	4	50	50	100
	Core-II	Practical – I: C & C++ Programming	5	4	50	50	100
	Allied-I	Allied Mathematics	6	5	50	50	100
Part IV	Non Major Elective-I	Basic Tamil-I/ Advanced Tamil-I/ Web Office	2	2	50	50	100
	Soft Skills-I	Communication Skills and Personality Development Skills	2	2	50	50	100
Total			30	23			
Semester II		Subject	Hrs/Week	Credit	Marks		Total
Course Component					Internals	Externals	
Part I	Language				Language – II	6	
Part II	English	English – II	4	3	50	50	100
Part III	Core -III	Web Application Development	5	4	50	50	100
	Core-IV	Practical – II: Web Application Development	5	4	50	50	100
	Allied-II	Statistics	6	5	50	50	100
Part IV	Non Major Elective-II	Basic Tamil-II/ Advanced Tamil-II/ Data Visualization Using Power BI Lab	2	2	50	50	100
	Soft Skills-II	Interview Skills and Resume Writing	2	2	50	50	100
Total			30	23			

Semester III		Subject	Hrs/Week	Credit	Marks		Total
Course Component					Internals	Externals	
Part III	Core -V				Programming in Java	6	
	Core-VI	Practical – III: Java Programming	5	4	50	50	100
	Core-VII	Data Structures and Algorithms	6	4	50	50	100
	Core-VIII	System Software and Operating Systems	5	4	50	50	100
	Allied-III	Accounting Practices	6	5	50	50	100
Part IV	Soft Skills-III	Adobe UX Foundation	2	2	-	-	-
	Self-Study (Compulsory) Course	Indian Heritage and Knowledge System/ Contemporary World and Sustainable Development	-	2	-	100	100
		Total	30	25			
Semester IV		Subject	Hrs/Week	Credit	Marks		Total
Course Component					Internals	Externals	
Part III	Core –IX				Relational Database Management System	7	
	Core-X	Practical – IV: RDBMS	6	4	50	50	100
	Core-XI	Cloud Computing	7	4	50	50	100
	Allied-IV	Operations Research	6	5	50	50	100
Part IV	Soft Skills-IV	Foundations of Quantitative Aptitude	2	2	50	50	100
	EVS	Environmental Studies	2	2	50	50	100
		Total	30	21			

Semester V		Subject	Hrs/Week	Credit	Marks		Total
Course Component					Internals	Externals	
Part III	Core –XII				Programming in Python	6	
	Core –XIII	Practical – V: Python Programming	6	4	50	50	100
	Core-XIV	Software Engineering and Testing	6	4	50	50	100
	Elective-I	Data Communication and Networking/Information Security/ Data	6	5	50	50	100
	Elective-II (Interdisciplinary Elective)	Business Intelligence / Introduction to Blockchain Technology / Data Manipulation using SQL Lab	5	5	50	50	100
Part IV	Value Education	Value Education	1	2	50	50	100
Part V	Internship	Internship	-	2	-	-	-
Total			30	26			
Semester VI		Subject	Hrs/Week	Credit	Marks		Total
Course Component					Internals	Externals	
Part III	Core –XV				R-Programming	6	
	Core-XVI	Practical – VI: Data Analysis using R- Programming	4	4	50	50	100
	Core-XVII	Practical – VII: Mobile Application Development	4	4	50	50	100
	Core -XVIII	Internet of Things	6	4	50	50	100
	Core - XIX	Mini Project	4	3	50	50	100
	Elective-III	Artificial Intelligence / Big Data Analytics / Graphics and Multimedia	6	5	50	50	100
Part V	Extension Activity	Participation in NSS/NCC/ROTRAC T etc.	-	1	-	-	-
Total			30	25			
Grand Total			180	143			

Total credit distribution for all the 3 years

		No. of Paper	Credits
Part I	Language	2	6
Part II	English	2	6
Part III	Core	19	75
	Allied	4	20
	Elective	3	15
Part IV	NME	2	4
	Soft Skills	4	8
	Self-Study (Compulsory) Course	1	2
	EVS	1	2
	Value Education	1	2
	Internship	1	2
Part V	Extension activity	1	1
Total			143

EXAMINATION

Continuous Internal Assessment (CIA) will be for 50 percent and End Semester Examination (ESE) will be for 50 percent.

CONTINUOUS INTERNAL ASSESSMENT (CIA)

Every semester will have a mid-semester examination which will be conducted on completion of 45 working days in each semester. A Model exam for three hours duration will be conducted on completion of 80 working days in each semester. For the courses coming under Part IV, ESE will be conducted in MCQ pattern. Internship credits will be given in semester V after verification of documents by the respective Heads.

The schedule for these tests is as follows:

CIA	Schedule	Syllabus Coverage
Mid Semester Examination	After 45 working days of the Semester	60%
Model Examination	After 80 working days of the Semester	95%

The components for the CIA (Theory & Practicals) are as follows:

Internal Components			
Assessment Type	Nature	Maximum Marks	% of Weightage
CIA	Mid Semester Examination	50	10
Model	Model Examination	100	10
	Assignment		10
	Class activities		15
	Attendance		5
Total			50

The class activity relates to a programme of accepted innovative techniques such as Seminar, Quiz, Portfolio creation, PowerPoint presentation, Objective tests, Role play, Group discussion, Case Study etc. The mode of evaluation of the class activity will be fixed before the commencement of the semester and an approval will be obtained from the Head of the programme/wing. The students will be informed of the various methods of evaluation once the semester begins.

A record of all such assessment procedures will be maintained by the department and is open for clarification. Students will have the right to appeal to the Principal in case of glaring disparities in marking. CIA marks for practical subjects will be awarded by the respective faculty based on the performance of the student in the model practical examination, observation notebook, submission of record books, regularity and attendance for the practical classes. The attendance particulars for practical classes will be maintained by the concerned faculty. The marks for attendance will be awarded as per the following:

% of General Attendance	Marks Awarded
90-100	5
75-89	4
60-74	3
<60	0

END SEMESTER EXAMINATIONS (ESE)

After the completion of a minimum of 90 working days each semester, the End Semester Examinations will be conducted. Examinations for all UG and PG programmes will be held for all courses in November/December and April/May. Practical examinations will be conducted only during the end of the odd / even semester before, during or after the commencement of the theory exam. The schedule for ESE Practicals will be notified by the Controller of Examinations in consultation with the Dean (Academics)

Mode of Evaluation

METHODS OF EVALUATION		
Internal Evaluation	Mid Sem Exam (10)	50 Marks
	Model Exam (10)	
	Assignment (10)	
	Class activity (15)	
	Attendance (5)	
External Evaluation	End Semester Examination	50 Marks
Total		100 Marks

Method of assessment

Remembering (K1)	<ul style="list-style-type: none">• The lowest level of questions requires students to recall information from the course content• Knowledge questions usually require students to identify information in the textbook.• Suggested Keywords: Choose , Define, Find, How, Label, List, Match, Name, Omit, Recall, Relate, Select, Show, Spell, Tell, What, When, Where, Which, Who, Why
Understanding (K2)	<ul style="list-style-type: none">• Understanding off acts and ideas by comprehending organizing, comparing, translating, interpolating and interpreting in their own words.• The questions go beyond simple recall and require students to combined at altogether• Suggested Keywords: Classify, Compare, Contrast, Demonstrate, Explain, Extend, Illustrate, Infer, Interpret, Outline, Relate, Rephrase, Show, Summarize, Translate
Application (K3)	<ul style="list-style-type: none">• Students have to solve problems by using / applying a concept learned in the classroom.• Students must use their knowledge to determine a exact response.• Suggested Keywords: Apply, Build, Choose, Construct, Develop, Experiment with, Identify, Interview, Make use of, Model, Organize, Plan, Select, Solve, Utilize

Analyze (K4)	<ul style="list-style-type: none"> • Analyzing the question is one that asks the students to breakdown something into its component parts. • Analyzing requires students to identify reasons causes or motives and reach conclusions or generalizations. • Suggested Keywords: Analyze, Assume, Categorize, Classify, Compare, Conclusion, Contrast, Discover, Dissect, Distinguish, Divide, Examine, Function, Inference, Inspect, List, Motive, Relationships, Simplify, Survey, Take part in, Test for, Theme
Evaluate (K5)	<ul style="list-style-type: none"> • Evaluation requires an individual to make judgment on something. • Questions to be asked to judge the value of an idea, a character , a work of art, or a solution to a problem. • Students are engaged in decision-making and problem–solving. • Evaluation questions do not have single right answers. • Suggested Keywords: Agree, Appraise, Assess, Award, Choose, compare, Conclude, Criteria, Criticize, Decide, Deduct, Defend, Determine, Disprove, Estimate, Evaluate, Explain, Importance, Influence, Interpret, Judge, Justify, Mark, Measure, Opinion, Perceive, Prioritize, Prove, Rate, Recommend, Rule on, Select, Support, Value
Create (K6)	<ul style="list-style-type: none"> • The questions of this category challenge students to get engaged in creative and original thinking. • Developing original ideas and problem solving skills • Suggested Keywords: Adapt, Build, Change, Choose, Combine, Compile, Compose, Construct, Create, Delete, Design, Develop, Discuss, Elaborate, Estimate, Formulate, Happen, Imagine, Improve, Invent, Make up, Maximize, Minimize, Modify, Original, Originate, Plan, Predict, Propose, Solution, Solve, Suppose, Test, Theory

SEMESTER - I

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – I
COURSE NAME: PROGRAMMING IN C & C++	COURSE CODE:
SEMESTER: I	MARKS:100
CREDITS: 4	TOTAL HOURS:75
THEORY	

COURSE OBJECTIVE:

To introduces the basic concepts of C & C++ programming.

COURSE OUTCOMES:

1. Impart conceptual understanding of functions and emphasize its importance in solving real world problems.
2. Understand the basic terminology used in computer programming.
3. Explain the class structures as fundamental, modular building blocks.
4. Plan to write, compile and debug programs in C & C++ language.
5. Apply the knowledge in writing programs to implement the concept of OOP's.

UNIT I

(15 HOURS)

C Fundamentals: Character set - Identifiers and Keywords - Data Types – Constants - Variables –Operators - Expression - Statements - Character I/O Functions.

Control Statements: Flow of controls - If, If - else, while, do- while, for Loop, Nested Control Structures - Switch, Break and Continue and goto Statements.

UNIT II

(15 HOURS)

Functions: Functions - Definition of Functions - Function Calls - Function declaration - Recursion - Storage Classes - Library Function.

Arrays: Array definition - Processing arrays - Passing array to a function – Multidimensional arrays - Strings - Storage Classes.

UNIT III

(15 HOURS)

Pointers: Pointers – Pointer declaration - Pointers and arrays - Pointer operation – Passing pointers to a function-Passing function to a function (Passing Pointers to Structures).

Structures and Unions: Structure Definition-Processing a structure-Structures and Pointers-Self-referential structures - Unions.

UNIT IV

(15 HOURS)

OOPs Concept: Limitation of Procedural Language - Characteristics of Object-Oriented Language – Objects - Class - Defining Member Functions - Structure of C++ program - Constructors and Destructors – Default Constructors - Parameterized Constructors – Multiple Constructors in a Class – Copy Constructors – Destructors.

UNIT V

(15 HOURS)

Inheritance & Polymorphism: Inheritance - Extending Classes – Defining Derived Classes – Types of Inheritance - Polymorphism - Overloading – Applications of OOPs.

PRESCRIBED BOOKS:

1. E. Balaguruswamy, 2019, 8th Edition, Programming in ANSI C, Mc Graw-Hill
2. E. Balaguruswamy, 2020, 8th Edition, Object Oriented Programming with C++, Mc Graw-Hill

REFERENCE BOOKS:

1. Herbert Schildt, 2017, 4th Edition, C: The Complete Reference, Mc Graw-Hill
2. Tim Warren, 2019, C Programming For Beginners: The Simple Guide to Learning C Programming Language Fast!, Ingram Publishing
3. Michael Vine, 2007, 2nd Edition, C Programming for absolute beginners, Delmar Cengage Learning
4. Herbert Schildt, 2015, 5th Edition, C++ the Complete Reference, McGraw-Hill Osborne
5. Bjarne Stroustrup, 2013, 4th Edition, C++ Programming Language, Addison-Wesley Educational Publishers Inc

E-LEARNING RESOURCES:

1. https://topperworld.in/c-programming-notes/#google_vignette
2. <https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/pages/lecture-notes/>
3. https://chenweixiang.github.io/docs/The_C++_Programming_Language_4th_Edition_Bjarne_Stroustrup.pdf
4. <https://lib.fbtuit.uz/assets/files/c-thecompletereferece4thedition-herbertschildt.pdf>
5. https://www.vssut.ac.in/lecture_notes/lecture1424354156.pdf

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	<i>Answer any 10 out of 12 questions (each in 50 words)</i>	<i>1-12</i>	<i>3</i>	<i>30</i>
B	<i>Answer any 5 out of 7 questions (each in 300 words)</i>	<i>13-19</i>	<i>6</i>	<i>30</i>
C	<i>Answer any 4 out of 6 questions (each in 1200 words)</i>	<i>20-25</i>	<i>10</i>	<i>40</i>
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	1	1
II	2	1	1
III	3	2	1
IV	2	1	2
V	2	2	1
TOTAL	12	7	6
SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	2	2	3	3	3
CO 2	3	3	3	2	3
CO 3	3	3	3	3	3
CO 4	3	3	2	2	3
CO 5	3	2	2	3	3
Ave.	2.8	2.6	2.6	2.6	3

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Impart conceptual understanding of functions and emphasize its importance in solving real world problems	PSO1, PSO2,PSO3 PSO4,PSO5	K1, K2, K3
CO2	Understand the basic terminology used in computer programming.	PSO1, PSO2,PSO3 PSO4,PSO5	K2, K3, K4, K5
CO3	Explain the class structures as fundamental, modular building blocks.	PSO1, PSO2,PSO3 PSO4,PSO5	K3, K4, K5, K6
CO4	Plan to write, compile and debug programs in C & C++ language.	PSO1, PSO2,PSO3 PSO4,PSO5	K4, K5, K6
CO5	Apply the knowledge in writing programs to implement the concept of OOP's.	PSO1, PSO2,PSO3 PSO4,PSO5	K2, K3, K4, K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – II
COURSE NAME: PRACTICAL - I: C & C++ PROGRAMMING	COURSE CODE:
SEMESTER: I	MARKS:100
CREDITS: 4	TOTAL HOURS:75
PRACTICAL	

COURSE OBJECTIVE:

To give exposure to hands on training in C & C++ programming.

COURSE OUTCOMES:

1. Familiarize the student with basic concepts of computer programming and developer tools.
2. Understand the role of functions involved the idea of modularity
3. Describe the syntax and semantics of the programming language
4. Acquire practical experience in C & C++ programming through hands-on training.
5. Enable the student to write their own programs using standard language infrastructure

LAB EXERCISES:

C Programming

1. Write a program to add, subtract, multiply and divide two numbers. (Arithmetic operation).
2. Write a program to check if a number is even or odd. (if-else)
3. Write a program to find the largest of three numbers. (using if-else)
4. Write a program to find the maximum and minimum of n numbers. (using for- statement)
2. Write a program to check for prime numbers. (do while loop)
3. Write a program to check for Armstrong number. (while loop)
4. Write a program to accept day numbers and print the day of the week. (switch)
5. Write a program for counting the number of vowels, consonants, words, white spaces in a line of text. (switch)
6. Write a program to check whether a string is a palindrome or not. (Numbers)
7. Write a program to find if the given year is leap year or not.
8. Write a program for Pascaline Triangle.
9. Write a program to print Fibonacci series using a function.
10. Write a program to find the factorial of a number (using recursive function).
11. Write a program for GCD (Greatest Common Divisor using recursive function).
12. Write a program to implement Towers of Hanoi using Recursion.
13. Write a program to arrange the set of numbers in ascending order. (1D Array).
14. Write a program to print the addition and subtraction of matrices.
15. Write a program to implement call by value and call by reference.

C++ Programming

1. Write a program that implements a class & use it with objects
2. Write a program to implement all types of constructors (constructor overloading) with destructors.
3. Write a program to implement single inheritance.
4. Write a program to implement multilevel inheritance.
5. Write a program to implement multiple inheritance.
6. Write a program to demonstrate function overloading.

PSO-CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	3	2	3	3
CO 2	2	2	2	2	3
CO 3	2	3	3	3	3
CO 4	2	3	3	2	2
CO 5	3	3	3	3	3
Ave.	2.4	2.8	2.6	2.6	2.8

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Familiarize the student with basic concepts of computer programming and developer tools.	PSO3, PSO4, PSO5	K3, K5, K6
CO2	Understand the role of functions involved the idea of modularity	PSO1, PSO3, PSO4	K1, K2, K3, K5
CO3	Describe the syntax and semantics of the programming language	PSO1, PSO3, PSO4, PSO5	K3, K5, K6
CO4	Acquire practical experience in C & C++ programming through hands-on training.	PSO1, PSO2, PSO4, PSO5	K3, K4, K5, K6
CO5	Enable the student to write their own programs using standard language infrastructure	PSO2, PSO3, PSO4	K3, K5, K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: B.Sc. (CS), BCA, B.Sc. (IT)	BATCH: 2024 – 25
PART: III	COURSE COMPONENT: ALLIED
COURSE NAME: ALLIED MATHEMATICS	COURSE CODE:
SEMESTER: I	MARKS:100
CREDITS: 5	TOTAL HOURS: 90
THEORY AND PROBLEMS	

COURSE OBJECTIVE:

To improve basics in mathematical and analytical skills.

COURSE OUTCOMES:

1. Recall the basic concepts of matrices, finite difference, trigonometry, differentiation and differential equations.
2. Understand the types of Matrices, interpolation of unknown values, expansion of trigonometric functions, higher order derivatives, solving differential equations.
3. Apply operations of matrix to find eigen value, interpolation formula, expansion of sine series, Jacobian function and complimentary functions.
4. Analyze the verification of Cayley -Hamilton, interpolation for equal intervals, hyperbolic functions, particular solutions.
5. Evaluate inverse using Cayley-Hamilton, interpolation for unequal intervals, inverse hyperbolic, maximum and minimum of a function, general solution for differential equations.

UNIT I

(18 Hours)

Matrices: Symmetric matrix, skew symmetric matrix, Hermitian matrix, skew Hermitian matrix, orthogonal matrix, unitary matrix, Cayley-Hamilton theorem (statement), eigenvalues and eigen vectors.

Chapter 4, Section 4.1-4.1.6,4.5,4.5.2

UNIT II

(18 Hours)

Finite Differences: Interpolation, Operators Δ , ∇ and E, difference tables, Interpolation formulae: Newton’s forward and backward interpolation formulae for equal intervals, Lagrange’s interpolation formula.

Chapter 5

UNIT III

(18 Hours)

Trigonometry: Expansion of $\sin^n\theta$, $\cos^n\theta$, $\sin^m\theta \cos^n\theta$, expansion of $\sin n\theta$ and $\cos n\theta$, expansions of $\sin \theta$, $\cos \theta$ and $\tan \theta$ in a series of powers of “ θ ”, hyperbolic and inverse hyperbolic functions.

Chapter 6, section 6.1,6.2,6.3

UNIT IV**(18 Hours)**

Differentiation: Basic differentiation, Successive Differentiation, Jacobian, Maxima and Minima of functions of two variables.

Chapter 1, Section 1.1,1.2, 1.3,1.3.1

UNIT V**(18 Hours)**

Differential Equations: Second order differential equation with constant coefficients, differential equation of the form $(aD^2+bD+c)y = e^{ax} \phi(x)$ where a, b, c are constants,

$\phi(x) = \sin mx$ (or) $\cos mx$ (or) x^m .

Chapter5, Section 5.2,5.2.1

PRESCRIBED BOOK:

Treatment and content as in “Allied mathematics” – P. Durai Pandian, Dr .S. Udayabaskaran, Volume I & II S.Chand and company limited, Reprint 2018

REFERENCE BOOKS:

1. Allied Mathematics, S.G.Venkatachalapathy.
2. P. Kandasamy and K. Thilagavathi, Allied Mathematics Volume I and Volume II -- 2004, S.Chand and Co, New Delhi.
3. Ancillary Mathematics Volume 1 and 2 by Balasubramanian & K.G.Subramanian..

E - LEARNING RESOURCES:

1. https://ia801306.us.archive.org/5/items/MIT18.01JF07/ocw-18.01-f07-lec11_300k.mp4
2. <https://nptel.ac.in/courses/111107107>
3. <https://nptel.ac.in/courses/111106146>

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	Answer any 10 out of 12 questions	1 - 12	3	30
B	Answer any 5 out of 7 questions	13 - 19	6	30
C	Answer any 4 out of 6 questions	20 - 25	10	40
TOTAL MARKS				100

BREAK UP OF QUESTIONS FOR THEORY

UNITS	SECTION A		SECTION B		SECTION C	
	THEORY	PROBLEM	THEORY	PROBLEM	THEORY	PROBLEM
I	1	1	-	1	-	1
II	1	1	-	1	-	1
III	-	2	-	1	-	1
IV	-	2	-	1	-	1
V	-	2	-	1	-	1
Any Unit	-	2	-	2	-	1
TOTAL	2	10	-	7	-	6
	SECTION A -12		SECTION B - 7		SECTION C -6	

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	2	3	2	2	3
CO 2	3	2	2	3	2
CO 3	3	2	3	3	2
CO 4	2	3	2	2	3
CO 5	2	3	3	3	2
Ave.	2.4	2.6	2.4	2.6	2.4

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Recall the basic concepts of matrices, finite difference, trigonometry, basic differentiation and differential equations.	1-5	K1
CO2	Understand the types of Matrices, interpolation of unknown values, expansion of trigonometric functions, higher order derivatives, solving differential equations	1-5	K1,K2
CO3	Apply operations of matrix to find eigen value, interpolation formula, expansion of sine series, Jacobian function and complimentary functions.	1-5	K3
CO4	Analyze the verification of Cayley-Hamilton, interpolation for equal intervals, hyperbolic functions, particular solutions.	1-5	K3,K4
CO5	Evaluate inverse using Cayley-Hamilton, interpolation for unequal intervals, inverse hyperbolic, maximum and minimum of a function, general solution for differential equations.	1-5	K4,K5

K1= Remember, K2= Understand, K3= Apply, K4=Analyze, K5= Evaluate, K6= Create

PROGRAMME: For other Programmes except BCA	BATCH: 2024 -2027
PART: IV	COURSE COMPONENT: NON MAJOR ELECTIVE - I
COURSE NAME: WEB OFFICE	COURSE CODE:
SEMESTER: I	MARKS:100
CREDITS: 2	TOTAL HOURS:30
THEORY	

COURSE OBJECTIVE:

To understand how to use Google Workspace, includes all of the productivity apps.

COURSE OUTCOMES:

1. Understand the web browser for retrieving, presenting, and traversing information resources on the World Wide Web
2. Demonstrate of working with text, formatting text, and styling paragraphs in Google Docs
3. Comprehend the basics of creating presentations and working with templates by applying themes, background and layout to sides.
4. Proficiency in navigating google sheets and working with cells, rows, and columns.
5. Explain about automated grading, customizable questions and answers, data collection, and easy integration with Google Classroom for educational purposes.

UNIT – I (6 HOURS)

Google Docs: Accessing Google Doc - Sharing a Google Doc - Using the editing tools - Organizing Google Docs -Downloading and converting Google Docs.

UNIT – II (6 HOURS)

Google Slides: Accessing Google Slides - Creating presentation in Google Slides -Adding and Editing content - Presenting Google Slides - Sharing Google Slides

UNIT – III (6 HOURS)

Google Sheets: Accessing Google Sheets - Creating a Google Sheet - Sorting and Organizing data - Filtering data - Editing a Google Sheet - Creating charts and graphs - Sharing a Google Sheet.

UNIT – IV (6 HOURS)

Google Forms - Accessing Google Forms - Creating a Google Form - Sharing a Google Form - Viewing responses as a summary - Viewing responses individually.

UNIT – V (6 HOURS)

Google Drive - Google Calendar – Google Jamboard - Google Meet - Google Maps - Google Classroom - LMS - CANVAS LMS - MOODLE LMS - EDMODO.

PRESCRIBED BOOKS

1. Saqib Khan, “Mastering Google Drive and Docs (With Tips)” Kindle Edition, 2017.
2. David B. Norris “Google Drive and Docs for Beginners 2021: A Comprehensive Guide to Mastering Google drive and docs” Kindle Edition, 2021.

REFERENCE BOOKS:

1. Google Sheet Functions,” A Step-by-Step Guide by Barrie Roberts.
2. Beginner’s Guide to Google Apps Script 1& 2 by Barrie Roberts.
3. Zero to Spreadsheet Hero by Christopher Brielle.
4. Google Drive and Docs for Beginners 2022, A Comprehensive Illustrated guide to Mastering Google Drive,Docs,Sheets and Slides.” By Howard J.Wall”.
5. Google Drive and Docs User Guide by Howard Yeager.

E-RESOURCES

1. <https://www.sjsu.edu/cfd/docs/Google%20Docs.pdf>
2. https://civilsociety-centre.org/sites/default/files/resources/annex_02f_-_google_slides.pdf
3. <https://www.w3schools.com/googlesheets/>
4. <https://www.uww.edu/documents/icit/documentation/google/icit-google%20forms.pdf>
5. https://www.kuet.ac.bd/iqac/downloads/GCR_WorkShop_Handout.pdf

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	<i>Answer any 10 out of 12 questions (each in 50 words)</i>	<i>1-12</i>	<i>3</i>	<i>30</i>
B	<i>Answer any 5 out of 7 questions (each in 300 words)</i>	<i>13-19</i>	<i>6</i>	<i>30</i>
C	<i>Answer any 4 out of 6 questions (each in 1200 words)</i>	<i>20-25</i>	<i>10</i>	<i>40</i>
TOTAL MARKS			100	

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	1
II	3	1	1
III	2	1	1
IV	2	2	2
V	2	1	1
TOTAL	12	7	6
SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	2	2	3	2
CO 2	3	1	1	3	1
CO 3	2	1	1	2	1
CO 4	2	2	1	2	2
CO 5	2	1	1	2	1
Ave.	2.6	2.6	2.6	3	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Understand the web browser for retrieving, presenting, and traversing information resources on the World Wide Web	PSO1,PSO2,PSO3, PSO4,PSO5	K1,K3,K5
CO2	Demonstrate of working with text, formatting text, and styling paragraphs in Google Docs	PSO1,PSO2,PSO3, PSO4,PSO5	K2,K5,K6
CO3	Comprehend the basics of creating presentations and working with templates by applying themes, background and layout to sides.	PSO1,PSO2,PSO3, PSO4,PSO5	K1,K3,5
CO4	Proficiency in navigating google sheets and working with cells, rows, and columns.	PSO1,PSO2,PSO3, PSO4,PSO5	K2,K4,K5
CO5	Explain about automated grading, customizable questions and answers, data collection, and easy integration with Google Classroom for educational purposes.	PSO1,PSO2,PSO3, PSO4,PSO5	K3,K5,K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

SEMESTER – II

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – III
COURSE NAME: WEB APPLICATION DEVELOPMENT	COURSE CODE:
SEMESTER: II	MARKS:100
CREDITS: 4	TOTAL HOURS:75
THEORY	

COURSE OBJECTIVE:

To understand the development of a client-side browser-based web application including its capabilities and limitations.

COURSE OUTCOMES:

1. Develop the web pages using HTML and Cascading Style Sheets.
2. Create of XML documents and schemas.
3. Incorporate knowledge of client-side (JavaScript) and server-side scripting (PHP, ASP.NET) languages to build dynamic web pages.
4. Familiarize with Web Application Terminologies, Internet Tools, E –Commerce and other web services.
5. Develop database applications with MYSQL.

UNIT 1

(15 HOURS)

Introduction to VBScript - Adding VBScript Code to an HTML Page - VB Script Basics- VBScript Data Types - VBScript Variables - VBScript Constants -VBScript Operators: Mathematical - Comparison - Logical - Using Conditional Statements - Looping Through Code- VBScript Procedures – Type Casting Variables - Math Functions – Date Functions- String Functions – Other Functions - VBScript Coding Conventions - Dictionary Object in VBScript - Err Object.

UNIT II

(15 HOURS)

Introduction to Java Script – Advantages of Java Script – Java Script syntax - Data Type- Variable - Array – Operator & Expression – Looping – Control Structures -Constructor Function – User Defined Function Dialog Box.

UNIT III

(15 HOURS)

Java Script Document Object Model – Introduction – Object in HTML – Event Handling Window Object – Document Object – Browser Object – Form Object – Navigator Object– Screen Object – Build in Object – User Defined Object – Cookies.

UNIT IV**(15 HOURS)**

ASP.NET Language Structure – Page Structure – Page Event, Properties & Compiler Directives - HTML Server Controls – Anchor, Tables, Forms, Files. Basic Web server Controls– Label, Text Box, Button, Image Links, Check & Radio Button, Hyperlink, DataList Web Server Controls – Check Box List. Radio Button List, Drop Down List, List Box, Data Grid, Repeater.

UNIT V**(15 HOURS)**

Request and Response Objects, Cookies, Working with Data – OLEDB Connection Class, Command Class, Transaction Class, Data Adaptor Class, Data Set Class. Advanced Issues, E-mail, Application Issues, Working with IIS and Page Directives, Error Handling. Security – Authentication, IP Address, Secure by SSL & Client Certificates.

PRESCRIBED BOOKS:

1. Bayross, 2000, Web Enable Commercial Application Development Using HTML, DHTML, JavaScript, Perl CGI, BPB Publications.
2. Russell Jones, Mastering Active Server Pages 3, BPB Publications.

REFERENCE BOOKS:

1. HathleenKalata, Internet Programming with VBScript and JavaScript, ThomsonLearning
2. Mike McGrath, XML Harness the Power ofXML in easy steps, Dreamtech Publications
3. T.A. Powell, 2002, Complete Reference HTML, TMH.
4. J. Jaworski, 1999, Mastering Javascript, BPB Publications.
5. Powell, Thomas; Schneider, Fritz, JavaScript: The Complete Reference, 2ndedition 2004, TMH

E-LEARNING RESOURCES:

1. <https://developer.mozilla.org/en-US/docs/Web/JavaScript>
2. <https://developer.mozilla.org/en-US/docs/Web/HTML>
3. <https://docs.oracle.com/javaee/6/tutorial/doc/bnafe.html>
4. <https://www.javatpoint.com/asp-net>
5. <https://developer.mozilla.org/en-US/docs/Web/HTTP/Cookies>

GUIDELINES TO THE QUESTION PAPER SETTERS**QUESTION PAPER PATTERN**

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	<i>Answer any 10 out of 12 questions (each in 50 words)</i>	<i>1-12</i>	<i>3</i>	<i>30</i>
B	<i>Answer any 5 out of 7 questions (each in 300 words)</i>	<i>13-19</i>	<i>6</i>	<i>30</i>
C	<i>Answer any 4 out of 6 questions (each in 1200 words)</i>	<i>20-25</i>	<i>10</i>	<i>40</i>
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	1
II	3	1	1
III	2	1	1
IV	2	2	2
V	2	1	1
TOTAL	12	7	6
SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO-CO MAPPING

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	2	2	2	2
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	3	3	3	3
Ave.	3	3	3	3	3

PSO-CO-question paper mapping

CO No:	COUSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Develop the web pages using HTML and Cascading Style Sheets.	PSO1, PSO2, PSO3, PSO4, PSO5	K2, K3, K6
CO2	Create of XML documents and schemas.	PSO1, PSO2, PSO3, PSO4, PSO5	K2, K5, K6
CO3	Incorporate knowledge of client-side (JavaScript) and server-side scripting (PHP, ASP.NET) languages to build dynamic web pages.	PSO1, PSO2, PSO3, PSO4, PSO5	K3, K4, K5, K6
CO4	Familiarize with Web Application Terminologies, Internet Tools, E –Commerce and other web services.	PSO1, PSO2, PSO3, PSO4, PSO5	K2, K4, K6
CO5	Develop database applications with MYSQL.	PSO1, PSO2, PSO3, PSO4, PSO5	K3, K4, K5, K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – IV
COURSE NAME: PRACTICAL - II: WEB APPLICATION DEVELOPMENT	COURSE CODE:
SEMESTER: II	MARKS:100
CREDITS: 4	TOTAL HOURS:75
PRACTICAL	

COURSE OBJECTIVE:

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

COURSE OUTCOMES:

1. Develop a dynamic webpage by the use of java script and DHTML.
2. Create a well-formed / valid XML document.
3. Interconnect a java program to DBMS and perform insert, update and delete operations on DBMS table.
4. Implement a server-side java application called Servlet.
5. Apply JSP to catch form data sent from client and store it on database

LAB EXERCISES:

VB SCRIPT & JAVASCRIPT

1. Write a program outputs the squares, roots, cubes and complements of integers between 1 and 100.
2. Create a calculator.
3. Write a script to Sort numbers and strings.
4. Create a program to generate a hit counter.
5. Create a program to verify whether email address provided by user is valid or invalid.
6. Write a program to scroll the text on status bar.
7. The form consists of two multiple choice list and one single choice list
 - a. The first multiple choice list displays the major dishes available.
 - b. The second multiple choice list displays the stocks available.
 - c. The single choice list displays the miscellaneous (Milkshakes, softdrinks, softy available etc.)
8. Write a script to create a digital clock.
9. Create a web page using two image file which switch black and white one another as the mouse pointer moves over the image. Use the OnMouseover and OnMouse event, on Dbclick handler.
10. Build a WWW page with an image and 3 buttons, Pick three favorite graphics, Label the buttons and make each one swap in the graphic you have chosen.
11. Create a frameset that has two frames, side by side. Make the left-hand frame contain a form with 3 radio buttons. The buttons should be for three search engines:
 - a. Yahoo (<http://www.yahoo.com>)

b. Altavista(<http://www.altavista.com>)

c. Infoseek(<http://www.infoseek.com>)

When the user clicks on of the option buttons, the frame on the right-hand side should be loaded with the right search engine.

12. Write a program to implement Employee database with all validation

ACTIVE SERVER PAGE (ASP)

1. Create a login form, to expire, if the user does not type the password within 100 seconds.
2. Create an employee database and manipulate the records using command object in ASP.
3. Develop an application to illustrate the usage of Request and Response Objects in ASP.
4. Write an ASP program using Request Object to give the exact list of headers sent by the browser to the Web server.
5. Create an Active Server Page to display the records one by one from a student database. The student database should contain roll no, name, marks & total.
6. Design an ASP application that describes books in the Online Bookshop. (Use AD Rotator Component, Content Rotator Component, Content Linking Component)
7. Create a document and add a link to it. When the user moves the mouse over the link it should load the linked document on its own (User is not required to click on the link).
8. Create a document, which opens a new window without a toolbar, address bar, or a status bar that unloads itself after one minute.
9. Create a document that accepts the user's name in a text field form and displays the same the next time when the user visits the site informing him that he has accessed the site for the second time, and so on.

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	3	3	3	3
Ave.	3	3	3	3	3

PSO-CO-question paper mapping

CO No:	COUSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Develop a dynamic webpage by the use of java script and DHTML.	PSO1, PSO2, PSO3, PSO4, PSO5	K2, K3, K6
CO2	Create a well-formed / valid XML document.	PSO1, PSO2, PSO3, PSO4, PSO5	K2, K5, K6
CO3	Interconnect a java program to DBMS and perform insert, update and delete operations on DBMS table.	PSO1, PSO2, PSO3, PSO4, PSO5	K3, K5, K6
CO4	Implement a server-side java application called Servlet.	PSO1, PSO2, PSO3, PSO4, PSO5	K2, K4, K6
CO5	Apply JSP to catch form data sent from client and store it on database	PSO1, PSO2, PSO3, PSO4, PSO5	K3, K4, K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: B.Sc. (CS), BCA, B.Sc. (IT)	BATCH: 2024 - 25
PART: III	COURSE COMPONENT: ALLIED
COURSE NAME: STATISTICS	COURSE CODE:
SEMESTER: II	MARKS:100
CREDITS: 5	TOTAL HOURS: 90
THEORY AND PROBLEMS	

COURSE OBJECTIVE:

To understand about data and use various statistical techniques to measure and compare the relation between data points.

COURSE OUTCOMES:

1. Recall the basics of statistical data, meaning of correlation and regression and probability.
2. Understand the concept of Statistical data representation in graph, location of measure, difference between correlation and regression and concept of probability.
3. Apply the concepts of data in various types of graphical representation, various types of averages and deviations, relation between correlation and regression, real world problems into probability models.
4. Analyze graphical representation, measures of central tendency and dispersion, correlation and regression, Addition and multiplication theorem in probability.
5. Evaluate different types of graphical methods, measures of central tendency and dispersion, correlation and regression and Baye's Theorem applications in problems.

UNIT I

(18 Hours)

Introduction to statistics: Definition, Characteristics, Graphical Representation of data: Bar charts, Pie Diagrams, Histograms, Frequency polygon, Ogives.

Volume I: Chapter 1, Chapter 6

UNIT II

(18 Hours)

Measures of Central Tendency: Mean, Median, Mode, graphical location of median, quartiles, deciles, percentiles, relation among arithmetic mean, geometric mean and harmonic mean.

Volume I: Chapter 7

UNIT III

(18 Hours)

Measures of Dispersion: Range, Mean deviation, Quartile deviation, Standard deviation, Coefficient of variation, Inter quartile deviation, Mean Absolute deviation.

Volume I : Chapter 8

UNIT IV

(18 Hours)

Correlation and Regression: Correlation: Meaning, Applications, types of degree of correlation, Scatter diagram, Karl Pearson's Coefficient of Correlation, Spearman's Rank Correlation. Regression: Meaning, uses, Difference between correlation and regression, linear regression equations.

Volume I : Chapter 10 and Chapter 11

UNIT V

(18 Hours)

Probability: Basic probability, axioms of probability, independent events, Addition and Multiplication theorem (Statement only), Baye's theorem

Volume II : Chapter 1

PRESCRIBED BOOK:

Treatment and content as in "Statistical Methods" – S.P. Gupta, Sultan Chand & Sons 45th Edition(2017)

REFERENCE BOOKS:

1. New Mathematical statistics - Sanjay Arora & Bansilal (2002), Meerat Publications, New Delhi
2. Fundamentals of Mathematical Statistics - Gupta, S.C. and Kapoor, V.K.(2000): 10/e, Sultan Chand & Sons
3. Basic Statistics - 3/Agarwal .B.L (1996): e ,New Age International(P) Ltd.,
4. Statistics for Business and Economics - Hooda.R.P.(2003): 3/e, MacMillan.

E - LEARNING RESOURCES:

1. <https://www.digimat.in/nptel/courses/video/110107114/L01.html>
2. <https://ocw.mit.edu/courses/14-30-introduction-to-statistical-method-in-economics-spring-2006/>
3. www.e-booksdirectory.com
4. www.bookboon.com/en/statistics-and-mathematics-ebooks

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	Answer any 10 out of 12 questions	1 - 12	3	30
B	Answer any 5 out of 7 questions	13 - 19	6	30
C	Answer any 4 out of 6 questions	20 - 25	10	40
TOTAL MARKS				100

BREAK UP OF QUESTIONS FOR THEORY AND PROBLEMS

UNITS	SECTION A		SECTION B		SECTION C	
	THEORY	PROBLEM	THEORY	PROBLEM	THEORY	PROBLEM
I	2	-	-	1	-	1
II	1	1	-	1	-	1
III	-	2	-	1	-	1
IV	1	1	-	1	-	1
V	1	1	-	1	-	1
Any Unit	-	2	-	2	-	1
TOTAL	5	7	-	7	-	6
	SECTION A -12		SECTION B - 7		SECTION C -6	

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	2	3	2	2	3
CO 2	3	2	2	3	2
CO 3	3	2	3	3	2
CO 4	2	3	2	2	3
CO 5	2	3	3	3	2
Ave.	2.4	2.6	2.4	2.6	2.4

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Recall the basics of statistical data, meaning of correlation and regression and probability.	1-5	K1
CO2	Understand the concept of Statistical data representation in graph, location of measure, difference between correlation and regression and concept of probability.	1-5	K1, K2
CO3	Apply the concepts of data in various types of graphical representation, various types of averages and deviations, relation between correlation and regression, real world problems into probability models.	1-5	K3
CO4	Analyze graphical representation, measures of central tendency and dispersion, correlation and regression, Addition and multiplication theorem in probability.	1-5	K3, K4
CO5	Evaluate different types of graphical methods, measures of central tendency and dispersion, correlation and regression and Baye’s Theorem applications in problems.	1-5	K4, K5

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: For other Programmes except BCA	BATCH: 2024 -2027
PART: IV	COURSE COMPONENT: NON MAJOR ELECTIVE - II
COURSE NAME: DATA VISUALIZATION USING POWER BI LAB	COURSE CODE:
SEMESTER: II	MARKS:100
CREDITS: 2	TOTAL HOURS:30
PRACTICAL	

COURSE OBJECTIVE:

To provide training of data visualization using Power BI.

COURSE OUTCOMES:

1. Understand about features of MS-Excel.
2. Perform numerical operations on data.
3. Apply statistical operations on data.
4. Evaluate to perform data analysis and data modeling.
5. Create data visualization using Power BI.

LAB EXERCISES

1. Explore the features of MS-Excel.
2. Get the input from user and perform numerical operations (MAX, MIN, AVG, SUM, SQRT, ROUND)
3. Perform statistical operations – Mean, Median, Mode and Standard deviation, Variance, Skewness
4. Perform data import/export operations for different file formats
5. Perform data pre-processing operations i) Handling Missing data ii) Normalization
6. Perform bivariate and multivariate analysis on the dataset.
7. Explore the Features of PowerBi Desktop
8. Develop the Data Model
9. Design a Report
10. Create a Dashboard and perform data Analysis

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	2	2	2	2	2
CO 2	3	3	2	2	3
CO 3	3	3	3	3	3
CO 4	2	3	3	2	3
CO 5	2	3	2	3	3
Ave.	2.4	2.8	2.4	2.4	2.8

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Understand about features of MS-Excel.	PSO1, PSO2, PSO3, PSO4, PSO5	K1,K2
CO2	Perform numerical operations on data.	PSO1, PSO2, PSO3, PSO4, PSO5	K2,K3
CO3	Apply statistical operations on data.	PSO1, PSO2, PSO3, PSO4, PSO5	K2,K3,K4
CO4	Evaluate to perform data analysis and data modeling.	PSO1, PSO2, PSO3, PSO4, PSO5	K3,K4,K5
CO5	Create data visualization using Power BI.	PSO1, PSO2, PSO3, PSO4, PSO5	K5,K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

SEMESTER - III

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – V
COURSE NAME: PROGRAMMING IN JAVA	COURSE CODE:
SEMESTER: III	MARKS:100
CREDITS: 4	TOTAL HOURS:90
THEORY	

COURSE OBJECTIVE:

To introduce the concepts of Object-Oriented Programming in JAVA.

COURSE OUTCOMES:

1. Recall Java syntax rules, language constructs, and fundamental programming concepts such as variables, loops, and conditionals.
2. Interpret code snippets and explain the behavior of Java programs, identifying errors and understanding program flow.
3. Develop Java applications, ranging from simple console programs to more complex projects, by translating problem statements into executable code.
4. Analyze Java programs to identify errors, inefficiencies, and areas for improvement, debugging and optimizing code for better performance.
5. Create and evaluate original Java programs and projects, integrating multiple concepts and techniques learned throughout the course.

UNIT 1

(18 HOURS)

Object-Oriented Paradigm – Basic Concepts of Object-Oriented Programming – Java Evolution: History - Features of Java - How Java differs from C and C++ - Overview of Java: Java Tokens – Statements – Data Types - Constants – Variables - Type Conversion and Casting -Arrays - Operators – Expressions - Control Statements: Branching and Looping Statements.

UNIT II

(18 HOURS)

Classes, Objects and Methods - Constructors - Overloading Methods – Inheritance - Overriding Methods - Finalizer and Abstract Methods - Visibility Control - Strings and Vectors - StringBuffer Class.

UNIT III

(18 HOURS)

Interfaces – Packages - Creating Packages - Accessing a Package - Multithreaded Programming- Creating Threads - Stopping and Blocking a Thread - Life Cycle of a Thread - Using Thread Methods - Thread Priority – Synchronization - Implementing the Runnable Interface.

UNIT IV**(18 HOURS)**

Managing Errors and Exceptions - Syntax of Exception Handling Code - Using Finally Statement - Throwing Our Own Exceptions - Applet Programming - Applet Life Cycle- Graphics Programming.

UNIT V**(18 HOURS)**

Introducing the AWT: Working with Windows, Graphics and Text- AWT Classes: Working with Frames-Working with Graphics-Working with Color-Working with Fonts- Using AWT Controls, Layout Managers and Menus.

PRESCRIBED BOOKS:

1. Herbert Schildt , Java: The Complete Reference, McGraw Hill Education, Oracle Press 11th Edition, 2019
2. Programming with Java – A Primer – E. Balagurusamy, 5th Edition, TMH.

REFERENCE BOOKS:

1. Y. Daniel Liang, 2003, An Introduction to JAVA Programming, Prentice – Hall of India Pvt. Ltd.
2. The Complete Reference Java 2 – Patrick Naughton & Hebert Schildt, 3rd Edition, TMH
3. S. Sree Priya, - Java Programming (for java beginners)”, First Edition, Volume 1, 2021, VR1 Publications, Chennai.
4. Cay S. Horstmann and Gary Cornell, 2005, Core Java™2 Volume I, Fundamental 7th Edition, Pearson Education.
5. Programming with Java – John R. Hubbard, 2nd Edition, TMH.

E-LEARNING RESOURCES:

1. <https://www.w3schools.com/java/>
2. <https://www.javatpoint.com/java-tutorial>
3. <https://www.programiz.com/java-programming>
4. https://www.tutorialspoint.com/java/java_tutorial.pdf
5. <https://www.iitk.ac.in/esc101/share/downloads/javanotes5.pdf>

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	<i>Answer any 10 out of 12 questions(each in 50 words)</i>	<i>1-12</i>	<i>3</i>	<i>30</i>
B	<i>Answer any 5 out of 7 questions(each in 300 words)</i>	<i>13-19</i>	<i>6</i>	<i>30</i>
C	<i>Answer any 4 out of 6 questions(each in 1200 words)</i>	<i>20-25</i>	<i>10</i>	<i>40</i>
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	1
II	3	1	2
III	2	2	1
IV	2	1	1
V	2	1	1
TOTAL	12	7	6
SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	2	2	2	2
CO 2	2	3	3	3	3
CO 3	3	2	2	3	2
CO 4	2	3	3	3	3
CO 5	3	2	3	3	3
Ave.	2.6	2.4	2.6	2.8	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Recall Java syntax rules, language constructs, and fundamental programming concepts such as variables, loops, and conditionals.	PSO1, PSO2, PSO3, PSO4, PSO5	K1
CO2	Interpret code snippets and explain the behavior of Java programs, identifying errors and understanding program flow.	PSO1, PSO2, PSO3, PSO4, PSO5	K2
CO3	Develop Java applications, ranging from simple console programs to more complex projects, by translating problem statements into executable code.	PSO1, PSO2, PSO3, PSO4, PSO5	K3
CO4	Analyze Java programs to identify errors, inefficiencies, and areas for improvement, debugging and optimizing code for better performance.	PSO1, PSO2, PSO3, PSO4, PSO5	K4
CO5	Create and evaluate original Java programs and projects, integrating multiple concepts and techniques learned throughout the course.	PSO1, PSO2, PSO3, PSO4, PSO5	K5, K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – VI
COURSE NAME: PRACTICAL - III: JAVA PROGRAMMING	COURSE CODE:
SEMESTER: III	MARKS:100
CREDITS: 4	TOTAL HOURS:75
PRACTICAL	

COURSE OBJECTIVE:

To provide hands on training in JAVA programming.

COURSE OUTCOMES:

1. Recognize and recall Java syntax and basic language constructs.
2. Interpret and explain the functionality of Java code snippets.
3. Utilize Java programming concepts to solve programming tasks in the lab sessions.
4. Categorize complex programming problems into manageable components and design appropriate Java solutions.
5. Decide the correctness and effectiveness of Java programs through testing and debugging and develop Java applications to solve real-world problems.

LAB EXERCISES

APPLICATIONS

1. Write a java program to read student marks for five subjects and print the total and average using class and objects.
2. Write a java program to display the employee details using Scanner class.
3. Write a java program to implement inheritance in java.
4. Write a java program for Method overloading and Constructor overloading.
5. To implement the concept of method overriding.
6. Write a java program to represent Abstract class.
7. Write a java program to implement Interface using extends keyword.
8. Write a java program to create a user defined package.
9. Write a java program to create inner classes.
10. Write a java program for Exception handling mechanism.
11. Write a java program to represent Arithmetic Exception and ArrayIndexOutOfBoundsException.
12. Write a java program for creating multiple catch blocks.
13. Write a java program for producer-consumer problems using Threads.
14. Write a Java program that implements a multi-thread application that has three threads.
15. Write a Java program for substring Removal from a String using StringBuffer Class.

16. Write a java program to print the month using Calendar Class.
17. Write a Java program to determine the order of numbers generated randomly using Random class.
18. Write a Java program to demonstrate InetAddress.

APPLETS

1. Write an applet program using text Colors and Fonts.
2. Write a java program for handling Mouse events and Key events
3. Write a Java Program to draw different shapes at the mouse click positions.
4. Write a Java Program to create a frame with three text fields for name, age and qualification and a textarea for multiple lines for address.
5. Write a Java Program to create Menu Bars and pull-down menus.
6. Write a java program that works as a simple calculator.

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	2	2	2	2
CO 2	2	3	3	3	3
CO 3	3	2	2	3	2
CO 4	3	3	3	3	3
CO 5	3	2	3	2	3
Ave.	2.8	2.4	2.6	2.6	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Recognize and recall Java syntax and basic language constructs.	PSO1, PSO2, PSO3, PSO4, PSO5	K1
CO2	Interpret and explain the functionality of Java code snippets.	PSO1, PSO2, PSO3, PSO4, PSO5	K2
CO3	Utilize Java programming concepts to solve programming tasks in the lab sessions.	PSO1, PSO2, PSO3, PSO4, PSO5	K3
CO4	Categorize complex programming problems into manageable components and design appropriate Java solutions.	PSO1, PSO2, PSO3, PSO4, PSO5	K4
CO5	Decide the correctness and effectiveness of Java programs through testing and debugging and develop Java applications to solve real-world problems.	PSO1, PSO2, PSO3, PSO4, PSO5	K5, K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyze, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – VII
COURSE NAME: DATA STRUCTURES AND ALGORITHMS	COURSE CODE:
SEMESTER: III	MARKS:100
CREDITS: 4	TOTAL HOURS:90
THEORY	

COURSE OBJECTIVE:

To introduce fundamental data structures, algorithms, and abstract data types and its usages

COURSE OUTCOMES:

1. Describe the complexity of algorithms in data structure.
2. Explain applications for linear and nonlinear data structure.
3. Categorize various tree and graph traversing algorithm.
4. Identify the Shortest Path in the Graph using algorithms.
5. Apply the various sorting algorithms, including bubble sort, insertion sort, selection sort, heap sort and quick sort.

UNIT 1

(18 HOURS)

Definition of a Data structure – Basic Terms - primitive and composite Data Types, Asymptotic Notations-Big Oh, Omega, Theta notations. Arrays: Operations on Arrays: Insertion, Deletion and Traversal with algorithms - Order list: Definition, Operations

UNIT II

(18 HOURS)

Stacks – Operations on stack: PUSH, POP. Applications of Stack - Infix to Postfix Conversion, Recursion and Maze Problems - Queues - Operations on Queues: ENQUEUE AND DEQUEUE. Queue Applications, Circular Queue: Operations on Circular Queue.

UNIT III

(18 HOURS)

Singly Linked List – Operations: Insertion, Deletion and Traversal- Application - Representation of a Polynomial, Polynomial Addition; Doubly Linked List – Representation – Operations: Insertion, Deletion, Insert Last, Insert After, Delete Last and Display operation - Applications

UNIT IV**(18 HOURS)**

Trees and Graphs: Binary Trees – Basic Terminologies in Trees - Representation - Conversion of Forest to Binary Tree, Operations - Tree Traversals; Graph - Definition, Basic Terms – Basic Operations - Types of Graphs, Hashing Tables and Hashing Functions, Traversal: BFS and DFS- Shortest Path: Dijkstra’s Shortest Path Algorithm.

UNIT V**(18 HOURS)**

Algorithm - Definition - Examples - Complexity: Time Complexity, Space Complexity Divide and Conquer - Binary Search - Maximum and Minimum with example - Merge Sort and Quick Sort with example.

PRESCRIBED BOOKS:

1. E.Horowitz and S. Shani Fundamentals of Data Structures in C++, Galgotia Pub. 1999
2. Horowitz, S. Sahni, and S. Rajasekaran, Computer Algorithms, Galgotia Pub. Pvt. Ltd.,1998.

REFERENCE BOOKS:

1. R. Kruse C.L. Tondo and B. Leung, Data Structures and Program design in C, PHI, 1997.
2. Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, “Data Structures and Algorithms”, Pearson Education, 2001.
3. “Data Structures and Algorithm Analysis in Java” by Mark Allen Weiss.
4. “Introduction to Algorithms: A Creative Approach” by Udi Manber.
5. “Data Structures and Algorithms Made Easy” by Narasimha Karumanchi.

E-LEARNING RESOURCES:

1. <https://ict.iitk.ac.in/wp-content/uploads/CS210-Data-Structures-Module-11-Expression-Evaluation-completed.pdf>
2. <https://introprogramming.info/english-intro-csharp-book/read-online/chapter-19-data-structures-and-algorithm-complexity/>
3. <https://brilliant.org/wiki/shortest-path-algorithms/>
4. https://www.tutorialspoint.com/data_structures_algorithms/
5. <http://www.cs.cmu.edu/~ab/15-121N11/>

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	Answer any 10 out of 12 questions(each in 50 words)	1-12	3	30
B	Answer any 5 out of 7 questions(each in 300 words)	13-19	6	30
C	Answer any 4 out of 6 questions(each in 1200 words)	20-25	10	40
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	1
II	3	1	2
III	2	2	1
IV	2	1	1
V	2	1	1
TOTAL	12	7	6
SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	3	3	2	3
CO 2	3	2	2	3	3
CO 3	2	3	3	3	3
CO 4	3	3	2	3	3
CO 5	2	3	3	2	2
Ave.	2.6	2.8	2.6	2.6	2.8

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Describe the complexity of algorithms in data structure.	PSO1,PSO2,PSO3,PSO4, PSO5	K1,K2
CO2	Explain applications for linear and nonlinear data structure.	PSO1,PSO2,PSO3,PSO4, PSO5	K2,K4
CO3	Categorize various tree and graph traversing algorithm.	PSO1,PSO2,PSO3,PSO4, PSO5	K3,K4
CO4	Identify the Shortest Path in the Graph using algorithms	PSO1,PSO2,PSO3,PSO4, PSO5	K3,K4,K5
CO5	Apply the various sorting algorithms, including bubble sort, insertion sort, selection sort, heap sort and quick sort.	PSO1,PSO2,PSO3,PSO4, PSO5	K4,K5

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – VIII
COURSE NAME: SYSTEM SOFTWARE AND OPERATING SYSTEMS	COURSE CODE:
SEMESTER: III	MARKS:100
CREDITS: 4	TOTAL HOURS:75
THEORY	

COURSE OBJECTIVE:

To understand the processing of programs on a computer system to design and in-depth understanding of the operating system concepts

COURSE OUTCOMES:

1. Understand the concept of system software and its architecture.
2. Acquire the concept of machine dependent compiler features and compiler design.
3. Analyze the process management & thread, processor scheduling and its criteria.
4. Apply the concept of multiprogramming system and how to avoid deadlock in operating system
5. Prioritize the issues and challenges of main memory, virtual memory and file systems

UNIT 1

(15 HOURS)

Introduction to System Software, Programming languages and language processors: procedure oriented and Problem oriented programming languages, Program execution: Program Translation, Program Interpretation.

UNIT II

(15 HOURS)

Assemblers: Assembly Language Statements - Machine dependent compiler features – Intermediate form of the program – Machine dependent code optimization – Machine independent compiler features – Compiler design options – Division into passes – Interpreters – p-code compilers – Compiler-compilers.

UNIT III

(15 HOURS)

Introduction: Views– Goals–OS Structure–Components–Services-System Design and Implementation. Process Management: Process - Process Scheduling – Cooperating Process – Threads - Interprocess Communication. CPU Scheduling: CPU Schedulers – Scheduling criteria – Scheduling Algorithms.

UNIT IV

(15 HOURS)

Deadlock: Characterization – Methods for handling Deadlocks – Prevention, Avoidance, and Detection of Deadlock - Recovery from deadlock. Memory Management: Address Binding:

Logical and Physical Address Space Contiguous Allocation – Internal & External Fragmentation. Non-Contiguous Allocation: Paging and Segmentation schemes Implementation – Sharing - Fragmentation.

UNIT V

(15 HOURS)

Virtual Memory: Demand Paging – Page Replacement - Page Replacement Algorithms – Thrashing. – File System: Concepts – Access methods – Directory Structure –Protection Consistency Semantics – File System Structures – Allocation methods – Free Space Management.

PRESCRIBED BOOKS:

1. H.M. Deitel, Operating Systems, 2nd Edition, Perason, 2003.
2. D M Dhamdhere, “Systems Programming”, 2011.Leland L.Beck, System Software:An Introduction to Systems Programming, Pearson, Third Edition.

REFERENCE BOOKS:

1. H.M. Deitel ,1990, An Introduction to Operating System,- Second Edition,Addison Wesley.
2. Achy8ut S. Godbole, Operating Systems, TMH, 2002.
3. John J. Donovan, Systems Programming, TMH, 1991.
4. Silberschatz A., Galvin P.B., Gange.,2012, Operating System Principles, Tenth Edition, JohnWiley& Sons.
5. Operating Systems: A Modern Perspective" by Gary J Nutt.

E-LEARNING RESOURCES:

1. <http://www.ics.uci.edu/~ics143/lectures.html>
2. <http://williamstallings.com/Extras/OS-Notes/notes.html>
3. <https://www.geeksforgeeks.org/system-software/>
4. <https://uotechnology.edu.iq/ce/Lectures/Dr-Shaima-Sys-Prog/lec1-2-3-4.pdf>
5. https://www.vssut.ac.in/lecture_notes/lecture1423726024.pdf

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	<i>Answer any 10 out of 12 questions(each in 50 words)</i>	<i>1-12</i>	<i>3</i>	<i>30</i>
B	<i>Answer any 5 out of 7 questions(each in 300 words)</i>	<i>13-19</i>	<i>6</i>	<i>30</i>
C	<i>Answer any 4 out of 6 questions(each in 1200 words)</i>	<i>20-25</i>	<i>10</i>	<i>40</i>
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	2
II	3	1	1
III	2	1	1
IV	2	2	1
V	2	1	1
TOTAL	12	7	6
SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	2	3	3	3	3
CO 2	3	3	2	2	3
CO 3	3	3	3	2	3
CO 4	3	3	3	3	2
CO 5	2	2	3	3	3
Ave.	2.6	2.8	2.8	2.6	2.8

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Understand the concept of system software and its architecture.	PSO,PSO1,PSO 2,PSO3,PSO4, PSO5	K1,K2,K3
CO2	Acquire the concept of machine dependent compiler features and compiler design.	PSO,PSO1,PSO 2,PSO3,PSO4, PSO5	K2,K3
CO3	Analyze the process management & thread, processor scheduling and its criteria.	PSO,PSO1,PSO 2,PSO3,PSO4, PSO5	K1,K2,K3
CO4	Apply the concept of multiprogramming system and how to avoid deadlock in operating system	PSO,PSO1,PSO 2,PSO3,PSO4, PSO5	K1,K2
CO5	Prioritize the issues and challenges of main memory, virtual memory and file systems	PSO,PSO1,PSO 2,PSO3,PSO4, PSO5	K1,K2,K3

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: ALLIED - III
COURSE NAME: ACCOUNTING PRACTICES	COURSE CODE:
SEMESTER: III	MARKS:100
CREDITS: 5	TOTAL HOURS:90
THEORY AND PROBLEMS	

COURSE FRAMEWORK:

To Introduce the Accounting Principles and Procedures, Depreciation, Analysis of Cost, Overheads, Procedure and Practices, Management Perspective Accounting.

COURSE OUTCOMES:

1. Acquire the basic concepts of accounting and preparation of final accounts.
2. Know the different methods of charging depreciation.
3. Understand the basic concepts used in cost accounting and selling price through cost sheets.
4. Expressing the marginal costing techniques and decisions making.
5. Acquire knowledge of management accounting and Statement Analysis.

UNIT I

(15 HOURS)

Meaning and Scope of Accounting, Objectives of Accounting – Basic Accounting Concepts and Conventions – Objectives of Accounting – Accounting Transactions: Difference Between Financial Accounting and Cost Accounting – Difference Between Cost Accounting and Management Accounting: Double Entry – Book Keeping, Types of Accounts, Accounting Terminology – Journal – Ledger – Preparation of Trail Balance (Simple Problems, Excluding Suspense Accounts).

UNIT II

(19 HOURS)

Preparation of Final Accounts and Adjustments to Final Accounts; Closing Stock, Accrued Income, Income Received in Advance, Outstanding Expenses, Prepaid Expenses, Depreciation, Bad Debts, Provision for Bad and Doubtful Debts.

UNIT III

(19 HOURS)

Cost Accounting Definition, Meaning, Objectives, Nature, Scope: Preparation of Cost Sheet, Tender, Quotation (Simple Problems).

UNIT IV

(18 HOURS)

Management Accounting Definition, Meaning, Objectives, Nature, Scope: Financial Statement Analysis: Meaning, Nature, Scope – Techniques of Financial Statement Analysis - Comparative Financial Statements, Common Measurement or Size Statement, Trend Analysis.

UNIT V

(19 HOURS)

Marginal Costing – Cost-Volume-Profit (CVP) Analysis – profit-volume ratio – Break Even Point – Margin of Safety – Sales Required to Earn derived Profit – Product Mix – Make or Buy Decision – Key Limiting Factor.

THEORY: 20% PROBLEMS: 80%

RECOMMENDED TEXT BOOKS

1. Gupta. R.L & Gupta V.K, 2005, Financial Accounting, Sultan Chand & Sons, New Delhi, 6th edition.
2. Reddy T.S & Murthy. A, 2007, Financial Accounting, Margham Publications, Chennai, 5th edition.
3. Dr. S. Manikandan, Financial Accounting, Scitech Publications, Chennai.
4. Jain S.P. and Narang K.L., Cost Accounting, Kalyani Publishers, Ludhiana, Eighth Edition
5. Reddy T.S. and Hari Prasad Reddy Y., Cost Accounting, Margham Publications, Chennai, Fourth Edition
6. Maheswari, D. S., “Principles of Management Accounting” Sultan Chand & Sons. Delhi 53, 17th edition
7. Reddy, T. S., & Y. Hari Prasad Reddy, Management Accounting. Margham Publication, 15th Edition.

REFERENCE BOOKS

1. Goel. D. K and Shelly Goel, 2018, Financial Accounting, Arya Publications, 2nd edition.
2. Jain. S.P & Narang. K, 1999, Financial Accounting, Kalyani Publishers, Ludhiana, 4th edition.
3. Dr. Maheswari S.N, Principles of Cost Accounting, Sultan Chand & Sons, New Delhi
4. Shukla M.C., Grewal T.S. and Dr. Gupta M.P., Cost Accounting, S.Chand, New Delhi
5. Khanna B.S., Pandey I.M. Ahuja G.K. and Arora M.N.– Practical costing.
6. N.K. Prasad and V.K .Prasad– Cost Accounting.
7. Khan, M.Y., & Jain ,P.K.(2017). Management Accounting and Financial Analysis.

E-LEARNING RESOURCES

1. <https://www.accountingtools.com/articles/2017/5/15/basic-accounting-principles>
2. https://en.wikipedia.org/wiki/Single-entry_bookkeeping_system
3. <https://www.profitbooks.net/what-is-depreciation/>
4. <http://www.yourarticlelibrary.com/cost-accounting/cost-accounting-meaning>
5. <http://www.accountingnotes.net/cost-accounting/cost-sheet/cost-sheet-meaning-advantages-and-preparation/7505>

GUIDELINES TO THE QUESTION PAPER SETTERS

Question Paper Pattern

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12 questions (each in 50 words)	1-12	3	30
B	Answer any 5 out of 7 questions (each in 300 words)	13-19	6	30
C	Answer any 2 out of 4 questions	20-23	20	40
TOTAL MARKS				100

BREAK UP OF QUESTIONS

Distribution of Questions: (Problem Paper)

Sections	Units	No. of Questions	
		Theory	Problems
Section A (Answer any 10 out of 12 questions) 3 marks each	1	2	1
	2	1	1
	3	1	2
	4	1	1
	5	1	1
Section B (Answer any 5 out of 7 questions) 6 marks each	1	1	1
	2	-	1
	3	-	1
	4	1	1
	5	-	1
Section C (Answer any 2 out of 4 questions) 20 marks each	1	-	1
	2	-	1
	3	-	1
	4	-	1
	5	-	-

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	3	3	3	3
CO 2	3	3	2	2	3
CO 3	3	2	3	2	3
CO 4	3	3	3	3	2
CO 5	2	2	3	3	3
Ave.	2.8	2.6	2.8	2.6	2.8

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Acquire the basic concepts of accounting and preparation of final accounts.	PSO1, PSO2, PSO3, PSO4, PSO5	K1
CO2	Know the different methods of charging depreciation.	PSO1, PSO2, PSO3, PSO4, PSO5	K2, K3
CO3	Understand the basic concepts used in cost accounting and selling price through cost sheets.	PSO1, PSO2, PSO3, PSO4, PSO5	K1, K2, K3
CO4	Expressing the marginal costing techniques and decisions making.	PSO1, PSO2, PSO3, PSO4, PSO5	K1, K2
CO5	Acquire knowledge of management accounting and Statement Analysis.	PSO1, PSO2, PSO3, PSO4, PSO5	K1, K2, K3

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

SEMESTER – IV

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – IX
COURSE NAME: RELATIONAL DATABASE MANAGEMENT SYSTEM	COURSE CODE:
SEMESTER: III	MARKS:100
CREDITS: 4	TOTAL HOURS:105
THEORY	

COURSE OBJECTIVE:

To introduce the basic knowledge about DML, DDL operations and to develop a Database with enhanced models and Techniques in RDBMS.

COURSE OUTCOMES:

1. Analyze the database design methodology.
2. Acquire knowledge in fundamentals of database management system.
3. Compare the difference between traditional file system and DBMS.
4. Incorporate the different database languages.
5. Create various data models for DBMS using SQL queries.

UNIT 1

(20 HOURS)

DBMS Definition – Characteristics of DBMS – Application and advantages of DBMS– Instances – Schemas and Database States – Three Levels of Architecture – Data Independence – DBMS languages– Data Dictionary– Database Users– Data Administrators.

UNIT II

(20 HOURS)

Data Models– Types and their comparison– Entity Relationship Model– Entity Types– Entity Sets– Attributes and its types– Keys– E-R Diagram– Data Integrity– RDBMS : Concept– Components and Codd’s rules.

UNIT III

(20 HOURS)

Relational Algebra (Selection, Projection, Union, Intersection, Cartesian product) - Different types of Joins: Theta join, Equi-join, Natural join, Outer join. Normalization: 1NF, 2NF, 3NF, BCNF, 4NF and 5NF.

UNIT IV

(25 HOURS)

Introduction to SQL, DDL, DML, and DCL statements– Creating Tables– Adding Constraints– Altering Tables, Update, Insert, Delete Tables & various form of SELECT- Simple, Using Special Operators for Data Access– Aggregate functions– Joining Multiple Tables (Equi Joins) – Joining a Table to itself (self Joins) Functions.

UNIT V**(20 HOURS)**

Introduction to PL/SQL (blocks of PL/SQL, Variables, constants) – Control Structure – Introduction to Stored Procedures – Functions – Cursor and Triggers

PRESCRIBED BOOKS:

1. "Database Management Systems" by Raghu Ramakrishnan and Johannes Gehrke - This book covers all the topics in detail, including DBMS definition, characteristics, architecture, data models, SQL, normalization, and PL/SQL.
2. "Database System Concepts" by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan - Another comprehensive textbook covering fundamental concepts of database systems, including relational algebra, SQL, normalization, and PL/SQL.

REFERENCE BOOKS:

1. H.F. Korth & A. Silberschatz, Database Concepts, Tata McGraw Hill, New Delhi .
2. C. J. Date, Database Systems, Prentice Hall of India, New Delhi.
3. Ivan Bayross, SQL, PL/SQL, The programming language of Oracle.
4. "SQL Programming" by Chris Fehily - A handy reference for SQL programming, including DDL, DML, DCL statements, query optimization, and advanced SQL techniques.
5. "Oracle PL/SQL Programming" by Steven Feuerstein - An excellent resource for learning PL/SQL programming with detailed explanations, examples, and best practices.

E-LEARNING RESOURCES:

1. <https://www.javatpoint.com/what-is-rdbms>
2. <https://cloud.google.com/learn/what-is-a-relational-database>
3. <https://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm>
4. <https://www.geeksforgeeks.org/dbms/>
5. <https://www.jbiet.edu.in/coursefiles/cse/HO/cse2/DBMSI-III.pdf>

GUIDELINES TO THE QUESTION PAPER SETTERS**QUESTION PAPER PATTERN**

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	<i>Answer any 10 out of 12 questions(each in</i>	<i>1-12</i>	<i>3</i>	<i>30</i>
B	<i>Answer any 5 out of 7 questions(each in 300</i>	<i>13-19</i>	<i>6</i>	<i>30</i>
C	<i>Answer any 4 out of 6 questions(each in 1200</i>	<i>20-25</i>	<i>10</i>	<i>40</i>
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	1
II	3	1	2
III	2	2	1
IV	2	1	1
V	2	1	1
TOTAL	12	7	6
SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	2	3	3	3
CO 2	2	3	2	3	2
CO 3	3	2	3	2	3
CO 4	2	3	3	3	3
CO 5	3	2	2	3	3
Ave.	2.6	2.4	2.6	2.8	2.8

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to
CO1	Analyze the database design methodology.	PSO1, PSO2,PSO3, PSO4, PSO5	K1. K2
CO2	Acquire knowledge in fundamentals of database management system.	PSO1, PSO2,PSO3, PSO4, PSO5	K1, K2, K3
CO3	Compare the difference between traditional file system and DBMS.	PSO1, PSO2,PSO3, PSO4, PSO5	K2, K3, K4
CO4	Incorporate the different database languages.	PSO1, PSO2,PSO3, PSO4, PSO5	K3, K4, K5
CO5	Create various data models for DBMS using SQL queries.	PSO1, PSO2,PSO3, PSO4, PSO5	K4, K5

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE –X
COURSE NAME: PRACTICAL - IV: RDBMS	COURSE CODE:
SEMESTER: IV	MARKS:100
CREDITS: 4	TOTAL HOURS:90
PRACTICAL	

COURSE OBJECTIVE:

To provide a strong foundation in database concept, developing and querying a database, SQL and PL/ SQL Commands

COURSE OUTCOMES:

1. Design and implement a database schema for a given problem-domain using SQL-DDL commands.
2. Populate and query a database using SQL(DML/DCL) commands.
3. Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS
4. Describe views, indexes, TCL, PL/SQL.
5. Programming PL/SQL including stored procedures, stored functions, cursors, packages.

LAB EXERCISES

INTRODUCTION TO SQL

1. Logging onto SQL interface
2. Choosing and Describing Tables
3. Elements of the SQL Query
4. The System Dummy Table
5. Selecting Tables and Columns
6. Duplicate Information DISTINCT
7. Sorting Information

DATA DEFINITION LANGUAGE (DDL)

1. Create
2. Drop
3. Alter
4. Rename

INTEGRITY CONSTRAINTS

1. Types of Constraint
2. Referential Integrity
3. Defining Constraints

DATA MANIPULATION LANGUAGE DML

1. Select
2. Insert
3. Update
4. Delete

FILTERING DATA USING WHERE

1. Where Operators
2. Where with Keywords
3. Where and Logical Operators

SQL FUNCTIONS AND DATA TYPES

1. Date and Time Functions
2. Numeric Functions
3. String Functions
4. Conversion Functions

GROUP BY

1. Group Function Examples
2. Group Function with Having

RETRIEVING DATA FROM MULTIPLE TABLES USING JOINS

1. Natural Join
2. Inner Join
3. Outer Join

SUB-QUERIES

1. Basic Subqueries
2. Multiple Column Subqueries
3. Subqueries with Having
4. Correlated Subqueries

VIEWS

1. Create view
2. View with check option

INDEXES

1. Create Index
2. Unique Option
3. When and What to Index
4. Drop Index

DATA CONTROL LANGUAGE (DCL)

1. Grant
2. Revoke

TRANSACTION CONTROL LANGUAGE

1. Commit
2. Rollback
3. Savepoint
4. SetTransaction

PL/SQL

1. Variables and type declarations
2. Loop structure
3. Procedures and Functions

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	2	3	3	3
CO 2	2	3	2	3	2
CO 3	3	3	3	2	3
CO 4	3	3	2	3	3
CO 5	3	2	2	3	2
Ave.	2.8	2.6	2.4	2.8	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to
CO1	Design and implement a database schema for a given problem-domain using SQL-DDL commands.	PSO1, PSO2, PSO3, PSO4, PSO5	K1, K2
CO2	Populate and query a database using SQL(DML/DCL) commands.	PSO1, PSO2, PSO3, PSO4, PSO5	K1, K2, K3
CO3	Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS	PSO1, PSO2, PSO3, PSO4, PSO5	K2, K3, K4
CO4	Describe views, indexes, TCL, PL/SQL.	PSO1, PSO2, PSO3, PSO4, PSO5	K3, K4, K5
CO5	Programming PL/SQL including stored procedures, stored functions, cursors, packages.	PSO1, PSO2, PSO3, PSO4, PSO5	K4, K5

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – XI
COURSE NAME: CLOUD COMPUTING	COURSE CODE:
SEMESTER: IV	MARKS:100
CREDITS: 4	TOTAL HOURS:105
THEORY	

COURSE OBJECTIVE:

To introduce the basic concepts of cloud computing and to understand the emerging area of “cloud computing” and how it relates to traditional models of computing.

COURSE OUTCOMES:

1. Understand the fundamental concept of Cloud and its types
2. Analyze the Cloud Architecture and Virtualization
3. Analyze the Cloud Infrastructure
4. Understand the key mechanisms and models for distributed systems.
5. Analyze the Cloud Security and Risk Management

UNIT 1

(20 Hours)

CLOUD DEFINITION AND TYPES

Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud

UNIT II

(20 hours)

ARCHITECTURE & VIRTUALIZATION

Cloud Computing Architecture: Cloud Computing Technology – Cloud Architecture – Cloud Modeling and Design - Virtualization: Foundation –Grid, Cloud and Virtualization – Virtualization and Cloud Computing

UNIT III

(20 hours)

CLOUD INFRASTRUCTURE

Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

UNIT IV

(20 hours)

PROGRAMMING MODEL

Parallel and Distributed Programming Paradigms – MapReduce, Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS- Cloud Software Environments - Eucalyptus, Open Nebula, OpenStack.

UNIT V

(25 hours)

SECURITY IN THE CLOUD

Security Overview – Cloud Security Challenges and Risks – Software- as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control– Autonomic Security.

PRESCRIBED BOOKS

1. John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation,
2. Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing, A Practical Approach”, TMH, 2009. 3. Kumar Saurabh, “Cloud Computing – insights into New-Era Infrastructure”, Wiley India,2011.

REFERENCE BOOKS

1. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud” O'Reilly
2. Rajkumar Buyya, Christian Vecchiola, S.ThamaraiSelvi, ‘MasteringCloud Computing”, TMGH,2013.
3. Douglas E.Comer “The Cloud Computing Book”
4. ThomasErl,Ricardo Puttini, Zaigham Mahmood,”Cloud Computing:Concepts,Technology and Architecture”
5. Arshdeep Bahga, and Vijay Madiseti,” Cloud computing:A hands on Approach”

E-LEARNING RESOURCES

1. [https://mrcet.com/downloads/digital_notes/IT/CLOUD%20COMPUTING%20DIGITAL%20NOTES%20\(R18A0523\).pdf](https://mrcet.com/downloads/digital_notes/IT/CLOUD%20COMPUTING%20DIGITAL%20NOTES%20(R18A0523).pdf)
2. https://www.lpude.in/SLMs/Master%20of%20Computer%20Applications/Sem_2/DECAP470_CLOUD_COMPUTING.pdf
3. <https://www.geeksforgeeks.org/cloud-computing/>
4. <https://www.jbiet.edu.in/pdf/IT-coursematerial/Cloud-Computing-Notes.pdf>
5. <https://www.investopedia.com/terms/c/cloud-computing.asp>

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
A	Definition/Principle Answer any 10 out of 12 questions (each in 50 words)	1-12	3	30
B	Short Answer Answer any 5 out of 7 questions (each in 300 words)	13-19	6	30
C	Essay Answer any 4 out of 6 questions (each in 600 words)	20-25	10	40
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	2
II	3	1	1
III	2	1	1
IV	2	2	1
V	2	1	1
TOTAL	12	7	6
SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	3	3	3	3
CO 2	2	2	3	3	2
CO 3	3	3	3	3	2
CO 4	2	3	2	3	3
CO 5	3	2	2	3	3
Ave.	2.6	2.6	2.6	3	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Understand the fundamental concept of Cloud and its types	PSO1,PSO2,PSO3,PSO4,PSO5	K1,K3,K5
CO2	Analyze the Cloud Architecture and Virtualization	PSO1,PSO2,PSO3,PSO4,PSO5	K2,K5,K6
CO3	Analyze the Cloud Infrastructure	PSO1,PSO2,PSO3,PSO4,PSO5	K1,K3,5
CO4	Understand key mechanisms and models for distributed systems	PSO1,PSO2,PSO3,PSO4,PSO5	K2,K4,K5
CO5	Analyze the Cloud Security and Risk Management	PSO1,PSO2,PSO3,PSO4,PSO5	K3,K5,K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyze, K5= Evaluate, K6= Create

PROGRAMME: B.Sc. (CS), BCA, B.Sc. (IT), B.Sc. (DA)	BATCH: 2024 - 25
PART: III	COURSE COMPONENT: ALLIED
COURSE NAME: OPERATIONS RESEARCH	COURSE CODE:
SEMESTER: IV	MARKS:100
CREDITS: 5	TOTAL HOURS: 90
THEORY AND PROBLEMS	

COURSE OBJECTIVE:

On completion of this course student will be able to use the mathematical knowledge in optimal use of resources.

COURSE OUTCOMES:

1. Recollect the fundamental ideas of Operations Research.
2. Understand Solution of LPP, Transportation, Assignment, Sequencing and Network Problems.
3. Apply the concepts of graphical representation and different models into practice.
4. Analyze minimization and maximization concepts of different models.
5. Evaluate different models of LPP, Transportation, Assignment, Sequencing and Network problems.

UNIT I

(18 Hours)

Linear Programming Problem: Introduction, Requirements for a Linear Programming Problem, Assumptions in Linear Programming Models, Applications of Linear Programming Method, Areas of Application of Linear Programming, Formulation of Linear Programming Problems. Graphical Method of Solutions, Some exceptional cases

Chapter 1 & 2.

UNIT II

(18 Hours)

Transportation Problem: Definitions of the Transportation problem, Formulation and Solution of Transportation Models: Basic feasible solution by North West Corner Method, Least Cost Method, Vogel's Approximation Method. without degeneracy. Unbalanced Transportation Problem, Maximization Problem.

Chapter 7.

UNIT III

(18 Hours)

Assignment Problem: Definition of the Assignment problem, Formulation and Solution of the Assignment models, Unbalanced Assignment Problem, Maximization Problem.

Chapter 8.

UNIT IV

(18 Hours)

Sequencing Problem: n jobs through two machines, n jobs through three machines, two jobs through m machines, n jobs through m machines.

Chapter 14.

UNIT V

(18 Hours)

Network Analysis: Introduction, planning, scheduling, control, basic technologies, rules for constructing a project network, network construction, Program Evaluation Review Techniques (PERT), Critical Path Method (CPM). (no crashing).

Chapter 15

PRESCRIBED BOOK:

Resource Management Techniques - Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan, A.R.Publications.

REFERENCE BOOKS:

1. Operations Research - Kandiswarup, P.K.Gupta, ManMohan, S.Chand & Sons Education Publications, New Delhi, 12th Revised edition.
2. Operations Research Principles and Problems - S. Dharani Venkata Krishnan, Keerthi publishing house PVT Ltd
3. Operations Research - Prem Kumar Gupta & D. S. Hira, 7th Revised Edition, S. Chand & Company Ltd., 2014

E - LEARNING RESOURCES

1. <https://nptel.ac.in/courses/110106062> .
2. <https://maa.org/press/maa-reviews/operations-research-problems>
3. https://ocw.mit.edu/courses/15-053-optimization-methods-in-management-science-spring-2013/resources/mit15_053s13_lec2/

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	Answer any 10 out of 12 questions	1 - 12	3	30
B	Answer any 5 out of 7 questions	13 - 19	6	30
C	Answer any 4 out of 6 questions	20 - 25	10	40
TOTAL MARKS				100

BREAK UP OF QUESTIONS FOR THEORY AND PROBLEMS

UNITS	SECTION A		SECTION B		SECTION C	
	THEORY	PROBLEM	THEORY	PROBLEM	THEORY	PROBLEM
I	1	1	-	1	-	1
II	1	1	-	1	-	1
III	1	1	-	1	-	1
IV	1	1	-	1	-	1
V	1	1	-	1	-	1
Any Unit	-	2	1	1	-	1
TOTAL	5	7	1	6	-	6
	SECTION A - 12		SECTION B - 7		SECTION C - 6	

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	3	3	3	2
CO 2	2	2	3	2	3
CO 3	3	3	2	3	2
CO 4	3	3	3	3	3
CO 5	3	2	3	2	3
Ave.	2.8	2.6	2.8	2.6	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Recollect the fundamental ideas of Operations Research.	1-5	K1
CO2	Understand Solution of LPP, Transportation, Assignment, Sequencing and Network Problems.	1-5	K1,K2
CO3	Apply the concepts of graphical representation and different models into practice.	1-5	K3
CO4	Analyze minimization and maximization concepts of different models	1-5	K3,K4
CO5	Evaluate different models of LPP, Transportation, Assignment, Sequencing and Network Problems.	1-5	K4,K5

K1=Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: ALL UG	BATCH: 2024 - 27
PART: IV	COURSE COMPONENT: EVS
COURSE NAME: ENVIRONMENTAL STUDIES	COURSE CODE:
SEMESTER: IV	MARKS:100
CREDITS: 2	TOTAL HOURS: 30
THEORY	

COURSE OBJECTIVE:

To make students realize the importance of Environmental Studies.

COURSE OUTCOMES:

1. Understand the multidisciplinary nature, scope, and importance of environmental studies, emphasizing public awareness.
2. Recognize the challenges associated with natural resources and propose sustainable management solutions.
3. Comprehend the structure and function of ecosystems and identify different types of ecosystems.
4. Appreciate biodiversity, its value, threats, and conservation strategies, with a focus on India.
5. Gain insight into environmental pollution, its causes, effects, and mitigation measures, including disaster management.

UNIT I

(6 HOURS)

The Multidisciplinary nature of environmental studies Definition; Scope and importance, Need for public awareness.

UNIT II

(6 HOURS)

Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems.

- a) Forest resources: Use and Over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water dams benefits and problems.
- c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Case studies.

f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. - Role of an individual in conservation of natural resources. - Equitable use of resources for sustainable lifestyles.

UNIT III

(6 HOURS)

Ecosystems - Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem.

- Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem: -

a. Forest ecosystem

b. Grassland ecosystem

c. Desert ecosystem

d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT IV

(6 HOURS)

Biodiversity and its Conservation

- Introduction-Definition: genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT V

(6 HOURS)

Environmental Pollution: Definition - Causes, effects and control measures of: -

- a. Air pollution
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution
- g. Nuclear hazards

- Solid waste Management: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

SEMESTER – V

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – XII
COURSE NAME: PROGRAMMING IN PYTHON	COURSE CODE:
SEMESTER: V	MARKS:100
CREDITS: 4	TOTAL HOURS:90
THEORY	

COURSE OBJECTIVE:

To provide in-depth knowledge of python programming concepts.

COURSE OUTCOMES:

1. Develop problem-solving skills using Python Programming
2. Enhance functions and strings in text processing and data manipulation tasks.
3. Analyze choosing appropriate data structures (lists, dictionaries, tuples) based on the problem.
4. Understand object-oriented programming principles and their application in Python.
5. Apply numeric skills using NumPy and Pandas, and improve visualization skills using Matplotlib.

UNIT 1

(18 HOURS)

Introduction to Python: Python Basics-Keywords - Identifiers - Comments - Data types - Operators- Statements - Expressions - Input and Output - type conversion - Decision and Loop Control Statements.

UNIT II

(18 HOURS)

Functions: Introduction to function - Parameter passing - Keyword arguments - Default arguments - Variable scope - Recursion. Strings: Accessing values in String - Updating String - Slicing String-String Methods.

UNIT III

(18 HOURS)

List: List Operations - Traversing a List - List methods and build-in functions - Nested List - Copying list - List Manipulation - List as arguments to function. Tuples: Operations - Methods and built-in functions - Assignment - Nested tuples. Dictionaries: Dictionaries are mutable - Operations - Traversing a dictionary - Methods and built-in functions - Manipulation dictionaries.

UNIT IV

(18 HOURS)

Object-Oriented Programming: Creating class - Instance objects- Accessing attributes- Built-in class attributes - destroying objects - Inheritance - Method overriding - Overloading methods - Overloading Operators-Data hiding - Exceptions in Python - Detecting and Handling Exceptions - Exceptions as Strings - Raising Exceptions - Assertions - Standard Exceptions.

UNIT V**(18 HOURS)**

Python packages: Built-in Packages-Import module. Numpy package: Array creation- Accessing array elements and operations-Other functions in Numpy. Pandas: Features and functionalities of Pandas- Pandas series and Labels- DataFrames and operations-Pandas read external files (Read CSV files & JSON files)-Analyzing DataFrames-Cleaning Data. Matplotlib: Scatter plot- Line Graph-Bar graph- Histogram Graph-Pie Chart-Sub plot.

PRESCRIBED BOOKS:

1. Wesley J. Chun, “Core Python Applications Programming”, First Edition, Prentice Hall PTR, 2000.
2. Gowrishankar S, Veena A, “Introduction to Python Programming”, 1 st Edition, CRC Press /Taylor & Francis, 2018. ISBN-13: 978-0815394372

REFERENCE BOOKS:

1. AI Sweigart, “Automate the Boring Stuff With Python” , William Pollock, 2015.
2. Mark Lutz, “ Python Pocket Reference”, Fifth Edition, O’Reilly Publication, 2014.
3. David Beazley & Brain K. Jones, “Python Cookbook”, 3rd Edition, O’Reilly Publication, 2013.
4. Eric Matthes, “Python Crash Course”, 3rd Edition: A Hands-On, Project-Based Introduction to Programming
5. William McKinney, Python for Data Analysis, O’Reilly Publication.

E-LEARNING RESOURCES:

1. <https://www.cse.iitd.ac.in/~mcs112572/book1.pdf>
2. <https://edu.anarchocopy.org/Programming%20Languages/Python/Automate%20the%20Boring%20Stuff%20with%20Python.pdf>
3. <https://dokumen.pub/python-pocket-reference-978-1449357016.html>
4. <https://bedford-computing.co.uk/learning/wp-content/uploads/2015/10/Python-Cookbook-3rd- Edition.pdf>
5. <https://bedford-computing.co.uk/learning/wp-content/uploads/2015/10/Python-for-Data-Analysis.pdf>

GUIDELINES TO THE QUESTION PAPER SETTERS**QUESTION PAPER PATTERN**

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	<i>Answer any 10 out of 12 questions(each in 50 words)</i>	<i>1-12</i>	<i>3</i>	<i>30</i>
B	<i>Answer any 5 out of 7 questions(each in 300 words)</i>	<i>13-19</i>	<i>6</i>	<i>30</i>
C	<i>Answer any 4 out of 6 questions(each in 1200 words)</i>	<i>20-25</i>	<i>10</i>	<i>40</i>
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	1
II	3	1	2
III	2	2	1
IV	2	1	1
V	2	1	1
TOTAL	12	7	6
SECTION A – 12		SECTION B - 7	SECTION C – 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	2	2	2	2
CO 2	3	3	3	2	2
CO 3	3	3	2	2	3
CO 4	2	2	3	3	2
CO 5	3	3	3	2	2
Ave.	2.8	2.6	2.6	2.2	2.2

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Develop problem-solving skills using Python Programming	PSO1, PSO2, PSO3, PSO4, PSO5	K1,K2
CO2	Enhance functions and strings in text processing and data manipulation tasks.	PSO1, PSO2, PSO3, PSO4, PSO5	K1,K2,K3
CO3	Analyze choosing appropriate data structures (lists, dictionaries, tuples) based on the problem.	PSO1, PSO2, PSO3, PSO4, PSO5	K2,K3,K4
CO4	Understand object-oriented programming principles and their application in Python.	PSO1, PSO2, PSO3, PSO4, PSO5	K3,K4,K5
CO5	Apply numeric skills using NumPy and Pandas, and improve visualization skills using Matplotlib.	PSO1, PSO2, PSO3, PSO4, PSO5	K4,K5,K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – XIII
COURSE NAME: PRACTICAL - V: PYTHON PROGRAMMING	COURSE CODE:
SEMESTER: V	MARKS:100
CREDITS: 4	TOTAL HOURS:90
PRACTICAL	

COURSE OBJECTIVE:

To learn how to design and develop python based applications.

COURSE OUTCOMES:

1. Gain familiarity with the basic syntax and structure of Python programs.
2. Understand the fundamental programming concepts related to variable scope, recursion, string manipulation, and string methods in Python.
3. Apply fundamental data structure like lists, tuples, dictionaries for effective data handling and manipulation in Python programming.
4. Create robust and reliable python programs using OOPS, exception handling and assertions
5. Apply python libraries to analyze data and visualization tasks.

LAB EXERCISES

1. Demonstrate the different ways of creating list objects which operate on following functions with suitable examples.
 - i) list() ii) len() iii) count() iv) index () v) append() vi) insert() vii) extend() viii) remove()ix) pop() x) reverse() xi) sort() xii) copy() xiii) clear()
2. Demonstrate the different ways of creating tuple objects which operate on following functions with suitable examples.
 - i) len() ii) count() iii) index() iv) sorted() v) min() vi)max() vii) cmp() viii) reversed()
3. Demonstrate the different ways of creating set objects which operate on following functions with suitable examples.
 - i) add() ii) update() iii) copy() iv) pop() v) remove() vi)discard() vii) clear() viii) union(ix) intersection() x) difference()
4. Demonstrate the different ways of creating set objects which operate on following functions with suitable examples.
 - i) dict() ii) len() iii) clear() iv) get() v) pop() vi)popitem() vii) keys() viii) values(ix) items() x) copy() xi) update()
5. Write a Regular Expression to represent all 10-digit mobile numbers, to check whether the given number is a valid mobile number or not following the rules?

Rules:

 - a) Every number should contain exactly 10 digits.

- b) The first digit should be 7 or 8 or 9.
6. Write a Python program to demonstrate usage of Local and Global variables.
 7. Demonstrate lambda functions in Python with suitable example programs.
 8. Demonstrate the following in-built functions to use Regular Expressions very easily in our applications.
 - i) compile() ii) finditer() iii) match() iv) fullmatch() v) search() vi) findall()
 - vii) sub() viii) subn() ix) split()
 9. a) Python program to perform read and write operations on a file.
b) Python program to copy the contents of a file to another file.
 10. Demonstrate the following functions/methods which operates on strings in Python with suitable examples:
 - i) len() ii) strip() iii)rstrip() iv) lstrip() v) find() vi) rfind() vii) index()
 - viii) rindex() ix) count() x) replace() xi) split() xii) join() xiii) upper()
 - xiv) lower() xv) swapcase() xvi) title() xvii) capitalize() xviii) startswith()
 - xix) endswith()
 11. Write a program to
 - i) Create a 3 X 3 matrix with values ranging from 0 to 8
 - ii) Create a 3 X 3 identity matrix
 - iii) Create a 3 X 3 X 3 array with random values
 - iv) Create a 10 X 10 array with random values and find the minimum and maximum values
 - v) Normalize a 5 X 5 random matrix
 12. Write a program to
 - a. Create a null vector of size 10
 - b. Create a vector with values ranging from 10 to 49
 - c. Reverse a vector
 - d. Find indices of non - zero elements form [1, 2, 0, 0, 4, 0]
 13. Write a program to
 - a. Create a random vector of size 10 and sort it
 - b. Create two random array A and B, check if they are equal
 - c. Make an array immutable
 - d. Create a random vector of size 10 and replace the maximum value by 0
 - e. Find the most frequent value in the array from a random array
 14. Write a program to create a data type object and use sum, sqrt and Transpose on the object.
 15. Write a program to demonstrate Stacking in numpy.
 16. Write a program to create series from scalar values, Dictionary and Nddarray.
 17. Write a program to create a dataframe from dictionary, series and 2D-numpy Nddarray.
 18. Write a program to read and write data from a csv file using pandas.
 19. Write a program to read and write data from a xlsx file using pandas.
 20. Write a program to view the top rows, borrow rows of the frames and view the statistical details of the dataframe.
 21. Create a csv file with roll no, name, five subject marks of students. Write a python program to select the students who are secured 60 marks and above in all the subjects.
 22. Write a program to generate 100 random numbers and create a scatter diagram for the random number.
 23. Create a csv file storing the temperature of the last 10 days and create a line chart using matplotlib.
 24. Write a program to generate 100 random numbers in range 1 to 100 and classify the number into frequency (1 - 10, 11 - 20, ..., 90 - 100) and create a histogram for the random numbers.

25. Create a csv file storing the attendance of the last month and create a pie chart by classifying attendance percentage into 0 - 50, 51 - 60, 61 - 75, 75 and above.
26. Write a program to demonstrate Stacking in numpy.

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	3	2	2	2
CO 2	3	3	3	3	3
CO 3	2	3	3	2	2
CO 4	3	3	3	3	3
CO 5	3	3	3	3	3
Ave.	2.8	3	2.8	2.6	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Gain familiarity with the basic syntax and structure of Python programs.	PSO1, PSO2, PSO3, PSO4, PSO5	K1,K2
CO2	Understand the fundamental programming concepts related to variable scope, recursion, string manipulation, and string methods in Python.	PSO1, PSO2, PSO3, PSO4, PSO5	K1,K2,K3
CO3	Apply fundamental data structure like lists, tuples, dictionaries for effective data handling and manipulation in Python programming.	PSO1, PSO2, PSO3, PSO4, PSO5	K2,K3,K4
CO4	Create robust and reliable python programs using OOPS, exception handling and assertions	PSO1, PSO2, PSO3, PSO4, PSO5	K4,K5
CO5	Apply python libraries to analyze data and visualization tasks.	PSO1, PSO2, PSO3, PSO4, PSO5	K4,K5,K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – XIV
COURSE NAME: SOFTWARE ENGINEERING AND TESTING	COURSE CODE:
SEMESTER: V	MARKS:100
CREDITS: 4	TOTAL HOURS:90
THEORY	

COURSE OBJECTIVE:

To introduce the five phases of software engineering and various software testing techniques.

COURSE OUTCOMES:

1. Decompose the given project in various phases of a lifecycle.
2. Choose appropriate process model depending on the user requirements.
3. Perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.
4. Describe the basic concepts of software testing.
5. Design SQA activities, SQA strategy, formal technical review report for software quality control and assurance

UNIT 1

(18 HOURS)

Introduction to Software Engineering Some definition – Some size factors – Quality and productivity factors – Managerial Issues. Software Development Life Cycle Models: Phases of Software Project - Waterfall Lifecycle Model. Planning a Software Project: Defining the problem - Developing a solution strategy – planning the development process – planning an organizational structure – other planning activities.

UNIT II

(18 HOURS)

Software Cost Estimation: Software Cost Factors – Software Cost Estimation Techniques – Staffing Level Estimation – Estimating Software Maintenance Costs. Software Requirement Definition: The Software Requirement Specification – Formal Specification Techniques.

UNIT III

(18 HOURS)

Software Design: Fundamental Design Concepts – Modules and Modularization Criteria – Design Notations – Design Techniques – Detailed Design Considerations- Real-Time and Distributed System Design - Test Plans – Milestones, Walkthroughs and Inspections – Design Guidelines. Implementation issues: Structured Coding techniques. Software Maintenance: Enhancing Maintainability during development, Managerial aspects of software maintenance.

UNIT IV**(18 HOURS)**

Software Testing: Quality, Quality Assurance, and Quality Control, Testing, Verification, and Validation, Types of Testing: White Box Testing - Black Box Testing - Integration testing: Top-Down Integration - Bottom-Up Integration - Bi-Directional Integration - System Integration.

UNIT V**(18 HOURS)**

System and Acceptance Testing: System Testing Overview - Functional testing - Non-functional Testing, Performance Testing: Methodology of Performance Testing - Regression Testing: Types of Regression Testing.

PRESCRIBED BOOKS:

1. Richard E.Fairly - Software Engineering Concepts, 5th Edition - Tata McGrawHillbookCompany
2. Srinivasan Desikan and Goplalawamy Ramesh – “Software Testing – Principles and Practices” – Pearson Education, 2010.Chapters 1 to 10.

REFERENCE BOOKS:

1. Roger S.Pressman,Software Engineering A Practitioner’s Approach-6 th Edition, McGraw-Hill,2005 .
2. R.S.Pressman, 1997, Software Engineering – 1997 - Fourth Ed., McGraw Hill.
3. Software Testing: A Craftsman's Approach, by Paul C. Jorgensen, Third Edition.
4. Eric Matthes, “Python Crash Course”, 3rd Edition: A Hands-On, Project-Based Introduction to Programming.
5. “Ron Patton”, Software Testing-Second Edition, 2014.

E-LEARNING RESOURCES:

1. www.bcanotes.com
2. <https://www.pit.ac.in/assets/pdf/be-cse/qb/3/IT8076-Software-Testing.pdf>
3. www.testing-whiz.com
4. https://acecollege.in/CITS_Upload/Downloads/Books/1035_File.pdf
5. <https://gacbe.ac.in/pdf/ematerial/18BIT41C-U1.pdf>

GUIDELINES TO THE QUESTION PAPER SETTERS**QUESTION PAPER PATTERN**

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
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TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	1
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SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	3	2	2	2
CO 2	2	3	3	2	3
CO 3	3	2	3	2	2
CO 4	3	3	3	2	3
CO 5	2	3	3	2	3
Ave.	2.6	2.8	2.8	2	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Decompose the given project in various phases of a lifecycle.	PSO1, PSO2, PSO3, PSO4, PSO5	K2
CO2	Choose appropriate process model depending on the user requirements.	PSO1, PSO2, PSO3, PSO4, PSO5	K3
CO3	Perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.	PSO1, PSO2, PSO3, PSO4, PSO5	K2
CO4	Describe the basic concepts of software testing.	PSO1, PSO2, PSO3, PSO4, PSO5	K1, K2
CO5	Design SQA activities, SQA strategy, formal technical review report for software quality control and assurance	PSO1, PSO2, PSO3, PSO4, PSO5	K1, K4

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: ELECTIVE - I
COURSE NAME: DATA COMMUNICATION AND NETWORKING	COURSE CODE:
SEMESTER: V	MARKS:100
CREDITS: 5	TOTAL HOURS:90
THEORY	

COURSE OBJECTIVE:

To introduce the basic concepts of Data Communication and Networking devices

COURSE OUTCOMES:

1. Understand the fundamental concepts of computer networking and provide the knowledge of different protocols at different layers of models.
2. Analyze the various techniques used to share network bandwidth among the multiple understand provide the depth knowledge of DLL fundamentals.
3. Identify the data is transferred between the computers over the network.
4. Learning about the synchronization in distributed systems and thread implementations.
5. Gaining knowledge about distributed file systems.

UNIT I

(18 hours)

Introduction to Data Communication, Network, Protocols and Standards - Line Configuration - Topology - Transmission mode - Classification of Network - OSI Model - Layers of OSI Model.

UNIT II

(18 hours)

Parallel and Serial Transmission - DTE/DCE/such as EIA-449, EIA-530, EIA-202 and x.21 interface - Interface standards - Modems - Guided Media - Unguided Media - Performance - Types of Error - Error Detection - Error Corrections.

UNIT III

(18 hours)

Multiplexing - Types of Multiplexing - Multiplexing Application - Telephone system - Project 802 - Ethernet - Token Bus - Token Ring - FDDI - IEEE 802.6 - SMDS - Circuit Switching - Packet Switching - Message switching - Connection Oriented and Connectionless services.

UNIT IV

(18 hours)

Repeaters - Bridges - Routers - Gateway - Routing algorithms: Distance Vector, link State, path vector Routing, Multicast Routing - TCP/IP Network, Transport Layer of TCP/IP: TCP, TCP Services, TCP Features - Application Layers of TCP/IP: Namespace, DNS, Distribution of Namespace, DNS in the Internet, Resolution, DNS messages, Types of Records, Registers, Dynamics DNS, Encapsulation- World Wide Web: Architecture, Client, Server, URL, Cookies. Web document: Static Document, Dynamic Document, active Document.

UNIT V**(18 hours)**

Computer Security Concepts-Security Attacks: Active Attacks, Passive Attacks - Message authentication Codes: message Authentication Requirements, Message Authentication Functions Requirements for message Authentication codes-Electronic mail Security: s/MIME, Domain Keys Identified Mail- IP Security: IP Security Overview, IP Security Policy, Encapsulating Security payload, Combining Security Associations, Internet key Exchange, Cryptographic suits- Firewalls: The Need for Firewalls, Firewall Characteristics, Types of Firewalls, Firewalls Basing, Firewall Location and Configuration.

PRESCRIBED BOOKS:

1. Behrouz A. Forouzan, 2007, "Data Communications and Networking", 4th Edition, Tata McGraw-Hill Publication
2. William Stallings, Cryptography and Network Security -6 th Edition, PHI.

REFERENCE BOOKS:

1. Achyut S. Godbole , 9th reprint, 2018, "Data Communications and Networks", 2nd Edition, Tata McGraw Hill PublicationsReferences
2. Andrew S. Tanenbaum, 2003, "Computer Networks", 4th Edition, Prentice Hall of India.

E-LEARNING RESOURCES:

1. https://archive.mu.ac.in/myweb_test/syllFybscit/dcn.pdf
2. <https://dpvipracollege.in/wp-content/uploads/2023/01/Data-Communications-and-Networking-By-Behrouz-A.Forouzan.pdf>
3. [https://www.tvu.edu.in/wpcontent/uploads/2020/01/DCN_Notes_Final%20\(1\)_compressed.pdf](https://www.tvu.edu.in/wpcontent/uploads/2020/01/DCN_Notes_Final%20(1)_compressed.pdf)
4. <https://elcom-hu.com/Subjects/Computer/Compulsory/Communication/Data-Communications-and-Network-5e.pdf>
5. https://mrcet.com/downloads/digital_notes/ECE/III%20Year/DATA%20COMMUNICATIO NS.pdf

GUIDELINES TO THE QUESTION PAPER SETTERS**QUESTION PAPER PATTERN**

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
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TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	1
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CO 2	2	3	3	3	3
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CO 4	2	3	3	3	2
CO 5	3	2	2	2	3
Ave.	2.6	2.4	2.8	2.4	2.8

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Understand the fundamental concepts of computer networking and provide the knowledge of different protocols at different layers of models.	PSO1,PSO2,PSO3,PSO4,PSO5	K1,K2
CO2	Analyze the various techniques used to share network bandwidth among the multiple understand provide the depth knowledge of DLL fundamentals.	PSO1,PSO2,PSO3,PSO4,PSO5	K1,K2,K4
CO3	Identify the data is transferred between the computers over the network.	PSO1,PSO2,PSO3,PSO4,PSO5	K2,K3,K4
CO4	Learning about the synchronization in distributed systems and thread implementations.	PSO1,PSO2,PSO3,PSO4,PSO5	K3,K4,K5
CO5	Gaining knowledge about distributed file systems.	PSO1,PSO2,PSO3,PSO4,PSO5	K4,K5

K1= Remember, K2= Understand, K3= Apply, K4=Analyze, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: ELECTIVE - I
COURSE NAME: INFORMATION SECURITY	COURSE CODE:
SEMESTER: V	MARKS:100
CREDITS: 5	TOTAL HOURS:90
THEORY	

COURSE OBJECTIVE:

To understand the basic principles and techniques of Information Security.

COURSE OUTCOMES:

1. Understand the Information Security and Virus and Other Malicious Code
2. Analyze the access control and protection.
3. Apply the database security and integrity
4. Illustrate the network security and cryptography
5. Identify and protect from ethical issues in computer security

UNIT I

(18 HOURS)

Introduction: Security – Attacks - Computer Criminals - Method of Defense Program Security: Secure Programs - Non-Malicious Program Errors- Viruses and other Malicious Code - Targeted Malicious Code - Controls against Program Threats.

UNIT II

(18 HOURS)

Protection in OS: Memory and Address Protection, Access control, File Protection and User Authentication

UNIT III

(18 HOURS)

Database Security: Security Requirements- Reliability and Integrity- Sensitive Data Interface - Multilevel Database- Proposals for Multilevel Security

UNIT IV

(18 HOURS)

Security in Networks: Threats in Networks - Network Security Control- Firewalls Intrusion Detection Systems - Secure E-Mail - Networks and Cryptography - Example Protocols: PEMSSL-IPsec

UNIT V

(18 HOURS)

Administrating Security: Security Planning - Risk Analysis - Organizational Security Policies - Physical Security – Legal – Privacy - Ethical Issues in Computer Security - Protecting Programs and Data - Information and Law- Rights of Employees and Employers Software Failures- Computer Crime- Privacy-Ethical Issues in Computer Society -Case Studies of Ethics.

PRESCRIBED BOOKS:

1. C.P.Pfleeger, and S.L.Pfleeger, Security in Computing, Pearson Education, 4th Edition, 2003.
2. Matt Bishop, Computer Security: Art and Science, Pearson Education, 2003.

REFERENCE BOOKS:

1. Stallings, Cryptography & N/w Security: Principles and practice, 4th Edition, 2006.
2. Kaufman, Perlman, Spincer, Network Security, Prentice Hall, 2nd Edition, 2003.
3. Eric Maiwald, Network Security : A Beginners Guide, TMH, 1999.
4. Macro Pistoia, Java Network Security, Pearson Education, 2nd Edition, 1999.
5. Whitman, Mattord, Principles of Information Security, Thomson, 2nd Edition, 2005.

E-LEARNING RESOURCES:

1. https://www.vssut.ac.in/lecture_notes/lecture1423183198.pdf
2. <https://nrcmec.org/pdf/Course-Content/CSE-CS/IS-Lecture-Notes.pdf>
3. <https://www.geeksforgeeks.org/what-is-information-security/>
4. <http://www.kavery.org.in/engg/cse-ecourse/IT2042-IS.pdf>
5. <https://study.com/academy/lesson/what-is-information-security-definition-best-practices.html>

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Ave.	2.8	2.6	2.8	2.6	2.8

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Understand the Information Security and Virus and Other Malicious Code	PSO 1, PSO 2, PSO 3, PSO 4, PSO 5	K1, K2, K3, K4, K5
CO2	Analyze the access control and protection.	PSO 1, PSO 2, PSO 3, PSO 4, PSO 5	K1, K2, K3
CO3	Apply the database security and integrity	PSO 1, PSO 2, PSO 3, PSO 4, PSO 5	K3, K4, K5
CO4	Illustrate the network security and cryptography	PSO 1, PSO 2, PSO 3, PSO 4, PSO 5	K3, K4, K5, K6
CO5	Identify and protect from ethical issues in computer security	PSO 1, PSO 2, PSO 3, PSO 4, PSO 5	K2, K4, K5, K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: ELECTIVE - I
COURSE NAME: DATA MINING	COURSE CODE:
SEMESTER: V	MARKS:100
CREDITS: 5	TOTAL HOURS:90
THEORY	

COURSE OBJECTIVE:

To understand the theoretical foundations and practical techniques in Data Mining.

COURSE OUTCOMES:

1. Understand the functionality of the various data mining and data warehousing component
2. Analyze the techniques of various data mining primitives and architecture
3. Understand different methodologies used in data mining and data warehousing
4. Compare the different approaches of classification and prediction.
5. Evaluate the performance of different data-mining methods

UNIT 1

(18 HOURS)

Introduction: Data mining – Functionalities – Classification – Introduction to Data Warehousing – Data Preprocessing: Preprocessing the Data – Data cleaning – Data Integration and Transformation – Data Reduction

UNIT II

(18 HOURS)

Data Mining, Primitives, Languages and System Architecture: Data Mining – Primitives– Data Mining Query Language -Architectures of Data mining Systems. Concept Description, Characterization and Comparison: Concept Description- Data Generalization and Summarization- Analytical Characterization- Mining Class Comparison – Statistical Measures.

UNIT III

(18 HOURS)

Mining Association Rules: Basics Concepts – Single Dimensional Boolean Association Rules from Transaction Databases-Multilevel Association Rules from transaction databases – Multi dimension Association Rules from Relational Database- Data Warehouses.

UNIT IV

(18 HOURS)

Classification and Prediction: Introduction – Issues – Decision Tree Induction – Bayesian Classification – Classification of Back Propagation. Classification based on Concepts from Association Rule Mining – Other Methods - Prediction – Introduction– Classifier Accuracy

UNIT V**(18 HOURS)**

Cluster Analysis: Introduction – Types of Data in Cluster Analysis-Petitioning Methods - Hierarchical Methods-Density Based Methods – GRID Based Method – Model based Clustering Method

PRESCRIBED BOOKS:

1. J. Han and M. Kamber, 2001, Data Mining Concepts and Techniques, Harcourt India Pvt. Ltd – New Delhi.
2. Jiawei Han, Micheline Kamber and Jian Pei “Data Mining Concepts and Techniques”, Third Edition, Elsevier, 2011.

REFERENCE BOOKS:

1. K.P. Soman ,Shyam Diwakar, V.Ajay ,2006, Insight into Data Mining Theory and Practice, Prentice Hall of India Pvt. Ltd - New Delhi.
2. Alex Berson and Stephen J. Smith “Data Warehousing, Data Mining & OLAP”, Tata McGraw – Hill Edition, Tenth Reprint 2007.
3. K.P. Soman, Shyam Diwakar and V. Ajay “Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
4. G. K. Gupta “Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.
5. Pang-Ning Tan, Michael Steinbach and Vipin Kumar “Introduction to Data Mining”, Pearson Education, 2007.

E-LEARNING RESOURCES:

1. [https://mrcet.com/pdf/Lab%20Manuals/IT/DATA%20WAREHOUSING%20AND%20DATA%20MINING%20\(R18A0524\).pdf](https://mrcet.com/pdf/Lab%20Manuals/IT/DATA%20WAREHOUSING%20AND%20DATA%20MINING%20(R18A0524).pdf)
2. <https://www.iitr.ac.in/media/facspace/patelfec/16Bit/slides/Lecture-1-Introduction-to-Data-Mining.pdf>
3. <https://www.geeksforgeeks.org/data-mining/>
4. https://www.vssut.ac.in/lecture_notes/lecture1422914558.pdf
5. https://www-users.cse.umn.edu/~kumar001/dmbook/dmslides/chap1_intro.pdf

GUIDELINES TO THE QUESTION PAPER SETTERS**QUESTION PAPER PATTERN**

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	<i>Answer any 10 out of 12 questions (each in 50 words)</i>	<i>1-12</i>	<i>3</i>	<i>30</i>
B	<i>Answer any 5 out of 7 questions (each in 300 words)</i>	<i>13-19</i>	<i>6</i>	<i>30</i>
C	<i>Answer any 4 out of 6 questions (each in 1200 words)</i>	<i>20-25</i>	<i>10</i>	<i>40</i>
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	1
II	3	1	2
III	2	2	1
IV	2	1	1
V	2	1	1
TOTAL	12	7	6
SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	3	2	3	2
CO 2	3	3	3	2	3
CO 3	3	3	2	3	1
CO 4	2	2	3	2	3
CO 5	3	3	3	3	3
Ave.	2.8	2.8	2.6	2.6	2.4

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Understand the functionality of the various data mining and data warehousing component	PSO 1, PSO 2, PSO 3, PSO 4, PSO 5	K1, K2, K3
CO2	Analyze the techniques of various data mining primitives and architecture	PSO 1, PSO 2, PSO 3, PSO 4, PSO 5	K2, K3, K4
CO3	Understand different methodologies used in data mining and data warehousing	PSO 1, PSO 2, PSO 3, PSO 4, PSO 5	K3, K4, K5
CO4	Compare the different approaches of classification and prediction.	PSO 1, PSO 2, PSO 3, PSO 4, PSO 5	K4, K5, K6
CO5	Evaluate the performance of different data-mining methods	PSO 1, PSO 2, PSO 3, PSO 4, PSO 5	K2, K4, K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyze, K5= Evaluate, K6= Create

PROGRAMME: For other Programmes except BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: ELECTIVE – II (INTERDISCIPLINARY ELECTIVE)
COURSE NAME: BUSINESS INTELLIGENCE	COURSE CODE:
SEMESTER: V	MARKS:100
CREDITS: 5	TOTAL HOURS:75
THEORY	

COURSE OBJECTIVE:

To familiarize with business analytics, and learn to do data visualization that helps to take data driven decisions in an organization.

COURSE OUTCOMES:

1. Understand the business Intelligence (BI) methodology and concepts.
2. Discuss data warehouse operation and security issues.
3. Examine the different types of analytics
4. Understand the importance of streaming data analytics
5. Explain the emerging technologies in Business Intelligence

UNIT 1

(15 HOURS)

An overview of Business Intelligence, Analytics and Decision support

Framework for Business Intelligence (BI) – Definition of BI – A Brief History of BI – The Architecture of BI – The origin and Drivers of BI – Intelligence Creation, Use and BI Governance – Transaction Processing versus Analytic Processing – Successful BI Implementation – Analytics Overview – Descriptive, Predictive and Perspective Analytics – Analytics applied to different domain

UNIT II

(15 HOURS)

Data Warehousing

Data Warehousing definitions and concepts – What is a data warehouse? (DW) – A Historical perspective to data warehousing – Characteristics of data warehousing – Data Marts – Operational Data stores – Enterprise data warehouses – Metadata – Data warehousing process overview – Data warehousing Architecture Data Integration and the Extraction, Transformation and Load (ETL) processes – Data Warehouse Development - OLAP versus OLTP.

UNIT III

(15 HOURS)

Business Reporting

Definitions and Concepts-Components of BRS - Visual Analytics - Data and Information Visualization – A brief history of data visualization – Different types of charts and graphs – The emergence of data visualization and visual analytics – Performance dashboards – Dashboard design

UNIT IV

(15 HOURS)

Text and Web Analytics

Text and Web Analytics - Text Analytics and Text mining overview – Natural Language processing – Text mining applications –Text mining process – Sentiment Analysis – Sentiment analysis applications – Web mining overview – Web content and web structure mining – Search Engines – Web Analytics – Social Analytics – Social media analytics.

UNIT V

(15 HOURS)

Business Analytics: Emerging trends and Future Impacts Location Based Analytics for organization – Geospatial Analytics – Real time location Intelligence – Analytics applications for consumers – Recommendation Engines – Web 2.0 revolution and online social networking – Cloud Computing and BI – Impacts of Analytics in Organization – Issues of legality, Privacy and Ethics – An overview of the Analytics Ecosystem.

PRESCRIBED BOOKS:

1. Ramesh Sharda, DursunDelen, Efraim Turban (2018), Business Intelligence, Pearson Education Services Pvt Ltd.
2. https://ebooks.lpude.in/computer_application/mca/term_6/DCAP606_BUSINESS_INTELLIGENCE.pdf

REFERENCE BOOKS:

1. Larissa T. Moss, S. Atre(2003), Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making, Addison Wesley.
2. Carlo Vercellis(2009), Business Intelligence: Data Mining and Optimization for Decision Making, Wiley Publications..
3. David Loshin Morgan, Kaufman(2012), Business Intelligence: The Savvy Manager’s Guide, Second Edition,
4. Cindi Howson(2007), Successful Business Intelligence: Secrets to Making BI a Killer
5. App, Tata McGraw-Hill Publication.
6. Ralph Kimball ,Margy Ross , Warren Thornthwaite, Joy Mundy, Bob Becker(2007), The data Warehouse Lifecycle Toolkit, Wiley Publication Inc.

E-LEARNING RESOURCES:

1. <https://www.talend.com/resources/business-intelligence-dat> <https://tdan.com/the-four-components-of-bi-governance/4681>
2. <https://www.stitchdata.com/resources/oltp-vs-olap/>
3. <https://www.logility.com/blog/descriptive-predictive-and-prescriptive-analyticsexplained/>
4. <https://www.talend.com/resources/what-is-data->
5. <https://www.geeksforgeeks.org/data-warehouse-architecture>

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	<i>Answer any 10 out of 12 questions (each in 50 words)</i>	<i>1-12</i>	<i>3</i>	<i>30</i>
B	<i>Answer any 5 out of 7 questions (each in 300 words)</i>	<i>13-19</i>	<i>6</i>	<i>30</i>
C	<i>Answer any 4 out of 6 questions (each in 600 words)</i>	<i>20-25</i>	<i>10</i>	<i>40</i>
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	1
II	3	1	2
III	2	2	1
IV	2	1	1
V	2	1	1
TOTAL	12	7	6
SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	2	3	3	3
CO 2	3	3	3	2	2
CO 3	2	2	2	3	3
CO 4	2	3	3	3	2
CO 5	3	2	3	2	3
Ave.	2.6	2.4	2.8	2.6	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Understand the business Intelligence (BI) methodology and concepts.	PSO1, PSO2, PSO3, PSO4, PSO5	K1, K2
CO2	Discuss data warehouse operation and security issues.	PSO1, PSO2, PSO3, PSO4, PSO5	K1, K2, K3
CO3	Examine the different types of analytics	PSO1, PSO2, PSO3, PSO4, PSO5	K2, K3, K4
CO4	Understand the importance of streaming data analytics	PSO1, PSO2, PSO3, PSO4, PSO5	K4, K5, K6
CO5	Explain the emerging technologies in Business Intelligence	PSO1, PSO2, PSO3, PSO4, PSO5	K5, K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: ELECTIVE – II (INTERDISCIPLINARY ELECTIVE)
COURSE NAME: INTRODUCTION TO BLOCKCHAIN TECHNOLOGY	COURSE CODE:
SEMESTER: V	MARKS:100
CREDITS: 5	TOTAL HOURS:75
THEORY	

COURSE OBJECTIVE:

To impart knowledge in block chain techniques and able to present the concepts clearly.

COURSE OUTCOMES:

1. Understand the blockchain technologies and its business use.
2. Analyze the blockchain applications in a structure manner.
3. Explain the modern concepts of block chain technology systematically.
4. Implement financial software systems using blockchain
5. Understand the blockchain cryptography.

UNIT 1 (15 HOURS)

History: Digital Money to Distributed Ledgers - Block chain Architecture and Design-Basic crypto primitives: Signature-Hash chain to Block Chain-Basic consensus mechanisms.

UNIT II (15 HOURS)

Requirements for the consensus protocols-Proof of Work (PoW)- Permissioned Block Chains-Design Goals-Consensus protocols for Permissioned Block chains

UNIT III (15 HOURS)

Decomposing the consensus process-Hyper ledger fabric components-Chain code Design and Implementation

UNIT IV (15 HOURS)

Block chain in Financial Software and Systems (FSS): -Settlements, -KYC, -Capital Markets-Insurance- Block chain in trade/supply chain

UNIT V (15 HOURS)

Block chain for Government: Digital identity, land records and other kinds of record keeping-Block chain Cryptography: Privacy and Security on Block chain.

PRESCRIBED BOOKS:

1. Mark Gates, “Block chain: Ultimate guide to understanding block chain, bit coin, cryptocurrencies, smart contracts and the future of money”, Wise Fox Publishing and Mark Gates 2017.
2. Bahga, Vijay Madiseti, “Block chain Applications: A Hands-On Approach”, Arshdeep Bahga, Vijay Madiseti publishers 2017.

REFERENCE BOOKS:

1. Andreas Antonopoulos, “Mastering Bitcoin: Unlocking Digital Crypto currencies ”,O’Reilly Media, Inc. 2014.
2. Melanie Swa, “Block chain”, O’Reilly Media 2014.
3. Imran Bashir, “Mastering Blockchain: Distributed Ledger Technology, Decentralization, and Smart Contracts Explained”, Second Edition, Packt Publishing, 2018.
4. Narayanan, J. Bonneau, E. Felten, A. Miller, S. Goldfeder, “Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction” Princeton University Press, 2016
5. Antonopoulos and G. Wood, “Mastering Ethereum: Building Smart Contracts and Dapps”, O’Reilly Publishing, 2018.

E-LEARNING RESOURCES:

1. NPTEL & MOOC courses titled blockchain technology blockgeeks.comguide/what-is-block-chain-technology <https://nptel.ac.in/courses/106105184/>
2. NPTEL online course : <https://nptel.ac.in/courses/106/104/106104220/#>
3. Udemy: <https://www.udemy.com/course/build-your-blockchain-az/>
4. EDUXLABS Online training :<https://eduxlabs.com/courses/blockchain-technology-training/?tab=tab-curriculum>
5. Online training :<https://www.edx.org/learn/blockchain-blockchain-technologies>.

GUIDELINES TO THE QUESTION PAPER SETTERS**QUESTION PAPER PATTERN**

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	<i>Answer any 10 out of 12 questions (each in 50 words)</i>	<i>1-12</i>	<i>3</i>	<i>30</i>
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C	<i>Answer any 4 out of 6 questions(each in 600 words)</i>	<i>20-25</i>	<i>10</i>	<i>40</i>
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	1
II	3	1	2
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TOTAL			
	SECTION A - 12	SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	2	3	3	3
CO 2	3	3	3	2	2
CO 3	2	2	2	3	3
CO 4	2	3	3	3	2
CO 5	3	2	3	2	3
Ave.	2.6	2.4	2.8	2.6	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Understand the blockchain technologies and its business use.	PSO1, PSO2, PSO3, PSO4, PSO5	K1, K2
CO2	Analyze the blockchain applications in a structure manner.	PSO1, PSO2, PSO3, PSO4, PSO5	K1, K2, K3
CO3	Explain the modern concepts of block chain technology systematically.	PSO1, PSO2, PSO3, PSO4, PSO5	K2, K3, K4
CO4	Implement financial software systems using blockchain	PSO1, PSO2, PSO3, PSO4, PSO5	K4, K5, K6
CO5	Understand the blockchain cryptography.	PSO1, PSO2, PSO3, PSO4, PSO5	K5, K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: ELECTIVE – II (INTERDISCIPLINARY ELECTIVE)
COURSE NAME: DATA MANIPULATION USING SQL LAB	COURSE CODE:
SEMESTER: V	MARKS:100
CREDITS: 5	TOTAL HOURS:75
PRACTICAL	

COURSE OBJECTIVE:

To enhance the knowledge in the process of Database Development and Administration using SQL.

COURSE OUTCOMES:

1. Understand the basic concepts of how a database stores information via tables.
2. Learn the SQL syntax for various queries.
3. Write complex SQL queries to retrieve information from database
4. Create SQL DDL to create, modify and drop objects within a relational database.
5. Retrieve and store information in a relational database using SQL in a multi-user, web based environment.

LAB EXERCISES

1. Table creation and simple Queries
2. SQL Data Type Specification
3. SQL Constraint specification (Primary key, Foreign key, Unique, check, Not Null)
4. Queries using ALTER, DROP, TRUNCATE
5. Queries using COMMIT, ROLLBACK
6. Insertion, Selection, Deletion, Updation of records
7. Selection with Where clause
8. Duplicate removal with Distinct clause
9. SQL Queries with Operators (Arithmetic Operators, Comparison Operators, Logical Operators)
10. SQL Queries with Operators (Like, In, Between)
11. SQL Queries with Grouping Function (Group By)
12. SQL Queries using Aggregate Function (Max, Min, Count, Sum, Avg)
13. SQL Queries using Sort Function (Order By)

14. SQL Queries using Join Operation
15. Nested SQL with sub Queries
16. SQL Union and Intersection Operation
17. SQL with Group By function
18. SQL Queries using Views
19. SQL Queries using Alias
20. Create Database using SQL

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	2	2	2	2
CO 2	3	3	3	3	3
CO 3	3	2	3	2	2
CO 4	3	3	3	3	3
CO 5	2	3	3	2	3
Ave.	2.8	2.6	2.8	2.8	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Understand the basic concepts of how a database stores information via tables.	PSO1, PSO2, PSO3, PSO4, PSO5	K1
CO2	Learn the SQL syntax for various queries.	PSO1, PSO2, PSO3, PSO4, PSO5	K1,K2
CO3	Write complex SQL queries to retrieve information from database	PSO1, PSO2, PSO3, PSO4, PSO5	K3,K4
CO4	Create SQL DDL to create, modify and drop objects within a relational database.	PSO1, PSO2, PSO3, PSO4, PSO5	K3,K4,K5
CO5	Retrieve and store information in a relational database using SQL in a multi-user, web based environment.	PSO1, PSO2, PSO3, PSO4, PSO5	K5,K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: ALL UG	BATCH: 2024 - 27
PART: IV	COURSE COMPONENT: VALUE EDUCATION
COURSE NAME: VALUE EDUCATION	COURSE CODE:
SEMESTER: V	MARKS:100
CREDITS: 2	TOTAL HOURS: 15
THEORY	

COURSE OBJECTIVE:

To teach and inculcate the importance of value based education.

COURSE OUTCOMES:

1. Explore the relationship between education and values, their origins, and their impact on societal norms.
2. Foster personal growth by instilling virtues like truthfulness and self-discipline, addressing contemporary challenges faced by adolescents.
3. Investigate the principles of human rights, including those of marginalized groups, and advocate for social cohesion.
4. Embrace a spectrum of values—constitutional, social, professional, religious, moral, and environmental—to drive national and global progress.
5. Examine the enduring relevance of Guru Nanak Devji's teachings, Sikh values, and rights in modern contexts.

UNIT I - EDUCATION AND VALUES

(3 HOURS)

Definition, Concept, Classification, Theory, Criteria and Sources of values Aims and objectives of value education Role and Need for value education in the contemporary society, Role of education in transformation of values in society Role of parents, teachers, society, peer group and mass media in fostering values

UNIT II - VALUE EDUCATION AND PERSONAL DEVELOPMENT (3 HOURS)

Human Values: Truthfulness, Sacrifice, Sincerity, Self-Control, Altruism, Scientific Vision, relevancy of human values to good life. Character Formation towards Positive Personality

Modern challenges of adolescents: emotions and behavior Self-analysis and introspection: sensitization towards gender equality, differently abled, Respect for - age, experience, maturity, family members, neighbors, strangers, etc.

UNIT III - HUMAN RIGHTS AND MARGINALIZED PEOPLE (3 HOURS)

Concept of Human Rights – Principles of human rights – human rights and Indian constitution – Rights of Women and children – violence against women – Rights of marginalized People – like women, children, minorities, transgender, differently abled etc.

Social Issues and Communal Harmony Social issues – causes and magnitude - alcoholism, drug addiction, poverty, unemployment – communal harmony –concept –religion and its place in public domain –secular civil society

UNIT IV - VALUE EDUCATION TOWARDS NATIONAL AND GLOBAL DEVELOPMENT (3 HOURS)

Constitutional Values :(Sovereign, Democracy, Socialism, Secularism, Equality, Justice, Liberty, Freedom, Fraternity)

Social Values: (Pity and Probity, Self-Control, Universal Brotherhood).

Professional Values :(Knowledge Thirst, Sincerity in Profession, Regularity, Punctuality, Faith).

Religious and Moral Values: (Tolerance, Wisdom, character).

Aesthetic Values: (Love and Appreciation of literature, fine arts)

Environmental Ethical Values

National Integration and international understanding.

Need of Humanistic value for espousing peace in society. Conflict of cross-cultural influences, cross-border education

UNIT V (3 HOURS)

Guru Nanak Devji's Teachings

Relevance of Guru Nanak Devji's teachings' relevance to Modern Society

The Guru Granth sahib

The five Ks

Values and beliefs

Rights and freedom (Right of equality, Right to Education, Right to Justice, Rights of women, Freedom of religion, Freedom of culture, Freedom of assembly, Freedom of speech)

Empowerment of women

Concept of Langar

Eminent Sikh personalities

REFERENCES BOOKS:

1. Dr.AbdulKalam. My Journey-Transforming Dreams into Actions. Rupa Publications, 2013.
2. Steven R Covey, 8th Habit of Effective People (From Effectiveness to Greatness), Free Press, NewYork, 2005.
3. Prem Singh, G.J. (2004). 'Towards Value Based Education', University News. Vol. 42 (45): P.11-12.
4. V.R. Krishna Iyer. Dialectics & Dynamics of Human Rights in India (Tagore Law Lectures) The Yesterday, Today and Tomorrow, Eastern Law House (1999, Reprint 2018)
5. <http://www.ncert.nic.in/rightside/links/pdf/framework/english/nf2005.pdf>

PROGRAMME: BCA	BATCH: 2024 -2027
PART: IV	COURSE COMPONENT: INTERNSHIP
COURSE NAME: INTERNSHIP	COURSE CODE:
SEMESTER: V	MARKS: -
CREDITS: 2	TOTAL HOURS: -
INTERNSHIP	

COURSE OBJECTIVE:

To Facilitate internship for students at software companies or tech startups, offering invaluable real-world experience to apply theoretical knowledge.

GUIDELINES:

The internship period is specifically designated to span a minimum of 4 weeks and is scheduled to occur during the extended summer break between the fourth and fifth semesters of their academic journey. During this training students are expected to immerse themselves in practical, hands-on learning opportunities, gaining exposure to real-world scenarios, industry practices, and the application of theoretical concepts learned throughout their coursework.

Upon the successful completion of the training program, each student is required to obtain an official internship completion certificate from the organization or company where they undertook their training.

SEMESTER - VI

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – XV
COURSE NAME: R-PROGRAMMING	COURSE CODE:
SEMESTER: VI	MARKS:100
CREDITS: 4	TOTAL HOURS:90
THEORY	

COURSE OBJECTIVE:

To focus on data science to perform the data analysis, data visualization, machine learning with statistics.

COURSE OUTCOMES:

1. Understand the fundamentals, standards of Functions and capabilities of Language R - Language
2. Learning the basic R-Language Constructs
3. Demonstrate Simulation in R-Language, Math functions and files processing
4. Know the Principals of Graphics and R-Base Graphics.
5. Understand, analyze, interpret correlation and regression to analyze the underlying relationships between different variables.

UNIT 1

(18 HOURS)

Introduction to R Programming: Variable Scope, Default Arguments - R Data Structures - Scalars, Vectors, Arrays, and Matrices - Adding and Deleting Vector Elements, Obtaining the Length of a Vector- Matrices and Arrays as Vectors, Common Vector Operations - Vector Arithmetic and Logical Operations - Vector Indexing - Using all() and any() - Conditional Control Structures – Interactive Control Structures (for loop, While Loop)

UNIT II

(18 HOURS)

Vectorized Operations: Vector In, Vector Out - NA and NULL Values – Filtering: Generating Filtering Indices - Filtering with the subset() Function- Matrices and Arrays : Creating Matrices - General Matrix Operations: Performing Linear Algebra Operations on Matrices- Matrix Indexing - Filtering on Matrices - Applying Functions to Matrix Rows and Columns: Using the apply() Function- Finding Outliers.

UNIT III

(18 HOURS)

Adding and Deleting Matrix Rows and Columns: More on the Vector/Matrix Distinction - Naming Matrix Rows and Columns - Higher-Dimensional Arrays – List: Creating Lists. General List Operations - List Indexing, Adding and Deleting List Elements, Getting the Size of a List, Accessing List Components and Values - Applying Functions to Lists: Using the lapply() and sapply() Functions, Recursive Lists.

UNIT IV**(18 HOURS)**

Data Frames - Creating Data Frames, Accessing Data Frames - Other Matrix-Like Operations
Extracting Subdata Frames - More on Treatment of NA Values - Using the rbind() and cbind()
Functions - Merging Data Frames - Applying Functions to Data Frames: Using apply(), lapply()
and sapply() on Data Frames. Data Visualization using R: Graphics – (Plotting commands – Bar
Chart, PieChart, Box Plots - Multiple Boxplots - Scatter Plot)

UNIT V**(18 HOURS)**

Factors and Tables: Factors and Levels, Common Functions Used with Factors- Working with
Tables - Matrix/Array-Like Operations on Tables. Probability Distributions: Normal Distribution-
Binomial Distribution - Poisson Distributions - Basic Statistics - Correlation and Covariance – T-
tests, Predictive Analytics: Simple Linear Regression - Multiple Regression Generalized Linear
Models - Logistic Regression – Poisson Regression- other Generalized Linear Models-Survival
Analysis- Nonlinear Models-Splines Decision-Random Forests.

PRESCRIBED BOOKS:

1. The Art of R Programming, Norman Matloff, Cengage Learning R forEveryone, Lander, Pearson
2. Siegel, S. (1956), Nonparametric Statistics for the Behavioral Sciences, McGrawHill International, Auckland.

REFERENCE BOOKS:

1. R in Action, Rob Kabacoff, Manning Venables, W. N. and Ripley, B. D. (2000), S Programming, Springer Verlag, New York.
2. Venables, W. N. and Ripley, B. D. (2002), Modern AppliedStatistics with S, 4th ed., SpringerVerlag, New York.
3. R Cookbook, PaulTeetor, Oreilly.
4. Statistical Analysis with R for Dummies, Joseph Schmuller, John Wiley Publication -2017.
5. Davies, Tilman M., author. Title: The book of R : a first course in programming and statistics / by. Tilman M. Davies.

E-LEARNING RESOURCES:

1. <https://www.geeksforgeeks.org/r-tutorial/>
2. <https://www.statmethods.net/r-tutorial/index.html>
3. <https://www.javatpoint.com/r-tutorial>
4. <https://www.programiz.com>
5. <https://www.guru99.com/r-tutorial.html>

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	Answer any 10 out of 12 questions(each in 50 words)	1-12	3	30
B	Answer any 5 out of 7 questions(each in 300 words)	13-19	6	30
C	Answer any 4 out of 6 questions(each in 1200 words)	20-25	10	40
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	2
II	2	1	1
III	3	1	1
IV	2	2	1
V	2	1	1
TOTAL	12	7	6
SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	3	3	2	3
CO 2	3	3	2	3	2
CO 3	2	3	2	3	2
CO 4	3	2	3	3	3
CO 5	3	2	3	3	2
Ave.	2.8	2.6	2.6	2.8	2.4

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Understand the fundamentals, standards of Functions and capabilities of Language R - Language	PSO1, PSO2, PSO3, PSO4, PSO5	K1, K2
CO2	Learning the basic R-Language Constructs	PSO1, PSO2, PSO3, PSO4, PSO5	K2
CO3	Demonstrate Simulation in R-Language, Math functions and files processing	PSO1, PSO2, PSO3, PSO4, PSO5	K3
CO4	Know the Principals of Graphics and R-Base Graphics.	PSO1, PSO2, PSO3, PSO4, PSO5	K4, K5
CO5	Understand, analyze, interpret correlation and regression to analyze the underlying relationships between different variables.	PSO1, PSO2, PSO3, PSO4, PSO5	K4, K5, K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyze, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – XVI
COURSE NAME: PRACTICAL - VI:DATA ANALYSIS USING R – PROGRAMMING	COURSE CODE:
SEMESTER: VI	MARKS:100
CREDITS: 4	TOTAL HOURS:60
PRACTICAL	

COURSE OBJECTIVE:

To provide practical exposure to R – Programming

COURSE OUTCOMES:

1. Understand the use of R and R-Studio interactive environment
2. Apply R programming and understand different data sets
3. Perform and interpret different distribution using R
4. Analyze the data and know descriptive statistics by using R Programming
5. Predict the data and take decisions through R programming.

LAB EXERCISES

1. Write an R Script to implement the concept of R Operators.
2. Write an R Script to implement the concept of Arrays.
3. Write an R Script to implement the concept of Built-in Functions
4. Write an R Script to implement the concept of Functions
5. Write an R Script to implement the concept of Lists.
6. The numbers below are the first ten days of rain fall amounts in 2023. 0.1,0.6,33.8,1.9,9.6,3.4,4.5,2.3,5.6,4.7, Read them in to a vector using c() Function
 - a. Find out mean and Standard Deviation
 - b. Calculate Cumulative Rainfall and total rainfall.
 - c. Calculate highest rainfall and lowest rainfall
7. Construct a matrix with 10 columns and 10 rows. All filled with Random Numbers between 0 and 100
 - a. Calculate the row means of the matrix
 - b. Calculate the Standard deviation
 - c. Calculate the Columns means of the matrix
8. The Weight of five people before and After a diet programme are given below before: 72, 78, 76,79,105 After : 67, 65, 79,70,93 Evaluate the amount of weight loss for each participant
 - a. Evaluate the amount of weight loss for each participant
 - b. What is the average amount of weight lost?

9. Create the Bar chart for the following data $\text{Hours} \leftarrow c(7,12,28,3,41)$ $\text{Month} \leftarrow c(\text{"Mar"}, \text{"Apr"}, \text{"May"}, \text{"Jun"}, \text{"Jul"})$ to processing the following operation Adding Label, Title, and color and save in the drive.
10. Let us use the built-in dataset air quality which has Daily air quality measurements in India from May to September 2023. Create a histogram by using appropriate arguments for the following statements.
 - a. Assigning names, using the air quality data set.
 - b. Change colors of the Histogram
 - c. Remove Axis and Add labels to Histogram
 - d. Change Axis limits of a Histogram
 - e. Create a Histogram with density and Add Density curve to the histogram
 - f. Write the steps to import data from Excel to CSV files and apply data viewer functions like `rm()`, `dim()`, `head()`, `tail()`, sorting, filtering, searching to view a few sets of rows.
11. Write a program to read a csv file and analyze the data in the file using R.
 - a. To display class / data type of argument
 - b. Create a Pie chart of a given data set
 - c. Create a Line chart for the dataset
12. Import CSV file and find the below operation.
 - a. To find out statistical function of mean, median, Variation of any one column
 - b. To find out the Dimension of the table.
 - c. Create a Boxplot for the dataset [use any one Column]
13. Import CSV file and find the below operation.
 - a. View the whole dataset with all rows and all columns
 - b. To display Top 10 rows of the dataset.
 - c. To draw a Scatter plot of a dataset
14. Create a CSV file named “employdetails.csv” that defines all the required information about the employee such as empid, name, salary, start_date, dept then Import into R and do the following analysis.
 - a. Find the total number rows & columns
 - b. Find the maximum salary
 - c. Retrieve the details of the employee with maximum salary
 - d. Retrieve all the employees working in the IT Department
15. Create a dataset or table [“Smart Phone”] in an excel sheet that stores the mobile information [price, company name, model, SalePercent] of five different companies. Store at least 20 rows. Write the scripts and find out the output for the following information.
 - a. Maximum price of the mobile of each company
 - b. Minimum price of mobile of each company
 - c. Average price of mobile of each company
 - d. Total Price of mobile of each company
16. The ToothGrowth data are from a study which examined the growth of teeth in guinea pigs (n=10) in response to three dose levels of Vitamin C (0.5, 1, and 2 mg), which was administered using two delivery methods (orange juice or ascorbic acid). Data from the Tooth Growth Study is available as an R dataset and information about this study can be found by using R help.

- a. How many rows are there for Tooth Growth?
 - b. What is the mean and standard deviation of Tooth length
 - c. Which treatment is the best in terms of tooth growth?
 - d. Derive the findings based on correlation between Dosage and Length for both supplements.
17. Write an R Script to implement the concept of Normal Distribution.
 18. Write an R Script to implement the concept of Binomial Distribution.
 19. Write an R Script to implement the concept of Logistic Regression

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	3	3	2	2
CO 2	3	2	3	3	3
CO 3	3	2	3	3	3
CO 4	2	3	2	3	3
CO 5	3	3	2	3	2
Ave.	2.8	2.6	2.6	2.8	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	To master the use of the R and R-Studio interactive environment	1-5	K1,K2
CO2	Apply R programming and understand different data sets	1-5	K3
CO3	Perform and interpret different distribution using R	1-5	K4
CO4	Analyze the data and know descriptive statistics by using R Programming	1-5	K4
CO5	Predict the data and take decisions through R programming.	1-5	K5,K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – XVII
COURSE NAME: PRACTICAL - VII: MOBILE APPLICATION DEVELOPMENT	COURSE CODE:
SEMESTER: VI	MARKS:100
CREDITS: 4	TOTAL HOURS:60
PRACTICAL	

COURSE OBJECTIVE:

To provide hands on training to understand and create Development Environment for various android applications.

COURSE OUTCOMES:

1. Setup the development environment.
2. Create a sample android application.
3. Understand the various parts of an android project.
4. Use the Android Emulator.
5. Install and run the application on a physical device.

LAB EXERCISES

1. Create a Hello World App. Run the App on the Emulator and on the Physical Device.
2. Create an App to accept the user's name and to greet him/her.
3. Create a Simple Android Application for Native Calculator.
4. Create an Android Application that creates Alarm Clock.
5. Create an Android Application for Layout Managers and Event Listeners.
6. Create an Android Application to draw Basic Graphical Primitives.
7. Develop an application for working with device camera.
8. Create an Android Application for change the Text size, Font, Color.
9. Create an Android Application using button with response.
10. Create and Android Application to get the input from user and display it.

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	2	3	3	3
CO 2	3	3	3	2	2
CO 3	2	2	2	3	3
CO 4	2	3	3	3	2
CO 5	3	2	3	2	3
Ave.	2.6	2.4	2.8	2.6	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Setup the development environment.	PSO1,PSO2,PSO3, PSO4,PSO5	K1,K2
CO2	Create a sample android application.	PSO1,PSO2,PSO3, PSO4,PSO5	K1,K2,K3
CO3	Understand the various parts of an android project.	PSO1,PSO2,PSO3, PSO4,PSO5	K2,K3,K4
CO4	Use the Android Emulator.	PSO1,PSO2,PSO3, PSO4,PSO5	K4,K5,K6
CO5	Install and run the application on a physical device.	PSO1,PSO2,PSO3, PSO4,PSO5	K5,K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyze, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – XVIII
COURSE NAME: INTERNET OF THINGS	COURSE CODE:
SEMESTER: VI	MARKS:100
CREDITS: 4	TOTAL HOURS:90
THEORY	

COURSE OBJECTIVE:

To explore to the interconnection and integration of the physical world and the cyber space using IoT Devices.

COURSE OUTCOMES:

1. Describe the characteristics, physical and logical design of IoT
2. Understand the Architecture of IoT, and differentiate IoT from M2M communication.
3. Analyze different protocols in various IoT Layer
4. Understand the application areas of IoT
5. Find various physical devices used in IoT

UNIT 1

(18 HOURS)

Introduction - Definition and Characteristics of IoT - Physical design of IoT – Things in IoT –IoT Protocols - Logical design of IoT – IoT Functional Blocks – IoT communication models –IoT Communication APIs - Enabling Technologies – Wireless Sensor Networks – Cloud Computing – Big data analytics – Communication Protocols – Embedded systems.

UNIT II

(18 HOURS)

Architecture reference model – Introduction – Reference model and architecture – IoT reference model- IoT reference Architecture – IoT Devices and deployment models- Deployment and operational view of M2M – Difference between IoT and M2M.

UNIT III

(18 HOURS)

Protocols for IoT – Messaging Protocols - MQ Telemetry Transport (MQTT) – Constrained Application Protocol (CoAP) – Transport Protocols - Bluetooth Low Energy (BLE) - Light Fidelity (Li-Fi) - Sensor Interfacing - Introduction - Types of sensors – Controlling sensors through webpages.

UNIT IV

(18 HOURS)

Home Automation – Cities – Environment – Energy - Retail - Logistics - Agriculture - Industry - Health & Life Style.

UNIT V**(18 HOURS)**

What is an IOT Device - Exemplary Device – Board - Linux on Raspberry Pi – Interfaces – Programming Raspberry Pi with python - other IOT Devices.

PRESCRIBED BOOKS:

1. Vijay Madiseti and Arshdeep Bahga, “Internet of Things (A Hands-on-Approach)”, 1st Edition, VPT, 2014
2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), “Architecting the Internet of Things”, Springer, 2011.

REFERENCE BOOKS:

1. Daniel Kellmerit, —The Silent Intelligence: The Internet of Things. 2013, ISBN 0989973700
2. Honbo Zhou, “The Internet of Things in the Cloud: A Middleware Perspective”, CRC Press, 2012.
3. Hakima Chaouchi, — “The Internet of Things Connecting Objects to the Web” ISBN : 978-1- 84821-140-7, Wiley Publications
4. Olivier Hersent, David Boswarthick, and Omar Elloumi, — “The Internet of Things: Key Applications and Protocols”, Wiley Publications
5. Vijay Madiseti and ArshdeepBahga, — “Internet of Things (A Hands-on-Approach)”, 1st Edition, VPT, 2014.

E-LEARNING RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc19_cs65/preview
2. <https://www.studocu.com/in/document/vellore-institute-of-technology/internet-of-thingsiot/>
3. <https://testbook.com/ias-preparation/internet-of-things-iot>
4. <https://www.careers360.com/courses/internet-of-things-course>
5. <https://www.youtube.com/watch?v=7ZudXhP7wFY>

GUIDELINES TO THE QUESTION PAPER SETTERS**QUESTION PAPER PATTERN**

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	<i>Answer any 10 out of 12 questions(each in 50 words)</i>	<i>1-12</i>	<i>3</i>	<i>30</i>
B	<i>Answer any 5 out of 7 questions(each in 300 words)</i>	<i>13-19</i>	<i>6</i>	<i>30</i>
C	<i>Answer any 4 out of 6 questions(each in 1200 words)</i>	<i>20-25</i>	<i>10</i>	<i>40</i>
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	1	1
II	3	1	1
III	2	2	1
IV	2	2	1
V	2	1	2
TOTAL	12	7	6
	SECTION A - 12	SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	2	3	3	2
CO 2	2	3	2	3	3
CO 3	3	3	3	3	3
CO 4	3	2	3	3	2
CO 5	3	3	3	2	3
Ave.	2.8	2.6	2.8	2.8	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Describe the characteristics, physical and logical design of IoT	PSO1,PSO2,PSO3, PSO4,PSO5	K1
CO2	Understand the Architecture of IoT, and differentiate IoT from M2M communication.	PSO1,PSO2,PSO3, PSO4,PSO5	K2
CO3	Analyze different protocols in various IoT Layer	PSO1,PSO2,PSO3, PSO4,PSO5	K3/K4
CO4	Understand the application areas of IoT	PSO1,PSO2,PSO3, PSO4,PSO5	K3/K4
CO5	Find various physical devices used in IoT	PSO1,PSO2,PSO3, PSO4,PSO5	K4/K5

K1= Remember, K2= Understand, K3= Apply, K4=Analyze, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: CORE – XIX
COURSE NAME: MINI PROJECT	COURSE CODE:
SEMESTER: VI	MARKS:100
CREDITS: 3	TOTAL HOURS:60
PRACTICAL	

The project work holds significant importance within the BCA program, requiring students to approach it diligently and with earnest effort. This mini project aims to cultivate students' capacity to utilize theoretical and practical methodologies to address real-world challenges encountered in industry, academic settings, and research laboratories.

COURSE OBJECTIVE:

To apply theoretical knowledge of programming languages, database management, and software engineering principles in a practical project.

COURSE OUTCOMES:

1. Demonstrate proficiency in programming languages such as HTML, CSS, JavaScript, and PHP for developing dynamic web applications.
2. Design and implement a relational database schema using SQL for storing and managing data related to books, customers, orders, and inventory.
3. Understand the principles of software engineering, including requirements gathering, system design, implementation, testing, and maintenance.
4. Utilize version control systems such as Git for collaborative development and code management.
5. Develop problem-solving skills by addressing various challenges encountered during the development lifecycle of the project.

GUIDELINES:

- A student is required to allocate approximately three months towards the comprehensive phases of project development, encompassing planning, analysis, design, and implementation. The project's commencement is marked by the submission of a project proposal, which serves as an initial assignment.
- Active participation from each student is obligatory for internal evaluation and eligibility to present in the final viva examination.

EVALUATION:

- Internal evaluation will rely on the submission of the initial project proposal, along with two subsequent reviews and a detailed final project report.
- External evaluation will be conducted through a presentation of the project work and an oral examination (Viva Voce).

PSO – CO Mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	3	3	3	3
CO 2	3	2	3	3	3
CO 3	2	3	3	2	3
CO 4	3	3	3	3	3
CO 5	2	3	3	3	2
Ave.	2.6	2.8	3	2.8	2.8

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: ELECTIVE - III
COURSE NAME: ARTIFICIAL INTELLIGENCE	COURSE CODE:
SEMESTER: VI	MARKS:100
CREDITS: 5	TOTAL HOURS:90
THEORY	

COURSE OBJECTIVE:

To introduce about Artificial Intelligence using Machine learning algorithm.

COURSE OUTCOMES:

1. Understand the informed and uninformed problem types and apply search strategies to solve them.
2. Apply difficult real-life problems in a state space representation so as to solve those using AI techniques like searching and game playing.
3. Apply machine learning techniques in the design of computer systems
4. Differentiate between various categories of ML algorithms
5. Design and make modifications to existing machine learning algorithms.

UNIT 1

(18 HOURS)

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT II

(18 HOURS)

Advanced Search: Constructing Search Trees, Stochastic Search, AO* Search Implementation, Minimax Search, Alpha-Beta Pruning Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT III

(18 HOURS)

Machine-Learning: Introduction. Machine Learning Systems, Forms of Learning: Supervised and Unsupervised Learning, reinforcement – theory of learning – feasibility of learning – Data Preparation– training versus testing and split.

UNIT IV

(18 HOURS)

Supervised Learning: Regression: Linear Regression, multi linear regression, Polynomial Regression, logistic regression, Non-linear Regression, Model evaluation methods. Classification: – support vector machines (SVM), Naïve Bayes classification

UNIT V**(18 HOURS)**

Unsupervised learning Nearest neighbor models – K-means – clustering around medoids – silhouettes – hierarchical clustering – k-d trees, Clustering trees – learning ordered rule lists – learning unordered rule. Reinforcement learning- Example: Getting Lost -State and Action Spaces

PRESCRIBED BOOKS:

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, Prentice Hall, 2010.

2. MACHINE LEARNING: An Algorithmic Perspective 2nd Edition, Stephen Marsland, 2015, by Taylor & Francis Group, LLC.

REFERENCE BOOKS:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009. 2. George F. Luger,

2. Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

3. Introduction to Machine Learning, Second Edition, Ethem Alpaydm, the MIT Press, Cambridge, Massachusetts, London, England.

4. Machine Learning, Tom M. Mitchell, McGraw-Hill Science, ISBN: 0070428077

5. Understanding Machine Learning: From Theory to Algorithms, c 2014 by Shai Shalev-Shwartz and Shai Ben-David, Published 2014 by Cambridge University Press.

E-LEARNING RESOURCES:

1. https://people.engr.tamu.edu/guni/csce421/files/AI_Russell_Norvig.pdf
2. https://kkpatel7.files.wordpress.com/2015/04/alppaydin_machinelearning_2010.pdf
3. https://mrcet.com/downloads/digital_notes/AE/III/Artificial%20Intelligence.pdf
4. <https://www.cin.ufpe.br/~cavmj/Machine%20-%20Learning%20-%20Tom%20Mitchell.pdf>
5. <https://www.cs.huji.ac.il/~shais/UnderstandingMachineLearning/understanding-machine-learning-theory-algorithms.pdf>

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	Answer any 10 out of 12 questions(each in 50 words)	1-12	3	30
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TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	1
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III	2	2	1
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V	2	1	1
TOTAL	12	7	6
SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	3	2	2	2
CO 2	2	3	3	2	3
CO 3	3	2	3	2	2
CO 4	3	3	3	2	3
CO 5	2	3	3	2	3
Ave.	2.6	2.8	2.8	2	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Understand the informed and uninformed problem types and apply search strategies to solve them.	PSO1, PSO2, PSO3, PSO4, PSO5	K1,K3
CO2	Apply difficult real-life problems in a state space representation so as to solve those using AI techniques like searching and game playing.	PSO1, PSO2, PSO3, PSO4, PSO5	K2,K3
CO3	Apply machine learning techniques in the design of computer systems	PSO1, PSO2, PSO3, PSO4, PSO5	K3,K4
CO4	To differentiate between various categories of ML algorithms	PSO1, PSO2, PSO3, PSO4, PSO5	K2,K3
CO5	Design and make modifications to existing machine learning algorithms	PSO1, PSO2, PSO3, PSO4, PSO5	K5,K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: ELECTIVE - III
COURSE NAME: BIG DATA ANALYTICS	COURSE CODE:
SEMESTER: VI	MARKS:100
CREDITS: 5	TOTAL HOURS:90
THEORY	

COURSE OBJECTIVE:

To provide overview of Big Data, i.e. storage, retrieval and processing and analytics on different data sets.

COURSE OUTCOMES:

1. Gain foundational understanding of Big Data, including its types handling of unstructured data.
2. Discover the essence of big data analytics and significance of business intelligence.
3. Learning big data technologies and databases
4. Utilize key aspects and components of Hadoop Architecture
5. Acquire the concepts of Big data analytical tools.

UNIT 1

(18 HOURS)

Introduction to Big Data: Data, Characteristics of data -Types of digital data: Unstructured, Semi- structured and Structured -Sources of data - Working with unstructured data - Evolution and Definition of big data - Characteristics and Need of big data - Challenges of big data - Data environment versus big data environment.

UNIT II

(18 HOURS)

Big data Analytics: Overview of business intelligence - Data science and Analytics - Meaning and Characteristics of big data analytics - Need of big data analytics - Classification of analytics - Challenges to big data analytics - Importance of big data analytics - Basic terminologies in big data environment.

UNIT III

(18 HOURS)

Big Data Technologies and Databases: Introduction to NoSQL - Uses, Features and Types of NoSQL- Need, Advantages and Disadvantages of NoSQL- Application of NoSQL- Overview of NewSQL- Comparing SQL, NoSQL and NewSQL- Introduction to MongoDB and its needs - Characteristics of MongoDB - Introduction of Apache Cassandra and its needs - Characteristics of Cassandra.

UNIT IV**(18 HOURS)**

Hadoop Foundation for Analytics: History, Needs, Features- Key advantage and Versions of Hadoop- Essential of Hadoop ecosystems- RDBMS versus Hadoop- Key aspects and Components of Hadoop- Hadoop architectures.

UNIT V**(18 HOURS)**

Hadoop MapReduce and YARN Framework: Introduction to MapReduce- Processing data with Hadoop using MapReduce- Introduction to YARN- Components, Need and Challenges of YARN- Dissecting YARN- MapReduce application.

PRESCRIBED BOOKS:

1. Seema Acharya and Subhashini Chellappan, “Big Data and Analytics”, Wiley India Pvt. Ltd., 2016.
2. “Big Data” by Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, Wiley Publications, 2014.

REFERENCE BOOKS:

1. “Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics” by Soumendra Mohanty, Madhu Jagadeesh and Harsha Srivatsa, Apress Media, Springer Science + Business Media New York, 2013
2. “Mining of Massive Datasets”, Anand Rajaraman, Jure Leskovec, Jeffery D. Ullman, Springer, July 2013.
3. Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
4. ArvindSathi, “BigDataAnalytics: Disruptive Technologies for Changing the Game”, MC Press, 2012
5. Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corigan , "Harness the Power of Big Data The IBM Big Data Platform ", Tata McGraw Hill Publications, 2012

E-LEARNING RESOURCES:

1. <https://elearningindustry.com/big-data-in-elearning-future-of-elearning-industry>
2. <https://www.bigdataelearning.com/>
3. <https://www.bigdataelearning.com/>
4. <https://www.mygreatlearning.com/academy/learn-for-free/courses/mastering-big-data-analytics>
5. <https://www.matellio.com/blog/big-data-in-elearning/>

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	Answer any 10 out of 12 questions(each in 50 words)	1-12	3	30
B	Answer any 5 out of 7 questions(each in 300 words)	13-19	6	30
C	Answer any 4 out of 6 questions(each in 1200 words)	20-25	10	40
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	1	1
II	3	1	1
III	2	2	1
IV	2	2	1
V	2	1	2
TOTAL	12	7	6
SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	3	3	3	3
CO 2	2	3	3	3	2
CO 3	3	3	3	2	2
CO 4	2	2	3	2	3
CO 5	3	3	2	2	3
Ave.	2.6	2.8	2.8	2.4	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Gain foundational understanding of Big Data, including its types handling of unstructured data.	PSO1, PSO2, PSO3, PSO4, PSO5	K1
CO2	Discover the essence of big data analytics and significance of business intelligence.	PSO1, PSO2, PSO3, PSO4, PSO5	K2
CO3	Learning big data technologies and databases	PSO1, PSO2, PSO3, PSO4, PSO5	K3/K4
CO4	Utilize key aspects and components of Hadoop Architecture	PSO1, PSO2, PSO3, PSO4, PSO5	K3/K4
CO5	Acquire the concepts of Big data analytical tools.	PSO1, PSO2, PSO3, PSO4, PSO5	K5 & K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyze, K5= Evaluate, K6= Create

PROGRAMME: BCA	BATCH: 2024 -2027
PART: III	COURSE COMPONENT: ELECTIVE - III
COURSE NAME: GRAPHICS AND MULTIMEDIA	COURSE CODE:
SEMESTER: VI	MARKS:100
CREDITS: 5	TOTAL HOURS:90
THEORY	

COURSE OBJECTIVE:

To introduce about the design and development of two-dimensional graphics and transformations along with multimedia concepts.

COURSE OUTCOMES:

1. Recall factual information about multimedia systems, text, audio, and video tools.
2. Implement algorithms for line-drawing, circle-generating, and ellipse-generating.
3. Apply computer graphics techniques to solve problems in various domains such as entertainment, design, and engineering.
4. Analyze and might compare different multimedia tools, evaluate their features and limitations, or analyze the impact of multimedia on communication and society.
5. Creates Animation with special effects using algorithms

UNIT 1

(18 HOURS)

Output Primitives: Points and Lines – Line-Drawing algorithms – Loading frame Buffer – Line function – Circle-Generating algorithms – Ellipse-generating algorithms. Attributes of Output Primitives: Line Attributes – Curve attributes – Color and Grayscale Levels – Area-fill attributes – Character Attributes.

UNIT II

(18 HOURS)

2D Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations. 2D Viewing: The Viewing Pipeline – Viewing Co-ordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation – 2D Viewing Functions – Clipping Operations.

UNIT III

(18 HOURS)

Text: Types of Text – Unicode Standard – Font – Insertion of Text – Text compression – File formats. Image: Image Types – Seeing Color – Color Models – Basic Steps for Image Processing – Scanner – Digital Camera – Interface Standards – Specification of Digital Images – CMS – Device Independent Color Models – Image Processing software – File Formats – Image Output on Monitor and Printer.

UNIT IV**(18 HOURS)**

Audio: Introduction – Acoustics – Nature of Sound Waves – Fundamental Characteristics of Sound– Microphone – Amplifier – Loudspeaker – Audio Mixer – Digital Audio – Synthesizers – MIDI – Basics of Staff Notation – Sound Card – Audio Transmission – Audio File formats and CODECs – Audio Recording Systems – Audio and Multimedia – Voice Recognition and Response – Audio Processing Software.

UNIT V**(18 HOURS)**

Video: Analog Video Camera – Transmission of Video Signals – Video Signal Formats – Television Broadcasting Standards – PC Video – Video File Formats and CODECs – Video Editing – Video Editing Software. Animation: Types of Animation – Computer Assisted Animation – Creating Movement – Principles of Animation – Some Techniques of Animation – Animation on the Web – Special Effects – Rendering Algorithms. Compression: MPEG-1 Audio – MPEG-1 Video – MPEG-2Audio – MPEG-2 Video

PRESCRIBED BOOKS:

1. Computer Graphics, Donald Hearn, M.Pauline Baker, 2nd edition, PHI.
2. Principles of Multimedia, Ranjan Parekh, 2007, TMH.

REFERENCE BOOKS:

1. Computer Graphics, Amarendra N Sinha, Arun D Udai, TMH.
2. Multimedia: Making it Work, Tay Vaughan, 7th edition, TMH.
3. Multimedia Learning, Richard F.Mayer
4. Computer Graphics & Multimedia A. P. Godse, Dr. D.A Godse
5. Computer Graphics and Multimedia by D. Evangeline, S. Anitha

E-LEARNING RESOURCES:

1. <https://www.geeksforgeeks.org/what-is-multimedia/>
2. https://www.tutorialspoint.com/multimedia/multimedia_introduction.htm
3. <https://bcastudyguide.com/computer-graphics-and-multimedia-application/>
4. <https://sctevtservices.nic.in/docs/website/pdf/140301.pdf>
5. https://users.dimi.uniud.it/~antonio.dangelo/MMS/materials/Fundamentals_of_Multimedia.pdf

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	Answer any 10 out of 12 questions(each in 50 words)	1-12	3	30
B	Answer any 5 out of 7 questions(each in 300 words)	13-19	6	30
C	Answer any 4 out of 6 questions(each in 1200 words)	20-25	10	40
TOTAL MARKS				100

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	3	2	1
II	3	1	2
III	2	2	1
IV	2	1	1
V	2	1	1
TOTAL	12	7	6
SECTION A - 12		SECTION B - 7	SECTION C - 6

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	2	3	2	3
CO 2	2	3	2	3	3
CO 3	3	2	3	2	2
CO 4	2	3	3	3	2
CO 5	3	2	3	3	3
Ave.	2.6	2.4	2.8	2.6	2.6

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Recall factual information about multimedia systems, text, audio, and video tools.	PSO 1,PSO 2, PSO 3, PSO 4,PSO 5	K1
CO2	Implement algorithms for line-drawing, circle-generating, and ellipse-generating.	PSO 1,PSO 2, PSO 3, PSO 4,PSO 5	K4
CO3	Apply computer graphics techniques to solve problems in various domains such as entertainment, design, and engineering.	PSO 1,PSO 2, PSO 3, PSO 4,PSO 5	K3
CO4	Analyze and might compare different multimedia tools, evaluate their features and limitations, or analyze the impact of multimedia on communication and society.	PSO 1,PSO 2, PSO 3, PSO 4,PSO 5	K4
CO5	Creates Animation with special effects using algorithms	PSO 1,PSO 2, PSO 3, PSO 4,PSO 5	K5,K6

K1= Remember, K2= Understand, K3= Apply, K4=Analyze, K5= Evaluate, K6= Create

SOFT SKILLS	BATCH: 2024- 2025 ONWARDS
COURSE NAME: COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT SKILLS	COURSE CODE:
SEMESTER: I	MARKS:100
CREDITS: 2	TOTAL HOURS: 30

COURSE OBJECTIVE:

To build communication skills for personal and professional development.

COURSE OUTCOMES:

1. Students will demonstrate the ability to actively listen to others, understand diverse perspectives, and paraphrase key points accurately, enhancing their comprehension skills in various personal and professional contexts.
2. Students will be able to articulate thoughts, ideas, and information clearly and concisely, using appropriate language and structure to convey messages effectively in both written and verbal communication
3. Students will develop confidence in expressing opinions, asserting boundaries, and advocating for themselves and others, leading to enhanced self-assurance and effectiveness in interpersonal and group communication.
4. Students will learn to adapt their communication style and approach based on the audience, context, and purpose of communication, fostering flexibility and versatility in interacting with diverse individuals and groups.
5. Students will acquire techniques for resolving conflicts, managing disagreements, and negotiating mutually beneficial outcomes through effective communication strategies, promoting constructive problem-solving and collaboration in personal and professional settings.

UNIT I Types of Communication

(6 Hours)

Verbal Communication - Nonverbal Communication - Visual Communication - Written Communication - Interpersonal Communication - Group Communication - Mass Communication - Digital Communication- Barriers – Language- Cultural- Psychological- Semantic- Technological Barriers

UNIT II Etiquette & Ethical Practices in Communication

(6 Hours)

Active Listening - Respectful Language - Clarity and Conciseness – Truthfulness-Professionalism-Tone -Timeliness - Constructive Feedback - Confidentiality - Cultural Sensitivity - - Emotional Intelligence-Social Intelligence- Social Etiquettes-Accountability

UNIT III Self Actualization

(6 Hours)

SWOC Analysis- Self Regulation-Self Evaluation, Self-Monitoring, Self- Criticism, Self-Motivation, Self-awareness and Reflection:

UNIT IV Leadership and Teamwork**(6 Hours)**

Leadership Skills: Leadership styles- Goal-setting and decision-making- Motivation and influence-
Team Dynamics: Team building activities- Conflict resolution- Collaborative problem-solving

UNIT V Stress and Time Management**(6 Hours)**

Definition of Stress, Types of Stress, Symptoms of Stress, Stress coping ability, Stress Inoculation
Training, Time Management and Work-Life Balance: Self-discipline Goal-setting

RECOMMENDED TEXTBOOKS

1. Goleman, Daniel (2006) *Emotional Intelligence*, Bantam Books
2. Linden, Wolfgang (2004) *Stress Management- From Basic Science to Better Practice-*
University of British Columbia, Vancouver, Canada.
3. Hasson, Gill (2012) *Brilliant Communication Skills*. Great Britain: Pearson Education.
4. Monippally, Matthukutty, M. *Business Communication Strategies*. New Delhi: Tata McGraw-
Hill Publishing Company Ltd., 2001.
5. Raman, Meenakshi & Sangeetha Sharma (2011) *Communication Skills*, Oxford University Press.

REFERENCE BOOKS

1. N.Krishnaswamy *Current English for College* (1st Edition) - Trinity Press
2. Wood, Julia T (2015) *Interpersonal Communication: Everyday Encounters* 8th Edition, Cengage
Learning.

E-LEARNING RESOURCES

1. <http://www.albion.com/netiquette/corerules.html>
2. <http://www.englishdaily626.com/c-errors.php>
3. <https://www.helpguide.org/articles/relationships-communication/nonverbal-communication.htm>
4. <https://www.communicationtheory.org/verbal-vs-non-verbal-communication-with-examples/>
5. <https://letstalkscience.ca/educational-resources/backgrounders/digital-citizenship-ethics>
6. <https://www.switchboard.app/learn/article/teamwork-leadership-skills>

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
A	Answer any 5 out of 7 questions (answer in 50 words)	1-7	2	10
B	Answer any 4 out of 6 questions (answer in 300 words)	8-13	5	20
C	Answer any two(Internal (Choice)	14-15	10	20
	Internal & Viva Voce		50	50

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	2	2	----
II	2	1	1
III	1	1	1
IV	1	1	1
V	1	1	1
TOTAL	12	6	4
SECTION A - 12		SECTION B - 6	SECTION C - 4

SOFT SKILLS	BATCH: 2024-25 ONWARDS
COURSE NAME: INTERVIEW SKILLS AND RESUME WRITING	COURSE CODE:
SEMESTER: II	MARKS:100
CREDITS: 2	TOTAL HOURS: 30

COURSE OBJECTIVE:

To equip the students to acquire the relevant skills for better employability.

COURSE OUTCOMES:

1. Students will gain an overall understanding of the concept, the purpose, and the objectives of an interview
2. Students will become aware of the various types of interviews and the nuances of each one of them
3. Students will understand and equip themselves with the techniques and strategies required to ace an interview
4. Students will be able to draft a biodata /CV/Resume in the proper format
5. Students will embark on acquiring the relevant skills and will learn to leverage them effectively for better employability

UNIT I Introduction to Interview Skills

(6 Hours)

Definition- meaning- concept of interview –Purpose- Objectives of interview-Characteristic features of job interviews

UNIT II Types of Interview

(6 Hours)

Traditional one on one job interview- Panel interview- Behavioral interview-Group interview-Phone Interview- Preliminary Interview-Patterned Interview Depth Interview, Stress Interview, Exit Interview- Interview through tele and video conferencing

UNIT III Interviews: Techniques and Strategies

(6 Hours)

Preparing for the Interview Process- Before the interview-During the interview-After the interview -Tips to ace an interview -Commonly asked questions in interview -Do's and Don'ts of interview - Reasons for rejections

UNIT IV Preparing Biodata/CV/Resume

(6 Hours)

Essential characteristics of a job Application-Difference between Biodata- CV-Resume-covering letter-Tips to draft an application

UNIT V Leveraging Employability Skills

(6 Hours)

Personality Development-Organizational skills-Time Management–Stress Management-Effective Communication Skills -Reasoning Ability-Verbal Ability- Group Discussion-Technical skills - Presentation skills

RECOMMENDED TEXTBOOKS

1. Monipally, Matthukutty M. (2017) *Business Communication: From Principles to Practice*
2. Peter, Francis. (2012) *Soft Skills and Professional Communication*. New Delhi: Tata McGraw Hill.

REFERENCE BOOKS

1. Higgins, Jessica JD (2018) *10 Skills for Effective Business Communication: Practical Strategies from the World's Greatest Leaders*
2. Nicholas, Sonji (2023) *Interviewing: Preparation, Types, Techniques, and Questions*, Pressbooks
3. Storey, James (2016) *The Art of The Interview: The Perfect Answers to Every Interview Question*

E-LEARNING RESOURCES

1. <https://careermobilityoffice.cs.ny.gov/cmo/documents/Resume%20&%20Interviewing%20Handout.pdf>
2. <https://edu.gcfglobal.org/en/interviewingskills/interview-etiquette/1/>
3. <https://findjobhub.com/en/types-of-interviews>
4. <https://egyankosh.ac.in/bitstream/123456789/23411/1/Unit-2.pdf>
5. https://bharatskills.gov.in/pdf/E_Books/CTS/ES/English/ES_Part_1_62%20hour_English.pdf
6. https://bharatskills.gov.in/pdf/E_Books/CTS/ES/English/ES_Part2_58hour_English.pdf

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
A	Answer any 5 out of 7 questions (answer in 50 words)	1-7	2	10
B	Answer any 4 out of 6 questions (answer in 300 words)	8-13	5	20
C	Answer any two(Internal (Choice)	14-15	10	20
	Internal & Viva Voce		50	50

BREAK UP OF QUESTIONS

UNITS	SECTION A	SECTION B	SECTION C
I	2	2	----
II	2	1	1
III	1	1	1
IV	1	1	1
V	1	1	1
TOTAL	7	6	4
SECTION A – 7		SECTION B – 6	SECTION C - 4

PROGRAMME: COMMON TO ALL IT STUDENTS, B.Com., ISM, B.Com., CA	BATCH: 2024-2027
PART: IV	COURSE COMPONENT: SOFT SKILL - III
COURSE NAME: ADOBE UX FOUNDATION	COURSE CODE:
SEMESTER: III	MARKS: -
CREDITS: 2	TOTAL HOURS: 30
PRACTICAL	

COURSE OBJECTIVE:

Adobe UX Foundation involves outlining the key skills and knowledge that participants should acquire by the end of the course.

COURSE OUTCOMES:

1. Define and explain the core concepts and principles of user experience.
2. Understand the key features and functionalities of Adobe XD for designing and prototyping.
3. Apply user-centered design principles to create interfaces that prioritize user needs and preferences.
4. Implement interactive and dynamic prototypes to simulate user interactions.
5. Explore collaboration tools within Adobe XD to work efficiently in a team environment.

UNIT I:

(6 HOURS)

Introduction to User Experience Design: Define User Experience - User Experience Process – Seven Components of user Experience (UX) – Definition of a Good User Experience Design- Usability Heuristics-Examples of Good User Experience Design – Practical Activity.

UNIT II:

(6 HOURS)

User Experience Research: What is User Experience Research – Designing Adobe XD :User Research & Testing – What is Competitor User Experience Research – User Experience Personas & User Profiles – Other types of User Experience Research – Qualitative and Quantitative User Experience Research – Running Interviews and Observations for User Experience –Understanding User – Practical Activity

UNIT III:**(6 HOURS)**

Visual Design : Definition- Introduction to Atomic Design – Elements of any Visual design:Color & Shape – Imagery – Typography - Buttons – Composition of Visual Design Elements: structure & Grid – Hierarchy of Content – States.

UNIT IV:**(6 HOURS)**

User Experience Design Strategy: An Introductory guide to information architecture – Techniques & Best practice for developing an information architecture: Software Process – Examples of Information Architecture – Sitemap – Sitemap for website – Examples – Navigation & Hierarchy : Taxonomy & metadata – Examples- Practical Activity

UNIT V:**(6 HOURS)**

Mock up : Different types of Design Mock –Ups – User Persona,Scenarios & stories – Design Ideation & Sketching – Storyboarding User Experiences – Design Wireframes –Design prototyping & types of prototypes – Practical Activity.

PRESCRIBED BOOKS:

1. The Design of Everyday Things by Don Norman, The revised and expanded edition,2013.
2. Lean UX: Designing Great Products with Agile Teams by Jeff Gothelf and Josh Seiden, 2013.

REFERENCE BOOKS:

1. Don't Make Me Think by Steve Krug, 3rd edition, 2014
2. The Elements of User Experience by Jesse James Garrett, 2nd edition, 2010
3. Information Architecture: For the Web and Beyond" by Louis Rosenfeld, Peter Morville, and Jorge Arango, 4th edition,2015.
4. Sketching User Experiences: Getting the Design Right and the Right Design" by Bill Buxton, 1st edition,2007.
5. About Face: The Essentials of Interaction Design" by Alan Cooper, Robert Reimann, and David Cronin, 4th edition, 2015.

E-LEARNING RESOURCES:

1. <https://learn.futureskillsprime.in/journey/adobe-ux-foundation-learning-journey-this-free-of-cost>.
2. <https://userresearch.google.com/>
3. <https://www.interaction-design.org/literature/topics/visual-design>
4. <https://www.nngroup.com/articles/ux-strategy/>
5. <https://www.mockupworld.co/>

PSO – CO mapping

	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO 1	3	3	2	3	2
CO 2	3	3	2	2	2
CO 3	2	3	3	2	3
CO 4	3	2	2	3	2
CO 5	2	2	2	2	2
Ave.	2.6	2.6	2.2	2.4	2.2

PSO-CO-question paper mapping

CO No:	COURSE OUTCOME	PSOs ADDRESSED	COGNITIVE LEVEL (K1 to K6)
CO1	Define and explain the core concepts and principles of user experience.	PSO1,PSO2,PSO3, PSO4,PSO5	K1
CO2	Illustrate the key features and functionalities of Adobe XD for designing and prototyping.	PSO1,PSO2,PSO3, PSO4,PSO5	K2
CO3	Apply user-centered design principles to create interfaces that prioritize user needs and preferences.	PSO1,PSO2,PSO3, PSO4,PSO5	K3
CO4	Implement interactive and dynamic prototypes to simulate user interactions.	PSO1,PSO2,PSO3, PSO4,PSO5	K4
CO5	Explore collaboration tools within Adobe XD to work efficiently in a team environment.	PSO1,PSO2,PSO3, PSO4,PSO5	K5

K1= Remember, K2= Understand, K3= Apply, K4=Analyse, K5= Evaluate, K6= Create

PROGRAMME: ALL UG	BATCH: 2024 - 27
PART: IV	COURSE COMPONENT: SOFT SKILLS – IV
COURSE NAME: FOUNDATIONS OF QUANTITATIVE APTITUDE	COURSE CODE:
SEMESTER: IV	MARKS:100
CREDITS: 2	TOTAL HOURS: 30
THEORY AND PROBLEMS	

COURSE OBJECTIVE:

Develop learners' problem-solving skills and critical thinking abilities in the context of recruitment aptitude tests.

COURSE OUTCOME:

1. The learner will be able to recognize, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.
2. To learn about factors and multiples that numbers have in common with each other.
3. The student will analyse monthly profit and loss statements for a school store and calculate profit margin percentages.
4. Students learn what different types of interest are, where it occurs in real life and understand the concept of simple and compound interests.
5. The learner will draw, interpret and compare pie charts, bar charts and frequency diagrams.

UNIT I: Number system and Number series

(6 HOURS)

Numbers: Numbers and their classification, test for divisibility of numbers, General properties of divisibility, division and remainder, remainder rules.

Number Series: Number series, three steps to solve a problem on series, two-line number series, sum rules on natural numbers.

UNIT II: HCF and LCM of Numbers

(6 HOURS)

Factors, Multiples, Principle of Prime factorization, Highest Common Factor (HCF) and Least Common Multiple (LCM), Product of two numbers, Difference between HCF and LCM.

UNIT III: Percentage, Profit and Loss**(6 HOURS)**

Percentage: Introduction, fraction to rate percent, rate percent to fraction, rate percent of a number, express a given quantity as a percentage of another given quantity, convert a percentage into decimals and convert a decimal into percentage.

Profit and Loss: Gain/Loss and % gain and % loss, relation among Cost price, Sale price, Gain/Loss and % gain and % loss.

UNIT IV: Simple Interest and Compound Interest**(6 HOURS)**

Simple Interest: Definition, effect of change of P , R and T on Simple Interest, amount.

Compound Interest: Introduction, conversion period, basic formula, to find the Principal/Rate/Time, Difference between Simple Interest and Compound Interest.

UNIT V: Data interpretation**(6 HOURS)**

Tabulation, Bar Graphs, Pie Charts, Line Graphs, average.

PRESCRIBED BOOK:

1. Quantitative Aptitude by R.S. Agarwal

REFERENCE BOOKS:

1. Quantitative Aptitude by Abhijit Guha, Fourth Edition.
2. Quantitative Aptitude by Ramandeep Singh.

E - LEARNING RESOURCES:

1. <https://byjus.com/maths/numeralsystem/#:~:text=crore%20is%207.International%20Numerical%20System,8%20%E2%80%93%20Ones>
2. <https://byjus.com/maths/hcf-and-lcm/>
3. <https://byjus.com/maths/profit-loss-percentage/>
4. <https://www.vedantu.com/jee-main/maths-difference-between-simple-interest-and-compound-interest>
5. <https://sites.utexas.edu/sos/guided/descriptive/descriptivec/frequency/>

GUIDELINES TO THE QUESTION PAPER SETTERS

QUESTION PAPER PATTERN

SECTION	QUESTION COMPONENT	NUMBERS	MARKS	TOTAL
A	Multiple Choice Questions: Answer 20 out of 20 questions (each question carries one mark)	1 – 20	20	20
B	Answer any 5 out of 7 questions (each question carries 6 marks)	21 – 27	6	30
TOTAL MARKS				50

BREAK UP OF QUESTIONS FOR PROBLEMS

UNITS	SECTION A	SECTION B
I	4	1
II	4	1
III	4	1
IV	4	1
V	4	1
Any Unit	-	2
TOTAL	20	7

PROGRAMME: COMMON TO ALL	BATCH: 2024-2027
PART: IV	COURSE COMPONENT: SELF-STUDY
COURSE NAME: INDIAN HERITAGE AND KNOWLEDGE SYSTEM	COURSE CODE:
SEMESTER: III	MARKS:100
CREDITS: 2	TOTAL HOURS: SELF-STUDY
THEORY	

Course Description:

Delving into Indian Heritage, this course focuses on South Indian cultures and ancient knowledge like Yoga, Ayurveda, and Siddha, shaping the Nation's identity.

Course Objectives:

Analyzing Indian heritage's impact on national identity, South India's culture, and holistic traditions like Yoga, Ayurveda, Siddha, Jyotish, and Natya Shastra.

Course Outcomes:

- To develop a comprehensive understanding among students of Indian heritage, its richness and diversity, and its role in shaping the nation's cultural identity.
- Students will gain an enhanced insight into the artistic, architectural, and literary achievements of South India and other regions, fostering a sense of pride in Indian cultural heritage.
- To enhance students' cultural literacy by gaining insights into traditional practices preserved through folklore across India.
- To acquire knowledge among students of ancient Indian sciences for holistic well-being, promoting physical, mental, and spiritual health.
- Students will develop a deeper understanding of the interconnectedness of spiritual, medicinal, and artistic dimensions within Indian Heritage systems.

Course Structure:

Unit 1: Introduction to Indian Heritage

- **Concept of Heritage:** Definition, the importance of studying heritage, and its diverse forms.
- **Cultural Landscape of India:** Overview of major cultural zones in India, with a focus on South India.

Key Concepts: Cultural heritage, diversity, tangible heritage (e.g., monuments), intangible heritage (e.g., traditions, practices).

Unit 2: Cultural Tapestry of South India

- **Literature:** The classical Tamil literature of *Sangam poetry*, the epic Kannada works like the "*Kuvempu Ramayana*," the Telugu compositions of *Annamacharya*, and the poetic Malayalam works of Kerala's rich literary tradition.
- **Painting:** The intricate gold leaf work of *Tanjore painting*, the intricate patterns of *Mysore painting*, hand-painting or block-printing of *Kalamkari*.
- **Theatre:** The ancient art form of *Koothu* and the elaborate dance-dramas of *Bhagavata Mela* in Tamil Nadu, and the colourful folk theatre of *Yakshagana* in Karnataka.
- **UNESCO Indian Heritage Sites:** *Great Living Chola Temples* artistry, *Hampi-Virupaksha Temple* and the *Vijaya Vittala Temple*, *Mahabalipuram*- a treasure trove of Pallava art, *Mysore Palace*-Indo-Saracenic architecture, *Periyar National Park*- Western Ghats, *Kanchipuram*-City of Thousand Temples

Unit 3: Tamil Nadu Folklores

- **Origins and Significance:** Historical background of Tamil Nadu folklore and its cultural significance.
- **Folk Dances:** Exploration of traditional Tamil folk dances like *Karakattam*, *Kolattam*, and *Kummi*.

- **Folk Music: Overview of folk music traditions in Tamil Nadu, including *Parai Attam and Villu Paatu*.**
- **Rituals and Festivals: Understanding the role of folklore in Tamil Nadu's rituals and festivals- *Pongal and Jallikattu*.**

Key Concepts: **Karakattam, Kolattam, Parai Attam, Villu Paatu, Tamil folk tales, cultural rituals.**

Unit 4: Unveiling the Knowledge Systems

- **Cultural Landscape of India:** Overview of major cultural zones in India, with a focus on South India.
- **Yoga:** Exploring the various aspects of Yoga - its philosophy, Eight Limbs, practices (e.g., Asanas, Pranayama), and benefits for physical and mental well-being.
- **Ayurveda:** Understanding the core principles of Ayurveda - its focus on holistic health, diagnosis, and treatment methods.

Key Concepts: Yoga philosophy, Asanas, Pranayama, Tridosha theory (Ayurveda), Doshas (Vata, Pitta, Kapha), Panchakarma, herbal medicine, Ayurvedic lifestyle.

Unit 5: Siddha Tradition and Other Knowledge Systems

- **Siddha Tradition:** Origins, philosophy, medicinal practices, and spiritual aspects.
- **Other Important Knowledge Systems:** Jyotish Shastra (Indian astrology), Natya Shastra (Treatise on performing arts).

Key Concepts: Siddha literature, alchemy, and spirituality in Siddha tradition. Pancha Boothas (Siddha), herbal remedies, Planetary influences, elements of classical Indian dance and music, and aesthetics in Natya Shastra.

QUESTION PAPER PATTERN: MCQ

PROGRAMME: COMMON TO ALL	BATCH: 2024-2027
PART: IV	COURSE COMPONENT: SELF-STUDY
COURSE NAME: CONTEMPORARY WORLD AND SUSTAINABLE DEVELOPMENT	COURSE CODE:
SEMESTER: III	MARKS:100
CREDITS: 2	TOTAL HOURS: SELF-STUDY
THEORY	

Course Overview:

Delving into global dynamics, this course highlights Asia and India's pivotal role in achieving global sustainability objectives.

Course Objectives:

Exploring global challenges, Asian politics, conflict resolution, sustainability, and India's SDG efforts, with a focus on Tamil Nadu.

Course Outcomes:

- Students will gain a comprehensive understanding of the key actors, institutions, and dynamics shaping the contemporary world order.
- Students will acquire the ability to analyze the political, economic, and security challenges within major Asian regions, fostering informed perspectives on these critical issues.
- Through the study of recent wars, students will develop critical thinking skills to assess the root causes, human costs, and potential solutions to contemporary conflicts.
- Students will gain a deeper understanding of the principles and challenges of sustainable development, empowering them to advocate for responsible solutions at local, national, and international levels.
- Students will be equipped to critically evaluate India's contributions to the SDGs, particularly through specific programs implemented in Tamil Nadu, and assess their effectiveness in achieving sustainable development goals.

Course Structure:

Unit 1: Global Governance and Institutions

- **State & Non-State Actors:** Definition, types (nation-states, failed states), functions.
Key Actors: International states, Intergovernmental organizations (IGOs), nongovernmental organizations (NGOs), multinational corporations (MNCs).
- **United Nations (UN):** Structure, key organs (General Assembly, Security Council), functions, WB, & others.
Key Concepts: United Nations General Assembly, United Nations Security Council.
- **Regional Organizations:** European Union (EU), African Union (AU), North Atlantic Treaty Organization (NATO)
Key Concepts: European Union Commission, African Union Commission, North Atlantic Treaty Organization.
- **International Law and Treaties:** Significance, role in addressing global challenges.
Key Concepts: International Court of Justice, International Criminal Court, Geneva Conventions.

Unit 2: Contemporary Asia

Major Geographical Regions

- **Middle East:** Characterized by rich oil reserves, Complex political dynamics, and ongoing conflicts.
Key countries: Iran, Iraq, Israel, Saudi Arabia, Syria, Turkey
- **Southeast Asia:** Rapid economic growth, Challenges- maritime security and environmental degradation.
Key countries: Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam
- **Far East:** Major economic powerhouses and Potential flashpoints.
Key countries: China, Japan, North Korea, South Korea
- **Rise of China:** Political-South China Sea, Territorial disputes and Competition for Resources. Economic- China's Belt and Road Initiative (BRI)
- **Major Economic Centers:** **Singapore-** Global financial hub, **Hong Kong-** Special Administrative Region of China, **United Arab Emirates (UAE)-** Diversified economy driven by oil and gas, tourism, and trade.

Regional Organizations:

- Association of Southeast Asian Nations (ASEAN)
- South Asian Association for Regional Cooperation (SAARC)
- Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC)
- Asia-Pacific Economic Cooperation (APEC)
- Shanghai Cooperation Organization (SCO)

Unit 3: Recent Wars of the World

- **Syrian Civil War (2011-present):** Bashar al-Assad regime, Syrian opposition groups, ISIS.

Key Concepts: Origins of the conflict, humanitarian crisis, foreign intervention, refugee crisis.

- **Yemeni Civil War (2015-present):** Houthi rebels, Yemeni government, Saudi-led coalition.

Key Concepts: Proxy war dynamics, humanitarian crisis, role of Iran and Saudi Arabia, UN peace efforts.

- **Ukraine Conflict (2014-present):** Ukrainian government, Russian-backed separatists, Russia.

Key Concepts: Annexation of Crimea, Donbas region conflict, Minsk agreements, NATO-Russia tensions.

- **Ethiopia Civil War (2020-present):** Ethiopian government, Tigray People's Liberation Front (TPLF), Eritrean forces.

Key Concepts: Tigray conflict, humanitarian crisis, regional implications, efforts for ceasefire and peace talks.

- **Nagorno-Karabakh War (2020):** Armenia, Azerbaijan, Russia.

Key Concepts: Conflict over Nagorno-Karabakh region, ceasefire agreement, role of Turkey, peace negotiations.

- **Myanmar Civil War (2021-present):** Myanmar military (Tatmadaw), ethnic armed groups, and Civilian resistance.

Key Concepts: Coup aftermath, Rohingya crisis, ethnic conflicts, ASEAN mediation efforts.

Unit 4: Sustainable Development Goals

- **Definition of Sustainable Development:** Balancing economic, social, and environmental needs.

Key Concepts: United Nations Development Programme (UNDP), World Wildlife Fund (WWF), Sustainable Development Solutions Network (SDSN).

- **UN Sustainable Development Goals (SDGs):** Overview, targets.

Key Concepts: United Nations, national governments, NGOs, private sector.

- **Challenges and Opportunities:** Achieving sustainability, global cooperation.

Key Concepts: United Nations, national governments, civil society organizations, multinational corporations.

Unit 5: India's Role in Achieving Sustainable Development Goals (SDGs) with Tamil Nadu Initiatives

Addressing Basic Needs:

- **Goal 1: No Poverty**
 - National Rural Employment Guarantee Act (NREGA)
 - Kalaignar Kanchi Thalaiyalar Scheme
 - Ungal Thozhil Udhayanam (UTOY)
- **Goal 2: Zero Hunger**
 - National Food Security Act (NFSA)
 - Nutritious Noon Meal Programme
 - Annadhanam Scheme
 - Amma Unavagam
- **Goal 3: Good Health and Well-being**
 - National Health Mission (NHM)
 - Health Insurance of Tamil Nadu
 - Chief Minister's Comprehensive Health Insurance Scheme
 - Maruthuva Mitri
 - Amma Mini Clinics

Ensuring Essential Services:

- **Goal 4: Quality Education**
 - Sarva Shiksha Abhiyan (SSA)
 - Rashtriya Madhyamik Shiksha Abhiyan (RMSA)
 - Namakkal District Library Scheme
 - Pudhumai Penn Scheme under Higher Education Assurance Scheme (HEAS)
 - Free Coaching for Competitive Exams
- **Goal 6: Clean Water and Sanitation**
 - Swachh Bharat Mission (Clean India Mission)
 - National Rural Drinking Water Programme (NRDWP)
 - Jal Jeevan Mission Tamil Nadu
 - Namakku Naathey Scheme
 - Kudimaramathu Scheme

- **Goal 7: Affordable and Clean Energy**
 - National Solar Mission
 - Tamil Nadu Solar Energy Policy
 - Green House Scheme

Building Sustainable Communities:

- **Goal 11: Sustainable Cities and Communities**
 - Smart Cities Mission
 - Atal Mission for Rejuvenation and Urban Transformation (AMRUT)
 - Adi Dravidar Housing Scheme
- **Goal 13: Climate Action**
 - National Action Plan on Climate Change (NAPCC)
 - International Solar Alliance
 - Tamil Nadu Wind Energy Policy 2019
- **Goal 17: Partnerships for the Goals**
 - Development Assistance Programmes (DAPs)
 - International Development Cooperation (IDC)

QUESTION PAPER PATTERN: MCQ