

KONGUNADU ARTS AND SCIENCE COLLEGE
(AUTONOMOUS)
COIMBATORE – 641 029.



DEPARTMENT OF INFORMATION TECHNOLOGY

CURRICULUM AND SCHEME OF EXAMINATIONS (CBCS)

(2025 - 2026 onwards)

DEPARTMENT OF INFORMATION TECHNOLOGY

Vision:

- To achieve excellent standards of quality education by keeping pace with rapidly changing technologies.
- To create technical manpower of global standards with capabilities of accepting new challenges in Information Technology.
- Integral Formation and Empowerment of students for social transformation through Information Technology.

Mission:

- To provide outstanding education and training to our graduate students for their productive careers in industry, academia, and government.
- To impart quality and value-based education to raise satisfaction level of all stakeholders.
- To empower students with academic excellence, knowledge and training.
- To enable critical thinking among students towards development in IT with reference to social transformation.
- To apply new developments in Information Management and provide all possible support to promote research & development.
- To serve as a platform whereby the student enrich their personalities to assume greater responsibilities.

PROGRAMME OUTCOMES (PO)

- PO1** Enhance the skills and new computing technologies through practical and theoretical knowledge of computer science and software engineering.
- PO2** Practice communication, problem solving and decision-making skills through the use of appropriate technology and with the understanding of the business environment.
- PO3** Identify, design, and analyze complex computer systems and interpret the results from those systems
- PO4** Configure and administer database servers to support contemporary business environments.
- PO5** Apply the knowledge of mathematics, science and computing in the core information technologies.
- PO6** Analyze the impact of computing on individuals, organizations, and society, including ethical, legal, security, and global policy issues.
- PO7** Learn future technologies through acquired foundational skills and knowledge and employ them in new business environments.
- PO8** Pursue higher education or practice as computing professionals to contribute to the economic development of the region, state and nation.

PROGRAMME SPECIFIC OUTCOMES (PSO)

- PSO1** Apply the knowledge of computing and mathematics appropriate to the discipline.
- PSO2** Apply current techniques, skills, and tools necessary for computing practical and to integrate IT-based solutions into the user environment effectively.
- PSO3** Use design and development principles in the construction of software systems of varying complexity.
- PSO4** An ability to use knowledge in various domains to identify real-world problems and hence to provide solution to new ideas and innovations.
- PSO5** Design, document and develop robust applications by considering human, financial and environmental factors using cutting edge technologies to address individual and organizational needs.

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KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

COIMBATORE – 641 029

Programme Name : **B.Sc INFORMATION TECHNOLOGY [B.Sc IT]**

Curriculum and Scheme of Examination under CBCS

(Applicable to the students admitted during the Academic Year 2025-2026)

Semester	Part	Subject Code	Title of the Paper	Instruction hours/ cycle	Exam. Marks			Duration of Exam	Credits
					CIA	ESE	TOTAL		
I	I	25TML101	Language I @	6	25	75	100	3	3
	II	25ENG101	English-I	6	25	75	100	3	3
	III	25UIT101	Core Paper 1 – Computer Fundamentals and Programming in C	4	25	75	100	3	4
	III	25UIT1CL	Core Practical 1 – Programming Lab -PC Hardware and Programming in C	4	40	60	100	3	2
	III	25UIT1CM	Core Practical 2 Office Suits and Designing	2	40	60	100	3	1
	III	25UIT1A1	Allied Paper 1 - Mathematical Foundations for Computer Science	6	25	75	100	3	5
	IV	25EVS101	Environmental Studies**	2	-	50	50	3	2
	Total			30	-	-	650	-	20
II	I	25TML202	Language II@	6	25	75	100	3	3
	II	25ENG202	English –II	6	25	75	100	3	3
	III	25UIT202	Core Paper 2 – Data Structures using C++	5	25	75	100	3	4
	III	25UIT2CN	Core Practical 3 -Programming Lab- Data Structures using C++	5	40	60	100	3	3
	III	25UIT2A2	Allied Paper 2 – Operations Research	6	25	75	100	3	5
	IV	25VED201	Value Education- Moral and Ethics**	2	-	50	50	3	2
	Total			30	-	-	550	-	20
III	I	25TML303	Language III@	6	25	75	100	3	3
	II	25ENG303	English –III	6	25	75	100	3	3
	III	25UIT303	Core Paper 3 –Java Programming	4	25	75	100	3	5
	III	25UIT3CO	Core Practical 4 – Programming Lab - Java	4	40	60	100	3	3
	III	25UIT3A3	Allied Paper 3 - Digital Fundamentals, Architecture and Microprocessors	6	25	75	100	3	5
	IV	25UGC3S1	Skill Based Subject 1 -Cyber Security	2	100	-	100	3	3
	IV	25TBT301/ 25TAT301/ 25UHR3N1	Basic Tamil*/ Advanced Tamil**/Non-Major Elective 1**	2	-	75	75	3	2
	Total			30	-	-	675	-	24

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IV	I	25TML404	Language IV@	6	25	75	100	3	3
	II	25ENG404	English – IV	6	25	75	100	3	3
	III	25UIT404	Core Paper 4-.NET and RDBMS	4	25	75	100	3	5
	III	25UIT4CP	Core Practical 5 -Programming Lab- .NET and RDBMS	4	40	60	100	3	3
	III	25UIT4A4	Allied Paper 4 - Embedded and Real time systems	6	25	75	100	3	5
	IV	25UIT4SL	Skill Based Subject 2 – R Programming Lab	2	40	60	100	3	3
	IV	25TBT402/ 25TAT402/ 25UWR4N2	Basic Tamil*/Advanced Tamil** / Non-Major Elective2**	2	-	75	75	3	2
Total				30	-	-	675	-	24
V	III	25UIT505	Core Paper 5 – Python Programming	6	25	75	100	3	5
	III	25UIT506	Core Paper 6 – Operating System	5	25	75	100	3	4
	III	25UIT507	Core Paper 7 - Data Communication and Networks	6	25	75	100	3	5
	III	25UIT5CQ	Core Practical 6 -Programming Lab – Python	6	40	60	100	3	3
	III	25UIT5E1	Major Elective 1	5	25	75	100	3	5
	IV		EDC	2	100	-	100	3	3
	-	25UIT5IT	Internship Training****	Grade					
Total				30	-	-	600	-	25
VI	III	25UIT608	Core Paper 8 -Web Technology	6	25	75	100	3	5
	III	25UIT609	Core Paper 9 - Software Engineering and Testing	6	25	75	100	3	5
	III	25UIT6CR	Core Practical 7 -Programming Lab- Web Technology and Testing	6	40	60	100	3	3
	III	25UIT6E2	Major Elective 2	6	25	75	100	3	5
	III	25UIT6Z1	Project and Viva-Voce***	4 & &	20	80	100	3	5
	III	25UBI6S3	Skill Based Subject 3– Basics of IPR	2	100	-	100	3	3
	Total			30	-	-	600	-	26
V		25NCC \$ / NSS / YRC / PYE / ECC / RRC / WEC101#	Co curricular Activities*	-	50	-	50	-	1
Grand Total				-	-	-	3800	-	140

Note :

CBCS – Choice Based Credit system
CIA– Continuous Internal Assessment
ESE– End of Semester Examinations

\$ For those students who opt NCC under Cocurricular activities will be studying the prescribed syllabi of the UGC which will include Theory, Practical & Camp components. Such students who qualify the prescribed requirements will earn an additional 24 credits.

@ Hindi/Malayalam/ French/ Sanskrit – 25HIN/MLM/FRN/SAN101 - 404

* - No End-of-Semester Examinations. Only Continuous Internal Assessment (CIA)

** - No Continuous Internal Assessment (CIA). Only End-of-Semester Examinations (ESE)

*** Project Report – 60 marks; Viva voce – 20 marks; Internal-20 marks

&& 4 Hours allotted for project will not be allocated for staff workload.

**** The students shall undergo Internship training / field work for a minimum period of 14 working days at the end of the fourth semester during summer vacation and submit the report in the fifth semester which will be evaluated for 100 marks by the concerned guide and followed by an Internal Viva voce by the respective faculty or HOD as decided by the department. According to their marks, the grades will be awarded as given below:

Marks %	Grade
85 – 100	O
70 – 84	D
60 – 69	A
50 – 59	B
40 – 49	C
< 40	U (Reappear)

Major Elective Papers (2 papers are to be chosen from the following 8 papers)

1. Internet of Things
2. Mobile Computing
3. Cloud Computing
4. Data Mining
5. Artificial Intelligence
6. Big Data Analytics
7. Machine Learning
8. Network Security

Non-Major Elective Papers

1. Human Rights
2. Women's Rights
3. Consumer Affairs

Sub. Code & Title of the Extra Departmental Course (EDC) :

25UIT5XL: EDC - Advanced Excel Lab

List of Cocurricular Activities:

1. National Cadet Corps (NCC)
2. National Service Scheme (NSS)
3. Youth Red Cross (YRC)
4. Physical Education (PYE)
5. Eco Club (ECC)
6. Red Ribbon Club (RRC)
7. Women Empowerment Cell (WEC)

List of JOC:

- Mobile Application Development Lab
- Quantitative Aptitude
- Linux Lab
- Network Security and Management Lab

Note: In core/ allied subjects, no. of papers both theory and practical are included wherever applicable. However, the total credits and marks for core/allied subjects remain the same as stated below.

Tally Table:

S.No.	Part	Subject	Marks	Credits
1.	I	Language – Tamil/Hindi/Malayalam/ French/ Sanskrit	400	12
2.	II	English	400	12
3.	III	Core – Theory/Practical	1600	60
	III	Allied	400	20
		Electives/Project	300	15
4.	IV	Basic Tamil / Advanced Tamil (OR) Non-major electives	150	4
		Skill Based subject	300	9
		EDC	100	3
		Environmental Studies	50	2
		Value Education	50	2
5.	V	Cocurricular Activities	50	1
		Total	3800	140

- 25 % CIA is applicable to all subjects except JOC, COP and SWAYAM courses which are considered as extra credit courses.
- 100% CIA for Cyber Security and EDC and Basics of IPR.
- The students should complete **Health and Wellness Programme (25UHW401) ###** in the 4th semester and the completion marks should be submitted through the HOD to the Controller of Examinations. Extra credits will be given to the candidates who have successfully completed.

- The students should complete any **MOOC course available for Online learning platforms like SWAYAM, NPTEL, Course era^{\$\$}, IIT Bombay Spoken Tutorial, e-Pathshala etc.**, with a minimum of 4 weeks in duration before the completion of the 5th semester and the course completion certificate should be submitted through the HOD to the Controller of Examinations. Extra credits will be given to the candidates who have successfully completed.

\$\$Note: One course to be taken from course era for all the under graduate students of self-finance stream during the even semester of the I year. Appropriate extra credits and certification as applicable shall be awarded to the students who have completed the course.

- An **Onsite Training** preferably relevant to the course may be undertaken as per the discretion of the HOD.
- Students who successfully complete **Naan Mudhalvan** courses in 3rd and 5th semester will be given 2 extra credits for each course. They are asked to submit the marks to Controller of Examinations through and undersigned by the HOD.

Semester	Naan Mudhalvan Course Title
III	AWS Academy Introduction to Cloud: Semester 1
V	AWS Academy Introduction to Cloud: Semester 2

Components of Continuous Internal Assessment

Components		Marks	Total
Theory			
CIA I	75	(75+75 = 150/10) 15	25
CIA II	75		
Assignment/Seminar		5	
Attendance		5	
Practical			
CIA Practical		25	40
Observation Notebook		10	
Attendance		5	
Project			
Review		15	20
Regularity		5	

BLOOM'S TAXONOMY BASED ASSESSMENT PATTERN

K1-Remembering; **K2**-Understanding; **K3**-Applying; **K4**-Analyzing; **K5**-Evaluating

1. ESE Theory Examination:

(i) CIA I & II and ESE: 75 Marks

Knowledge Level	Section	Marks	Description	Total
K1 Q1 to 10	A (Answer all)	10 x 1 = 10	MCQ	75
K1 – K5 Q11 to 15	B (Either or pattern)	5 x 5 = 25	Short Answers	
K2 – K5 Q16 to 20	C (Either or pattern)	5 x 8 = 40	Descriptive / Detailed	

2. ESE Practical Examination:

Knowledge Level	Section	Marks	Total
K3	Experiments	50	60
K4		Record Work	
K5	10		

3. ESE Project Viva Voce:

Knowledge Level	Section	Marks	Total
K3	Project Report	60	80
K4		20	
K5	Viva voce		

Scheme of Evaluation - Health and Wellness Programme (25UHW401) ###

Part	Description	Mark
A	Report	40
B	Attendance	20
C	Activities (Observation during Practice)	40
TOTAL		100

Programme Code: 12	B.Sc. Information Technology			
Title of the paper: Core Paper 1 – Computer Fundamentals and Programming in C				
Batch	Hours / Week	Total Hours	Credits	Skill Development
2025 – 2028	4	60	4	

Course Objectives

1. To enable the students to know about the fundamentals of computer types of software and operating system.
2. To impart adequate knowledge on the need of programming languages and problem-solving techniques.
3. To develop an in-depth understanding of functional and logical concepts of C Programming.
4. To provide exposure to arrays, Structures and Union through C programming.
5. To familiarize with the File Input and Output operation using C Language.

Course Outcomes (CO)

K1 - K5	CO1	Remember various computer Hardware and Software programming constructs.
	CO2	Understand the fundamentals of C programming.
	CO3	Apply the right data representation formats based on arrays, structures and unions.
	CO4	Implementing decision making using branching and looping statement.
	CO5	Execute programs using pointers, structures and files.

Syllabus

Unit I

(13 Hours)

Fundamentals of Computers: Introduction – Generations of Computers - Classification of Computers-Basic Anatomy of a Computer System-Input Devices Processor- Output Devices-Memory Management – Types of Computer Software- Overview of Operating System- Programming Languages - Translator Programs-Problem Solving Techniques - Steps involved in problem solving - Algorithms - Flow Charts.

Unit II

(12 Hours)

Introduction - Basic Structure of C Program - Constants, Variables, Data Types - Operators and Expressions - Evaluation of Expressions - Operator Precedence and Associativity - Managing the Input and Output Operation - Formatted I/O.

Unit III**(12 Hours)**

Decision Making and Branching: Simple if Statement - if-else statement - elseif Ladder -Switch statement. - goto statements. Looping: while loop - do-while loop -for loop - Arrays: Introduction - One Dimensional Arrays - Two Dimensional Arrays- Multi-Dimensional Arrays - **Dynamic Arrays***.

Unit IV**(12 Hours)**

Strings - Introduction - Declaring and initializing the string variables - String handling functions. Functions - Introduction - Need for functions - Elements of User – Definition functions - Category of functions - Recursion - Passing arrays to functions. Pointers: Understanding Pointers - Accessing the address of a Variable - Declaration of pointer variables - Initialization of pointer variables Accessing variables through pointers - Pointers and arrays.

Unit V**(11 Hours)**

Structures - Introduction - Defining a structure - Declaring structure variables - Accessing structure member - Array of structures - Structure within structures -Unions. Files - Introduction - Defining and opening a File - Closing a file - Input / Output Operations on files - **Random Access to Files*** - Command Line Arguments.

*** Self-study and questions for examinations may be taken from the self-study portions also.**

Teaching Methods:

Smart Class Room/Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Books:

1. E Balagurusamy, “Computing Fundamentals And C Programming “, 2nd Edition, September 2018, McGraw Hill Education.
2. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publications, 2002.

Reference Books:

1. Henry Mullish & Huubert L.Cooper: The Spirit of C, Jaico Pub. House, 1996.
2. H. Schildt, 2000, C: The Complete Reference, 4th Edition, TMH.

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
C01	S	S	S	H	H
C02	H	H	S	S	S
C03	S	M	H	H	H
C04	S	M	S	H	S
C05	H	S	H	S	M

S – Strong**H** – High**M** – Medium**L** – Low

Programme Code: 12		B.Sc. Information Technology		
Title of the paper: Core Practical 1 – Programming Lab -PC Hardware and Programming in C				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	4	60	2	

Course Objectives

1. To introduce the different parts of Motherboard, study of ROM and Assembling the PC.
2. To develop an in-depth understanding of functional and logical concepts of C Programming.
3. To enhance the analyzing and problem-solving skills in programming using C features.

Course Outcomes (CO)

K1 to K5	CO1	Understand basic parts of Motherboard and Set-up CMOS and examine about assembling and disassembling the PC system.
	CO2	Apply Arithmetic operator, Conditional operator, logical operator, relational operators and other C constructs for developing programs.
	CO3	Develop C programs using decision making, branching, looping constructs.
	CO4	Develop programs using the Arrays, structures, functions, pointers and Strings
	CO5	Implement files and command line arguments.

LIST OF PRACTICAL PROGRAMS

1. Identify and studying the different parts of a mother board(List the various latest CPUs, MOTHERBOARDS, RAM, MONITER, HARDDISK available in the present market).
2. Study of ROM BIOS, Hardware configuration, the CMOS set-up and the effect of various parameters on the working of the system.
3. Exercise on disassembling and assembling of PC
4. Write a Program
 - (i) To convert temperature from degree Centigrade to Fahrenheit,
 - (ii) Find whether given number is Even or Odd,
 - (iii) Find the greatest of three numbers.
5. Write a Program to display Monday to Sunday using switch statement
6. Write a Program to display first Ten Natural Numbers and their sum.
7. Write a Program to perform Multiplication of Two Matrices.
8. Write a Program
 - (i) To find the maximum number in an Array using pointer.
 - (ii) To reverse a number using pointer.
 - (iii) To add two numbers using pointer.
9. Write a Program to solve Quadratic Equation using functions.
10. Write a Program to find factorial of a number using Recursion.
11. Write a Program to demonstrate Call by Value and Call by Reference.
12. Write a Program to create a file containing Student Details.

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3 Hours / 60 marks)

Record: 10 Marks

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	5	5
Program Coding	15	15
Execution & Modifications	5	5

Teaching Methods:

Presentation and Program Demonstration using Projector
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Mapping

<div>PSO</div> <div>CO</div>	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S
CO2	S	H	S	M	S
CO3	S	S	H	H	H
CO4	M	S	S	S	H
CO5	S	M	H	S	H

S – Strong

H – High

M – Medium **L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the paper : Core Practical 2 - Office Suits and Designing				
Batch	Hours/Week	Total Hours	Credits	Employability
2025 – 2028	2	30	1	

Course Objectives

1. To learn the basics of Microsoft Office Word, Excel, Power Point and MS Access.
2. To gain an insight of Gmail Basics.
3. To gain the Knowledge on Google Applications.
4. To learn the basics of Canva.

Course Outcomes (CO)

K1 to K5	CO1	Recollect the working of Microsoft word and Excel
	CO2	Apply the concepts of Microsoft power point and MS Access
	CO3	To learn the basics of Gmail and its various options available.
	CO4	Design with Google Applications like Google sides, sheets and classroom.
	CO5	Implement Canva Applications exploring their functionalities.

LIST OF PRACTICAL PROGRAMS

1. To create a newspaper document model with Multi columns, 200 words using Microsoft word.
2. To create a Mathematical equation paper using ANY five equations.
3. To create a flowchart using proper shapes like ellipse, arrows, rectangle and parallelogram.
4. To create a table using Table menu with Rows, Columns, Merge, Split, Table border and color and Text format.
5. Create a student mark table contains marks, total, average and result use formula for total and average. Use filter to find the name of the students who has secured highest and lowest marks.
6. Create a Sales table contains Items, Year1, Year2, Year3 and Year4. Draw the bar graph, line graph and pie charts to compare the sales of the three items for four years.
7. Create a presentation of 7 slides using power point to describe the facilities available to students in your college using clip-art, picture, audio and video and hide option.
8. Create a power point presentation of 5 slides describing the side effects of smoking using custom animations.
9. To Create a database student with table name mark_sheet with fields std_name, rollno, Mark1, Mark2, Mark3 and total and assign rollno as Primary key. The total must be calculated using Update query. Also, use Query for sorting the table in ascending and descending order.
10. Use the above table add additional field “result” and calculate the result for all the students.
11. Create an email account in Gmail. Using the account created compose a mail to invite other college students for your college fest, enclose the invitation as attachment and send the mail using cc and bcc options.

12. Create a meeting using Google calendar and share meeting id to the attendees. Transfer the ownership to the Manager once the meeting id is generated.
13. Create a Google form with minimum 10 questions to conduct a quiz and generate a certificate after submission.
14. Design a function Invitation & Certificate using Canva that communicates the necessary event details effectively.
15. Create a logo and brand identity for a business organization using Canva.

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3 Hours / 60 marks)

Record: 10 Marks

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	5	5
Program Coding	15	15
Execution & Modifications	5	5

Teaching Methods:

Presentation and Program Demonstration using Projector
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Mapping

<div>PSO</div> <div>CO \</div>	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S
CO2	S	H	S	M	S
CO3	S	S	H	H	H
CO4	M	S	S	S	H
CO5	S	M	H	S	H

S – Strong

H – High

M – Medium **L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Core Paper 2 – Data Structures using C++				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	5	75	4	

Course Objectives

1. To develop a greater understanding of concepts of Object-Oriented Programming paradigms.
2. To impart adequate knowledge on the need of object-oriented programming languages.
3. To understand the concepts of Data Structures

Course Outcomes (CO)

K1 to K5	CO1	Remember the characteristics of Object-Oriented Programming Languages.
	CO2	Understand the fundamentals of C++ programming structure, function overloading and constructors.
	CO3	Examine different C++ features such as composition of objects, Operator Overloading, inheritance, files and Exceptions.
	CO4	Analyze the efficiency of Stack, Queue and Lists
	CO5	Evaluate the usage of Sorting, Searching and Tree Techniques.

Syllabus

Unit I (15 Hours)

Principles of Object-Oriented Programming: Object Oriented Programming Paradigm - Basic Concepts of OOPS-OOP Languages- A simple C++ program - structure of C++ program. Tokens, keywords, identifiers and constants, Basic datatypes – User-Defined Data Types- Derived Data types - Symbolic constants, variables, reference variables – Operators in C++ - Scope resolution operators – Type cast operators – Manipulators. **Control Structures*** - Functions in C++: Main function, Function prototyping- call by reference, return by reference, inline functions-Default arguments – function overloading.

Unit II (15 Hours)

Classes and objects: Specifying a class, defining member functions, arrays within a class, static data members and member functions, arrays of objects, Objects as function arguments – friend functions - returning objects. Constructors and Destructors - Constructors, parameterized constructors, multiple constructors in a class, copy constructor, dynamic constructors- destructors. Operator overloading and type conversions: Defining Operator Overloading - Overloading unary and binary operators, overloading binary using friends, rules of overloading.

Unit III**(15 Hours)**

Inheritance - Introduction, defining derived classes, Types of inheritance: Single inheritance – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance. - Virtual Base classes- Pointers, Virtual Functions and Polymorphism: Pointers, pointers to objects, this pointer, pointers to derived classes, virtual functions. Templates: Class templates, Function templates. Exception handling: Basics, Throwing and catching mechanisms, re throwing an exception.

Unit IV**(15 Hours)**

Data Structure: Introduction - The List Abstract Data Type – Linked Lists – Types of Linked Lists. Stacks and Queues: Stacks – Representation of Stacks using Arrays – Representation of Stacks using Linked Lists – Evaluation of Arithmetic Expressions – Queues – Types of Queues.

Unit V**(15 Hours)**

Sorting and Searching: Introduction – Bubble Sort – Insertion Sort – Quick Sort - **Sequential Search*** – Binary Search. Graphs: Introduction - Graph Representation and its Operations. Trees: Trees - Binary Trees – Representation of Binary Trees.

***-Self-study and questions for examinations may be taken from the self-study portions also.**

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Book:

1. Object oriented Programming with C++ -E Balaguruswamy, TMH publications, 7th Edition,2018
2. Data structures, Algorithms, and applications in C++ - Sartaj Sahni, McGraw Hill.2000.
3. J. John Manoj Kumar and P. Sudharsan (2007), Data Structures Using C, Second Edition, RBA Publications.

Reference Books:

1. Robert Lafore, Object oriented Programming with turbo C++, GALGOTIA Publications, 2007.
2. Data Structures using C++, D.S. Malik , India edition, Thomson, 2006.
3. Alfred V. Aho , Jeffrey D. Ullman, John E. Hopcroft (2012), Data Structures and Algorithms, Ninth Edition , Pearson Publication.

Mapping

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	H	M	S	S
CO3	S	H	H	S	H
CO4	S	M	S	H	M
CO5	S	M	S	H	M

S – Strong**H** – High**M** – Medium**L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Core Practical 3-Programming Lab- Data Structures using C++				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	5	75	3	

Course Objectives

1. To develop programs to understand and apply Object oriented features and OOPs concepts in C++.
2. To apply the concept of polymorphism and inheritance.
3. To enhance problem solving and programming skills in C++ by implementing the Concepts of Data Structures.

Course Outcomes (CO)

K3 to K5	CO1	Implement the concepts of object-oriented programming.
	CO2	Apply string functions to perform operator overloading.
	CO3	Analyze virtual functions and inheritance.
	CO4	Design and implement Stack and Queue operations in C++
	CO5	Evaluate the implementation of Data structure sorting and searching operations.

LIST OF PRACTICAL PROGRAMS

1. Write a C++ Program to check whether the given number is Armstrong or not.
2. Write a C++ Program to print the length of a string provided.
3. Write a C++ program to demonstrate the use of class and object.
4. Write a C++ program to demonstrate the use of Constructors and destructors in a class.
5. Write a C++ program to throw exception when entered marks are less than 0 or greater than 100.
6. Write a C++ program to get and print student data using Inheritance.
7. Write a C++ program to overload a sum function.
8. Write a C++ program that copy contents of one file to another file.
9. Write a C++ program to implement stack using Arrays.
10. Write a C++ program to implement Linked list.
11. Write a C++ program to search an element in the array using binary search.
12. Write a C++ program to sort an array using quick sort.

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3 Hours / 60 marks)

Record: 10 Marks

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	5	5
Program Coding	15	15
Execution & Modifications	5	5

Teaching Methods:

Presentation and Program Demonstration using Projector
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Mapping

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	S
CO2	S	M	H	S	S
CO3	M	H	H	H	H
CO4	S	S	H	S	H
CO5	S	H	S	M	S

S – Strong

H – High

M – Medium

L – Low

Programme Code: 12		B.Sc. Information Technology		
Title of the Paper: Core Paper 3–Java Programming				
Batch	Hours/Week	Total Hours	Credits	Employability
2025 – 2028	4	60	5	

Course Objectives

1. To learn the basic features of Java Programming.
2. To gain the knowledge about the concepts of Packages, Inheritance, Interfaces and Multithreading.
3. To develop the ability to create and run java programs using Applets, AWT, Swing and Connectivity.

Course Outcomes (CO)

K1 - K5	CO1	Remember the keywords, data types and Control Structures in Java.
	CO2	Understand the concept of Creating Classes, Functions and Objects.
	CO3	Apply the concepts of Packages, Inheritance, Exception Handling and Applet.
	CO4	Analyze the concepts of Files and AWT Controls.
	CO5	Evaluate the usage of Swings and JDBC in Java Applications

Syllabus

Unit I

(12 Hours)

Fundamentals of Object-Oriented Programming: Basic Concepts of Oops. JAVA Evolution: History – Features – How Java differs from C and C++ – Java and Internet- Java and WWW. Overview of Java Language: Introduction – Simple Java program – Structure – Java tokens – Statements.

Unit II

(12 Hours)

Constants, Variables and Data Types: Constants – Variables – Data types – **Operators and expressions***-Decision Making and Branching: Simple If Statement, The IF...Else statement, The Else... If ladder, The Switch Statement, The ? : Operator, Decision making and looping: The While statement, The do Statement- The for Statement – Jumps in loops – labeled loops – Classes, Objects and Methods.

Unit III

(12 Hours)

Arrays- Strings- Interfaces- Multiple Inheritance – Packages: Putting classes Together – Multi-Threaded Programming-Managing Errors and Exceptions-Applet Programming – Graphics Programming.

Unit IV**(12 Hours)**

Managing I/O Files in Java: Introduction – Concept of Streams – Stream Classes-Using the File Class-Creation of Files-**Reading/Writing Characters***-Random Access Files. Using AWT Controls: Control Fundamentals-Labels-Buttons – Checkboxes – Checkbox Group-Choice Control – List – Scrollbars-Text Field –Text Area– Menu Bar and Menus. Event Handling-Action Event–Key Event-Mouse Event – Mouse Wheel Event-Item Event.

Unit V**(12 Hours)**

Swing: JApplet-Text Field-Buttons-Checkboxes–Radio Buttons – Combo Boxes- tabbed panes-Scroll Panes-Trees. Talking to Database-What does JDBC do? JDBC versus ODBC and Other APIs. Two-tier & three-tier Models-The JDBC Package-Types of JDBC Drivers-Java Soft Framework-Driver Interface and Driver Manager Class-The Essential JDBC Program.

*** - Self Study and questions for examinations may be taken from the self-study portions also.**

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Books:

1. E. Balagurusamy, (2015), Programming with Java – A primer Tata McGraw Hill, 5th Edition. (Unit I, II, III, IV).
2. Stevan Holzner (2008), Java 2 Programming Black Book, Dream Tech Press, New Edition. (Unit IV, V).

Reference Books:

1. Instructional Software Research and Development (ISRD) Group, (2007), Introduction to Object Oriented Programming Through Java, Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. C.Muthu, 2008, Programming with Java, Tata McGraw Hill, Second Edition.
3. Herbert Schildt, (2018), The Complete Reference Java 2, 10th Edition, TATA McGraw Hill.

Mapping

PSO \ CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	S	S	M	S
CO2	S	M	S	S	H
CO3	H	S	M	S	M
CO4	S	S	H	M	H
CO5	H	S	H	M	S

S – Strong H – High M – Medium L – Low

Programme Code: 12		B.Sc. Information Technology		
Title of the Paper: Core Practical 4– Programming Lab - Java				
Batch	Hours/Week	Total Hours	Credits	Employability
2025 – 2028	4	60	3	

Course Objectives

1. To develop the ability to build web-based applications using applets and AWT.
2. To implement the concept of event handling.
3. To apply the concepts of Multithreading, Inheritance and Packages, Swing and Connectivity.

Course Outcomes (CO)

K3 to K5	CO1	Recollect the concepts of control structures, inheritance in Java
	CO2	Implement the concept of interface, packages, multithreading, applets.
	CO3	Apply event handling mechanisms and AWT Controls.
	CO4	Develop the programs using file concept and swings.
	CO5	Access database through Java programs, using Java Data Base Connectivity (JDBC)

LIST OF PRACTICAL PROGRAMS

1. Write a program for Multithreading.
2. Write a program for preparing mark list using Inheritance.
3. Write a program for Multiple Inheritance.
4. Write a program for creating your own Package.
5. Create an applet program to generate a human face.
6. Write a Java Program to demonstrate the Multiple Selection List- Box.
7. Create an applet containing three buttons labeled red, green and blue, change the background color of the applet based on the button pressed.
8. Develop a Java program to perform Mouse Event operations
9. Develop a Java program to create a Menu Bar and Pulldown Menus using Frames.
10. Write a Java Program which open an existing file and append text to that file.
11. Write a program to implement Tree viewer using Swings.
12. Write a Java program to display the Employee Details using Database Connectivity.

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3 Hours / 60 marks)

Record: 10 Marks

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	5	5
Program Coding	15	15
Execution & Modifications	5	5

Teaching Methods:

Presentation and Program Demonstration using Projector
--

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	S	S	M	S
CO2	S	H	M	H	S
CO3	S	M	H	H	S
CO4	M	S	S	H	S
CO5	S	S	H	S	S

S – Strong

H – High

M – Medium

L – Low

Programme Code: 12		B.Sc. Information Technology		
Title of the Paper: Allied Paper 3 – Digital Fundamentals, Architecture and Microprocessors				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	6	90	5	

Course Objectives

1. To know the different types of Number System
2. To gain knowledge about Digital Arithmetic and Logic Circuits.
3. To understand about the Combination circuit and Input Output Organization.
4. To understand various types of Microprocessor Architecture.
5. To Analyze the Parallel and serial Interfacing.

Course Outcomes (CO)

K1 - K5	CO1	Understand the basics of digital systems and computing
	CO2	Apply the basics in digital circuits
	CO3	Develop the various electronic circuits.
	CO4	Understand the architecture and functionalities of 8085 Microprocessor.
	CO5	Demonstrate an application or a working environment with Parallel and Serial Interfacing.

Syllabus

Unit I (18 Hours)

Number Systems and Logic Gates: Number systems - Octal and Hexadecimal Number –Decimal Representation – Alphanumeric Representation - Complements. Codes: Grey Code – Error Detecting and Correcting Codes. **Introduction to Computer Logic: Boolean Algebra and Logic Gates[&]** - Map Simplification.

Unit II (18 Hours)

Combinational Circuits - Half Adders - Full Adder- Flip Flop – SR Flip Flop – D Flip Flop – JK Flip Flop – T Flip Flop – Decoder – Multiplexers – Register – Shift Register – Binary Counter – Input –Output Organization – **I/O Interface*** – Asynchronous Data transfer - DMA.

Unit III (18 Hours)

Input – Output Processor (IOP) – Bus Standards - Memory Organization – Memory Hierarchy – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory.

Unit IV**(18 Hours)**

8085 Microprocessor: Introduction - Block Diagram - Pin Diagram - 8085 Architecture, bus organization. Instruction Format - Instruction Set - Addressing Modes. Programming the 8085: Arithmetic and Logical Programs.

Unit V**(18 Hours)**

Parallel and Serial Interfacing: 8255A Programmable Peripheral Interfacing: Block Diagram, Pin Diagram, Modes of Operation: VO and BSR. 8085 Intel 8255 - Architecture of Programmable Interrupt Controller 8259 - Architecture of 8254 Programmable Interval Timer / Counter. **Direct Memory Access - 8237 DMA Controller***. ADC Interfacing -DAC Interfacing.

*** Self-study and questions for examinations may be taken from the self-study portions also.**

& Indian Knowledge System concepts

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Book:

1. Morris Mano (2022), Computer System Architecture, 3rd Edition, Pearson Education. (Unit- I, II, III)
2. Salivahanan S, Arivazhagan (2012), Digital Circuits and Design, 3rd Edition, McGraw Hill Education.
3. Ramesh Gaonkar (2019), M microprocessor Architecture, Programming and Application with the 8086, Edition, Pearson International Publishing.
(Unit –IV & V)

Reference Books:

1. V K Puri (2017), Digital Electronics: Circuits and Systems, McGraw Hill Education.
2. Badri Ram (2012) Advanced Microprocessor and Interfacing, McGraw Hill Education.

Mapping

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	S	H	S
CO2	S	H	S	S	S
CO3	S	M	H	H	H
CO4	S	H	S	S	M
CO5	H	S	H	S	M

S – Strong**H** – High**M** – Medium**L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Core Paper 5 - .NET and RDBMS				
Batch	Hours / Week	Total Hours	Credits	Employability
2025– 2026	4	60	5	

Course Objectives

1. To understand the .Net Framework components.
2. To integrate variables and functions in developing .Net applications.
3. To learn the basic concepts of Database.
4. To understand the concepts of DDL, DML and PL/SQL .

Course Outcomes (CO)

K1 - K5	CO1	Understand the properties and methods of the various tools.
	CO2	Apply the concept of .NET in developing windows applications.
	CO3	Understand and construct database using Structured Query Language (SQL) in Oracle9i environment.
	CO4	Remembering the concept of Database.
	CO5	Learn basics of PL/SQL and develop programs using Triggers, Exceptions, Procedures and Functions.

Syllabus

Unit I (12 Hours)

Essential Visual Basic .NET: The VB.Net IDE - The Visual Basic Language: Operators - Conditionals and Loops - Procedures, Scope and Exception Handling.

Unit II (12 Hours)

Windows Forms: Windows MDI Forms - Adding Controls to Forms - Handling Events – Window Forms: Textboxes, Rich Text boxes, Labels – Window Forms: Buttons, Check boxes, Radio buttons, Panels and Group boxes. Windows Forms - List boxes, **checked list box***, Combo boxes, Picture boxes, Scroll bars, Splitters, Track Bars, Pickers, Notify Icons, Tool tips and Timers.

Unit III (12 Hours)

Window Forms : Menus - Built in Dialog Boxes - Image Lists, Trees and List Views, Toolbars, Status and Progress Bars and Tab Controls. Data Access with ADO.NET: What is database? – Accessing Data with Server Explorer- Working with ADO.NET – Overview of ADO.NET Objects.

Unit IV (12 Hours)

Database Concepts: A Relational approach: Database – Relationships – DBMS – Relational Database Model. Database Design: Data Modeling and Normalization: Data Modeling – Dependency -Normal forms - Dependency Diagrams – Denormalization. Oracle9i an introduction SQL*Plus Environment.

Oracle Tables. DDL: Naming Rules and Conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table. Working with Table: Data Management and Retrieval: DML – Adding a new Row/Record– Updating and Deleting an Existing Rows/Records – retrieving Data from Table – **Arithmetic Operations** * – Restricting Data with WHERE clause – Sorting – DEFINE command – CASE structure.

Unit V**(12 Hours)**

Functions and Grouping: Built-in functions – Grouping Data. Multiple Tables: Joins and Set Operations: Join Set operations. PL/SQL: A Programming Language: Fundamentals – Block Structure – Data Types - Declaration – Control Structures - PL/SQL Cursors and Exceptions: Implicit & Explicit cursor – Exceptions – Type of Exceptions. - PL/SQL Named Blocks: Procedures – Functions – Triggers.

*** - Self Study and questions for examinations may be taken from the self-study portions also.**

Teaching Methods:

Smart Class Room/Power point presentation/Seminar/Quiz/Discussion/Flipped Class/peer Learning/Experiential Learning/Blended learning

Text Books:

1. Steven Holzner, (2008), Visual Basic.NET Black Book, First Edition, Dream Tech Publication.
2. Database Systems using Oracle, Nilesh Shah, 2nd edition, PHI

Reference Books:

1. Evangelos Petroustes, (2002), **Mastering Visual Basic.NET**, First Edition, BPB Publications.
2. Jeffrey Kenf (2002), **VB.Net –A Beginners Guide**, Mc Graw Hill, OS Borne.

Mapping

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	M	H	M
CO2	H	M	S	H	S
CO3	S	S	M	H	S
CO4	S	H	H	M	H
CO5	S	H	S	M	S

S – Strong**H** – High**M** – Medium**L** – Low

Programme Code: 12		B.Sc. Information Technology		
Title of the Paper: Core Practical 5 – Programming Lab – .NET and RDBMS				
Batch	Hours/Week	Total Hours	Credits	Employability
2025 – 2028	4	60	3	

Course Objectives

1. To become familiar with the tools and operations of VB.Net
2. To get a simple understanding of windows- based programming.
3. To design and build database systems and demonstrate their competence.
4. To gain knowledge in developing real time applications.

Course Outcomes (CO)

K3 to K5	CO1	Design and develop the event- driven applications using .NET Framework.
	CO2	Understand the concepts of .NET and Learn the advantages of Controls in .NET
	CO3	Understand and construct database using Structured Query Language (SQL) in Oracle9i environment.
	CO4	Remembering the concept of Database.
	CO5	Learn basics of PL/SQL and develop programs using Cursors, Exceptions, Procedures and Function

LIST OF PRACTICAL PROGRAMS

.NET

1. Write a program for various font applications.
2. Write a program to simulate a simple calculator.
3. Write a program to simulate a digital clock with reset option.
4. Write a program for a notepad application.
5. Write a program to maintain Student details using ADO.NET.

ORACLE

1. Write queries for the following
 - Create a table **STUDENT** with required fields and insert values to it(use constraints while creating).
 - Alter table student to add a new column.
 - Display only distinct mark from the Student table.
 - Apply WHERE clause to retrieve specific data.
2. Create an **EMPLOYEE** and **DEPARTMENT** tables and perform JOIN operations.
3. Create a table **FACULTY** and perform sorting and group functions.
4. Create a table **HOTEL** and perform built-in functions.
5. Create a table **LIBRARY** and perform set operations.
6. Write a PL/SQL program to implement the concept of Triggers.
7. Write a PL/SQL program to implement the concept Procedures.

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3 Hours / 60 marks)

Record: 10 Marks

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	5	5
Program Coding	15	15
Execution & Modifications	5	5

Teaching Methods:

Presentation and Program Demonstration using Projector
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Mapping

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	M	S	H
CO2	S	H	H	H	H
CO3	S	H	M	M	M
CO4	M	H	M	S	M
CO5	S	H	S	M	S

S – Strong

H – High

M – Medium **L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Allied Paper 4 – Embedded and Real time systems				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	6	90	5	

Course Objectives

1. To teach the architecture and instruction set of different Microprocessors.
2. To learn the architecture of ARM, and embedded programs.
3. To understand the architectures of Real Time systems.

Course Outcomes (CO)

K1 to K5	CO1	Remember the Embedded system design process and ARM Processor.
	CO2	Understand the Bus-Based Computer Systems.
	CO3	Study about software performance optimization
	CO4	Analyze the Processes of Real time Operating Systems and multiprocessors.
	CO5	Evaluate the usage of networks and design techniques.

Syllabus

Unit I

(18 Hours)

Embedded Computing: Complex systems and microprocessors– Embedded system design process –Formalism for systems Design - Model train controller – Instruction Set: Computer Architecture taxonomy -Assembly language - ARM Processor - TI C55x DSP - Processor and Memory Organization- Addressing Modes - Data Operations - Flow of Control- C Coding Guidelines.

Unit II

(18 Hours)

CPUs - Programming Input and Output - Supervisor Mode, Exceptions, and Traps -Co-Processors - Memory System Mechanisms - CPU Performance - CPU Power Consumption - Design Example: Data Compressor - Bus-Based Computer Systems - The CPU Bus - Memory Devices -I/O devices - Component Interfacing - Designing with Microprocessors - Development and Debugging - System-Level Performance Analysis -Design Example: Alarm Clock.

Unit III

(18 Hours)

Program Design and Analysis: Components for embedded programs- Models of programs- Assembly, linking and loading – compilation techniques- Program Optimization – Program level performance analysis – Software performance optimization– Program level energy and power analysis and optimization – Analysis and optimization of program size- **Program validation and testing*.**

Unit IV**(18 Hours)**

Real Time Systems: Structure of a Real Time System — Estimating program run times – Task Assignment and Scheduling – Fault Tolerance Techniques – Reliability, Evaluation – Clock Synchronization.

Unit V**(18 Hours)**

Processes And Operating Systems: Introduction – Multiple tasks and multiple processes – Multirate systems- Preemptive realtime operating systems- Priority based scheduling- Interprocess communication mechanisms – Evaluating operating system performance- power optimization strategies for processes – Example Real time operating systems-POSIX-Windows CE. – System Design Techniques: Design Methodologies - Requirements Analysis- Specifications - **System Analysis and Architecture Design*** - Quality Assurance.

***- Self Study and questions for examinations may be taken from the self-study portions also.**

Teaching Methods:

Smart Class Room/Power point presentation/Seminar/Quiz/Discussion/Flipped Class/peer Learning/Experiential Learning/Blended learning

Text Books:

1. Marilyn Wolf, “Computers as Components - Principles of Embedded Computing System Design”, Third Edition “Morgan Kaufmann Publisher (An imprint from Elsevier), 2012. (UNIT I, II, III, V)
2. Jane W.S.Liu,” Real Time Systems”, Pearson Education, Third Indian Reprint, 2003.(UNIT IV)

Reference Books:

1. Lyla B.Das, “Embedded Systems : An Integrated Approach” Pearson Education, 2013.
2. Jonathan W.Valvano, “Embedded Microcomputer Systems Real Time Interfacing”, Third Edition Cengage Learning, 2012.
3. David. E. Simon, “An Embedded Software Primer”, 1st Edition, Fifth Impression, Addison-Wesley Professional, 2007.
4. Raymond J.A. Buhr, Donald L.Bailey, “An Introduction to Real-Time Systems- From Design to Networking with C/C++”, Prentice Hall, 1999.
5. C.M. Krishna, Kang G. Shin, “Real-Time Systems”, International Editions, Mc Graw Hill 1997
6. K.V.K.K.Prasad, “Embedded Real-Time Systems: Concepts, Design & Programming”, Dream Tech Press, 2005.
7. Sriram V Iyer, Pankaj Gupta, “Embedded Real Time Systems Programming”, Tata Mc Graw Hill, 2004.

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	H	S	M
CO2	H	S	H	S	H
CO3	S	H	S	H	S
CO4	H	S	S	H	H
CO5	S	S	H	H	H

S – Strong **H** – High **M** – Medium **L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Core Paper 5 – Python Programming				
Batch	Hours/Week	Total Hours	Credits	Employability
2025 – 2028	6	90	5	

Course Objectives

1. To acquire programming skills in core Python and to learn and understand Python
2. To Learn core Python scripting elements such as variables and flow control structures
3. To gain an insight of developing dynamic webpage by using CSS and DHTML.
4. To use Python data structures, lists, tuples, dictionaries.
5. To Learn Basics of Numpy and Pandas.

Course Outcomes (CO)

K1 to K5	CO1	Develop algorithmic solutions to simple computational problems and Read write, execute by hand simple Python programs.
	CO2	Structure simple Python programs for solving problems.
	CO3	Represent compound data using Python lists, tuples, dictionaries and Sets.
	CO4	Read and write data from/to files in Python Programs
	CO5	Introduction to Numpy and Pandas.

Syllabus

Unit I

(15 Hours)

Introduction to Python: Python Overview - Comments - Python Identifiers – Reserved Keywords- Variables - Standard data types - Operators - Statement and expressions –String Operations - Boolean Expressions - Control statements- Iteration – While statement. Functions – Buid-in Functions – User Defined Functions – Parameters and Arguments – Function calls – Return Statement – **Python Recursive Functions***.

Unit II

(15 Hours)

Strings: Strings- Compound Data Type – len function – string slices – Strings are Immutable – String Traversal – Escape Characters- String Formatting Operator, Formatting Functions. Lists, Set, Tuples and Dictionaries.

Unit III

(15 Hours)

Files and Exceptions: Text Files, Directories, Exceptions, Exception with Arguments – User-Defined Exceptions. Classes and Objects: Overview of OOP, Class Definition, Creating Objects, Objects as Arguments, Objects as Return values, Inheritance, Method Overriding, Data Encapsulation, Data Hiding.

Unit IV**(15 Hours)**

Introduction to Numpy: Basics of NumPy Arrays - Computation on NumPy Arrays - Aggregations - Computation on Arrays - Comparisons, Masks and Boolean Logic – Fancy Indexing - Sorting Arrays. Structured Data: NumPy's Structured Arrays.

Unit V**(15 Hours)**

Data Manipulation with Pandas: Introduction Pandas Objects – Data Indexing and Selection - Operating on Data in Pandas - Handling Missing Data - Hierarchical Indexing - Combining Data Sets – Aggregation and Grouping. Visualization with Matplotlib : Basic functions of Matplotlib - Simple Line Plot, **Scatter Plot*** – Visualizing Errors - Density and Contour Plots - Histograms, Binnings and Density.

*- Self Study and questions for examinations may be taken from the self-study portions also.

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Books:

1. E Balagurusamy, Problem Solving and Python Programming, McGraw Hill Education (India) Private Limited, 2018..
2. Jake VanderPlas , Python Data Science Handbook - Essential Tools for working with Data, O'Reilly Media, Inc, 2016.
3. T.R. Padmanabhan, Programming with Python, Springer Publications, 2016. Reference

Reference Books:

1. Mark Lutz , Programming Python, 4 th Edition (2010) , O'Reilly Media.
2. David Beazley and Brian K. Jones Python Cookbook, 3rd Edition: Recipes for Mastering Python 3, O'Reilly Atlas (2013)
3. Guido van Rossum and Fred L. Drake Jr, An Introduction to Python – Revised And updated for Python 3.2, Network Theory Ltd., 2011.

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	M	S	S
CO2	S	S	H	H	H
CO3	H	M	S	S	H
CO4	M	S	M	H	S
CO5	S	H	M	H	S

S – Strong**H** – High**M** – Medium**L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Core Paper 6 – Operating System				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	5	75	4	

Course Objectives

1. To impart adequate knowledge on the Operating Systems.
2. To develop an in-depth understanding Process and memory management.
3. To familiarize with the basic difference between Deadlocks and Disk management.
4. To provide exposure to Linux and Windows.

Course Outcomes (CO)

K1 to K5	CO1	Understand the fundamentals of computer operating system.
	CO2	Remember various Process Management programming constructs
	CO3	Apply the right Memory Management representation formats.
	CO4	Implement the Disk Management concepts.
	CO5	Discussion about Linux and Windows

Syllabus

Unit I (15 Hours)

Introduction - What is an OS - Mainframe systems - Desktop Systems- Multiprocessor systems - Distributed systems - Clustered systems- **Real - Time systems***. Operating system structures: System components - OS services - System calls.

Unit II (15 Hours)

Process Management: Process concept - Process scheduling - Operations on process – Co-operating process - Inter-process communication. CPU scheduling: Basic Concepts - Scheduling criteria - Scheduling algorithms - Multiple-processor scheduling - Real- Time Scheduling.

Unit III (15 Hours)

Deadlocks: Deadlock characterization - Methods for handling Deadlocks- Deadlock prevention - Deadlock Avoidance - Deadlock Detection -Recovery from Deadlock. Memory Management: Background - Swapping-Contiguous memory allocation- Paging –Segmentation- Segmentation with Paging.

Unit IV**(15 Hours)**

Virtual memory: Demand paging - Process creation - Page Replacement-Thrashing. I/O Systems: Disk structure - Disk scheduling: FCFS-SSTF-SCAN-C-SCAN-LOOK Scheduling - Disk management - **Swap Space Management** *. File systems: File concepts-Access methods-Directory structure - File system structure. File system implementation: Overview - Directory Implementation – Allocation methods: Contiguous-Linked Allocation-Indexed Allocation-Free Space Management- Recovery.

Unit V**(15 Hours)**

The Linux Systems: History-Design Principles-Kernel Modules-Process Management - Scheduling-Memory management-IPC. Windows 11: History of windows through Windows 11, Booting Windows, Processes and Threads in Windows- Fundamental Concepts, Memory Management – Fundamental Concepts, Caching in Windows.

***- Self Study and questions for examinations may be taken from the self-study portions also.**

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Book:

1. Abraham Silberschatz, Galvin, Gagne, (2004), Operating Systems Concepts, Sixth Edition, John Wiley & Sons.
2. Andrew S.Tanenbaum and Herbert Bos, Modern Operating System, Fifth Edition, Pearson.

Reference Books:

1. H.M.Deitel, (2009), Operating Systems, Third Edition, Pearson Education Publication.
2. Achyut S. Godbole, (2006), Operating Systems, Third Edition, TMH Publication.

Mapping

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	S	M	H
CO2	S	M	H	S	M
CO3	S	H	M	H	S
CO4	S	S	H	M	H
CO5	S	M	H	S	H

S – Strong**H** – High**M** – Medium**L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Core Paper 7 - Data Communication and Networks				
Batch	Hours/Week	Total Hours	Credits	Employability
2025 – 2028	6	90	5	

Course Objectives

1. To learn about Protocol Standards, Transmission methods, Digital Signals.
2. To Understand about Mode of Data Transmission, Transmission Media.
3. To understand a basic knowledge of Network Topologies and Routing Algorithms.
4. To know the outline of ISDN Architecture and Network Layers.
5. Analyze the Problem in internetworking, TCP and UDP.

Course Outcomes (CO)

K1 to K5	CO1	Remember the basic of Data communication and Networks.
	CO2	Understanding the knowledge of mode of Data Transmission, Multiplexing Techniques and Transmission Media.
	CO3	Apply the concept of routing algorithms.
	CO4	Analyzing about ISDN, MAC and Internetworking Devices.
	CO5	Evaluate the applications and usage of TCP / IP and UDP Formats.

Syllabus

Unit I

(18 Hours)

Introduction to Data Communications and Networking: Data Communications - Protocols - Standards - Signal propagation - Analog and Digital Signals - Bandwidth of a Signal and medium. Analog and Digital Transmission Methods: Analog Signal, Analog Transmission - Digital Signal, Digital Transmission - Digital Signal, Analog Transmission - Analog Signal, Digital Transmission - Baud Rate.

Unit II

(18 Hours)

Data Transmission Modes, Multiplexing and Transmission Media: Modes of Data Transmission and Multiplexing: Parallel and Serial Communication - Asynchronous, Synchronous and Isochronous Communication - Simplex, Half- duplex, Full-duplex Communication. Multiplexing: Frequency Division Multiplexing - Time Division Multiplexing –Transmission Errors: Introduction - Error Classification - Types of Error - Error Detection: Checksum – Vertical Redundancy Check - Longitudinal Redundancy Check - Cyclic Redundancy Check. Transmission Media: Guided Media, **Unguided Media***.

Unit III**(18 Hours)**

Network Topologies, Switching and Routing Algorithms: Network Topologies: Mesh, Star, Tree, Ring, Bus. Basics of Switching: Circuit Switching, Packet Switching, Message Switching. Router and Routing - Factors affecting Routing Algorithms - Routing Algorithms: Distance Vector Routing - Link State Routing.

Unit IV**(18 Hours)**

Network Protocols and OSI Model: Protocols in Computer Communications - OSI Model - OSI Layer Functions. Medium Access Sublayer and ISDN: Medium Access Control (MAC) Sublayer – MAC in LAN and WAN-Integrated Services Digital Network (ISDN): ISDN Architecture - Internetworking Concepts: Introduction – The Problems in internet working - Internetworking Devices - Repeaters - Bridges - Routers – **Gateways***.

Unit V**(18 Hours)**

Introduction to TCP / IP: Introduction - TCP/IP Basics – The Concept of IP Address and IP Datagram / Packet: Introduction-Classes of IP Addresses – Dotted Decimal Notation-Routers and IP Addresses- TCP & UDP - Features of TCP - Relationship between TCP and IP - Ports and Sockets - TCP Packet Format. User Datagram Protocol (UDP): UDP - UDP Packet - Domain Name System (DNS) - Electronic Mail (Email) Transfer Protocols - File Transfer Protocol (FTP).

***- Self Study and questions for examinations may be taken from the self-study portions also.**

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Books:

1. Achyut S. Godbole , 9th reprint, 2018, “Data Communications and Networks”, 2nd Edition, Tata McGraw Hill Publications

Reference Books:

1. Behrouz A. Forouzan,(2007), Data Communications and Network, Tata McGraw Hill, Fourth Edition.
2. Andrew S. Tanenbaum, 2003, Computer Networks, 4th Edition, Prentice Hall of India.

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	M	S	S
CO2	S	S	H	H	H
CO3	H	M	S	S	H
CO4	M	S	M	H	S
CO5	S	M	S	H	S

S – Strong **H** – High **M** – Medium **L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Core Practical 6 – Programming Lab – Python Programming				
Batch	Hours/Week	Total Hours	Credits	Employability
2025 – 2028	6	90	3	

Course Objectives

1. To gain knowledge about the concepts of python programming.
2. To understand the concepts of Built-in functions and User-defined functions.
3. To develop programs using String functions.

Course Outcomes (CO)

K3 to K5	CO1	Apply different types of operators in programming.
	CO2	Implement the concepts of built-in functions in programming.
	CO3	Analyze the use control structures in programming.
	CO4	Applying the concept of List, Tuple, Set and Dictionary.
	CO5	To Learn the Libraries Numpy and Pandas.

LIST OF PRACTICAL PROGRAMS

1. Write a python program to perform different Arithmetic Operations on Numbers.
2. Write Python program to demonstrate the use of Control Statements.
3. Write a Python program to perform following operations on Lists:
 - A) Create List
 - B) Access List
 - C) Update List (Add item, Remove Item)
 - D) Delete List
4. Write a Python program to perform following operations on Tuple:
 - A) Create Tuple
 - B) Access Tuple
 - C) Update Tuple
 - D) Delete Tuple
5. Write a Python program to perform following operations on Dictionary:
 - A) Create Dictionary
 - B) Access Dictionary
 - C) Update Dictionary
 - D) Delete Dictionary
6. Write a Python program to perform following operations on Sets:
 - A) Create Set
 - B) Access Set Elements
 - C) Update Set
 - D) Delete Set
7. Write a python program to perform binary search.
8. Write a program to demonstrate exception handling.
9. Write a program to demonstrate classes and their attributes.
10. Write a python program to copy the Content of first file to another file.
11. Write a program to demonstrate functions in Python Libraries using Numpy.
12. Write a program to demonstrate functions in Python Library using Pandas.

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3 Hours / 60 marks)

Record: 10 Marks

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	5	5
Program Coding	15	15
Execution & Modifications	5	5

Teaching Methods:

Presentation and Program Demonstration using Projector
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Mapping

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	M	S	H
CO2	S	H	H	H	H
CO3	S	H	M	M	M
CO4	H	H	M	S	M
CO5	S	M	M	M	S

S – Strong

H – High

M – Medium

L – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Core Paper 8-Web Technology				
Batch	Hours/Week	Total Hours	Credits	Entrepreneurship
2025 – 2028	6	90	5	

Course Objectives

2. To acquire the knowledge about web programming and scripting languages.
3. To learn the basic concepts of webpage design using HTML.
4. To gain an insight of developing dynamic webpage by using CSS and DHTML.
5. To develop the ability to create a well-formed and Valid XML documents.
6. To enhance the skills to create and deploy the web applications.

Course Outcomes (CO)

K1 to K5	CO1	Remember the concepts of HTML for designing web pages.
	CO2	Understand the concepts of DHTML and CSS to create dynamic web pages.
	CO3	Apply PHP and Ajax for developing real time web applications.
	CO4	Analyze and validate the web pages by using Java script.
	CO5	Evaluate the Applications and usage of static and dynamic web pages.

Syllabus

Unit I

(18 Hours)

Introduction to Computers and Internet: Introduction – Evolution –Web Basics- Client-side Scripting Vs Server-side Scripting - HTML: Introduction -Editing HTML-Common Tags- Headers-Linking-Images -Special Characters and Horizontal Rules. **Intermediate HTML***: Introduction-Unordered Lists- Nested and Ordered lists- Basic HTML tables- Basic HTML forms. Dynamic HTML: Cascading Style Sheets (CSS): Introduction-Inline Styles-Internal CSS -Linking External Style Sheets-Positioning Elements.

Unit II

(18 Hours)

XML: Introduction- XML Basics - Structuring Data- DTDs - Extensible Style Language (XSL)-DOM. Java Script: Introduction -Getting Started with JavaScript-Creating JavaScript functions-Storing your data in variables-Operating on your data with Operators-making decisions with the If statement-**Working with Loops***-Connecting JavaScript to HTML Buttons.

Unit III

(18 Hours)

Java Script Functions: Introduction – Function Definitions –Random Number Generation – Scope Rules – Recursion. Arrays – Declaring and Allocating Arrays – Examples – Random Image Generator – Passing Arrays to functions - Sorting – Searching.

Unit IV**(18 Hours)**

Java Script: Objects - Math – String-Date-Boolean-Document. Event Handling: Introduction – Load Event – Event Mousemove and Event object-Processing with focus and blur - submit and reset – Event Bubbling.

Unit V**(18 Hours)**

PHP: Introduction – Simple PHP Programs - Converting Between Data Types – Arithmetic Operators- Initializing and Manipulating Arrays – String Comparisons – String Processing with Regular Expressions – Reading from a Database.

***- Self Study and questions for examinations may be taken from the self-study portions also.**

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Books:

1. H.M. Deitel, P.J. Deitel & T.R.Nieto (2013), **Internet and World Wide Web How to program**, Pearson Education.(Unit- I , II)
2. Vikram Vaswani (2009), **PHP -A Beginner's Guide**, Tata McGraw Hill Edition, (Unit-IV, V).

Reference Books:

1. Ivan Bayross (2002), **Web Enabled Commercial Application Development using HTML, DHTML, Java Script, Perl, CGI**, Second Edition, BPB Publications.
2. Steven Holzner (2007), **The PHP Complete Reference**, First Edition, Tata Mc Graw Hill Publications.

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	M	S	S	H
CO2	S	M	S	H	S
CO3	S	H	M	S	S
CO4	H	M	S	S	H
CO5	S	M	H	M	H

S – Strong**H** – High**M** – Medium**L** – Low

Programme Code: 12		B.Sc. Information Technology		
Title of the Paper: Core Paper 9- Software Engineering and Testing				
Batch	Hours/Week	Total Hours	Credits	Employability
2025 – 2028	6	90	5	

Course Objectives

1. To assist the students in understanding the basic theory of software engineering.
2. To teach about various testing and debugging techniques.
3. To gain knowledge about quality control and to develop good quality software.

Course Outcomes (CO)

K1 to K5	CO1	Remember the fundamentals of software engineering concepts.
	CO2	Understand common life cycle processes such as waterfall model, spiral model, prototyping model and evolutionary models.
	CO3	Apply the principles and techniques of software engineering in the architectural design, detail design, and implementation of software applications.
	CO4	Analyze the developed software using different testing concepts.
	CO5	Evaluate the usage of Reengineering and Reverse Engineering.

Syllabus

Unit I (18 Hours)

Software Engineering: The Software Process – Software Development Myths – A Generic Process Model – Defining a Framework Activity – Prescriptive Process Models – Waterfall Model – Incremental Process Model – Evolutionary Process Model – A Final Word on Evolutionary Processes - Specialized process Models, Agile Process.

Unit II (18 Hours)

Requirements engineering – Establishing the Groundwork - Developing Use-Cases - Building the Analysis Model - Negotiating requirements - Validating requirements - Requirement analysis – Scenario – Based Modeling.

Unit III (18 Hours)

Design Process - Design concepts - The Design Model – User Interface Design: The golden rules - User Interface Analysis and Design - Interface Analysis– Interface Design Steps- Design Evaluation – **Design Patterns***- Implementation and Maintenance.

Unit IV (18 Hours)

Phase of Software Project – Quality, Quality Assurance, and Quality Control – Testing, Verification, and Validation – White Box Testing – Structural Testing – Black Box Testing – How to do Blackbox Testing? – What is Integration Testing - Integration Testing as a Types of Testing.

Unit V**(18 Hours)**

System Testing Overview – Function System Testing – Non-Functional Testing – Acceptance Testing – Performance Testing - Methodology for Performance Testing – Regression Testing – How to do Regression Testing? – Test Metrics and Measurement – What are Metrics and Measurement? - Types of Metrics – **Project Metrics***- Productivity Metrics.

***- Self-study and questions for examinations may be taken from the self-study portions also.**

Teaching Methods:

Smart Class Room/Power point presentation/Seminar/Quiz/Discussion/Flipped Class/peer Learning/Experiential Learning/Blended learning

Text Book:

1. Roger S Pressman, Bruce Maxim (2015), Software Engineering, Eighth Edition, TMH Publishers.
2. Srinivasan Desikan , Gopalaswamy Ramesh, 2012, “Software Testing” – Principles and Practices, 1st Edition, Pearson Publication.

Reference Books:

1. Watts S Humphrey, (2008), **A Discipline for Software Engineering**, Pearson Education Publishers.
2. Ian Somerville, (2007) **Software Engineering**, Seventh Edition, Pearson EducationPublication.

Mapping

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	S	M	H
CO2	S	M	H	S	M
CO3	S	H	M	H	S
CO4	S	S	H	M	H
CO5	S	M	H	S	H

S – Strong**H – High****M – Medium****L – Low**

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Core Practical 7-Programming Lab- Web Development and Testing				
Batch	Hours / Week	Total Hours	Credits	Entrepreneurship
2025 – 2028	6	90	3	

Course Objectives

1. To develop the ability to build web applications using various technologies like HTML, CSS, PHP and Ajax and construct the test cases.
2. To create dynamic web pages and validate it using Java script.
3. To design and implement real time applications by applying the concepts of PHP and Ajax.
4. To learn about the concepts of assert, verification, wait commands.

Course Outcomes (CO)

K3 to K5	CO1	Recollect the concept of designing web pages using HTML and validate it using Java script.
	CO2	Understand the concepts of CSS and DHTML to create dynamic web pages and implement the concepts of assert and verify
	CO3	Develop the webpage using the concepts of PHP and Ajax.
	CO4	Create web pages using XHTML and Cascading Style Sheets and apply essential characteristics of tool for test automation
	CO5	Build dynamic web pages using JavaScript and evaluate different strategies for Generating system test cases

LIST OF PRACTICAL PROGRAMS

1. Write a test case for scrolling a Text developed using HTML and validate using Selenium IDE.
2. Design a Webpage for a Library Management System using HTML tags.
3. Design a Webpage for a company using CSS.
4. Develop a College application form and validate it using Java script and validate using Selenium IDE.
5. Write a test case for a creating a link for a Paint Brush image using HTML and validate using Selenium IDE.
6. Write a test case for a performing the Calculator operations using HTML and validate using Selenium IDE.
7. Write a test case for designing a Employee form and calculating employee salary using Javascript and validate using Selenium IDE.

8. Develop a PHP program to check message passing mechanism between pages.
9. Write a PHP program to-
 - i. Calculate length of string.
 - ii. Count the number of words in string without using string functions.
 - iii. To demonstrate use of various built-in string functions.
10. Write a simple PHP program for sending and receiving plain text message (e-mail).

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3 Hours / 60 marks)

Record: 10 Marks

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	5	5
Program Coding	15	15
Execution & Modifications	5	5

Teaching Methods:

Presentation and Program Demonstration using Projector
--

Mapping

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	M	M
CO2	H	H	S	S	M
CO3	S	S	H	H	M
CO4	M	S	S	M	S
CO5	S	M	M	H	S

S – Strong

H – High

M – Medium

L – Low

Programme Code: 12		B.Sc. Information Technology		
Title of the Paper: Project and Viva-Voce ***				
Batch 2025 – 2028	Hours/Week 4	Total Hours 60	Credits 5	Employability

Course Objectives

On successful completion of all the above courses

1. To get the knowledge about selecting the task based on their course skills.
2. To get the knowledge about analytical skill for solving the selected task.
3. To gain confidence for implementing the task.
4. To gain confidence for solving the real time problems.

Course Outcomes (CO)

K3 to K5	CO1	Apply the programming skill for solving the project.
	CO2	Analyze the task to collect the necessary information about the system.
	CO3	Evaluating the project based on the software.
	CO4	Apply testing techniques to test the different modules of the project.
	CO5	Implement the Project in the user environment.

Mark Distribution

Particulars		Marks
CIA	Regularity	15
	Attendance	05
Viva –voce *		20
Project record *		60

*** Both Internal and External Examiners shall evaluate Project & Viva-Voce jointly**

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	S	H	S
CO2	S	M	M	H	H
CO3	S	H	S	H	H
CO4	H	H	S	S	H
CO5	H	H	S	S	H

S – Strong

H – High

M – Medium

L – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Elective – Internet of Things				
Batch	Hours/Week	Total Hours	Credits	Entrepreneurship
2025 – 2028	5 / 6	75 / 90	5	

Course Objectives

1. To learn the concepts of IOT and its protocols.
2. To learn how to analysis the data in IOT.
3. To analyze the industrial needs.
4. To learn IOT infrastructure for popular applications.

Course Outcomes (CO)

K1 to K5	CO1	Analyzing and evaluate the data received through sensors in IOT.
	CO2	Design and develop smart city in IoT
	CO3	Analyze various communication protocols for IoT.
	CO4	Analyze applications of IoT in real time scenario
	CO5	Evaluate appropriate protocol for communication between IoT.

Syllabus

Unit I (15/18 Hours)

Introduction to IoT - Genesis of IoT- IoT and Digitization - IoT Impact -Convergence of IT and OT - IoT Challenges - IoT Network Architecture and Design -Drivers Behind New Network Architectures - Comparing IoT Architectures - Additional IoT Reference Models.

Unit II (15/18 Hours)

The Core IoT Functional Stack - IoT Data Management and Compute Stack - Fog Computing – Edge Computing - The Hierarchy of Edge, Fog, and Cloud - Smart Objects - The Things in IoT - Sensors, Actuators, and Smart Objects- Sensor Networks-Wireless Sensor Networks - Communication Protocols for Wireless Sensor Networks.

Unit III (15/18 Hours)

Connecting Smart Objects - Communications Criteria - IoT Access Technologies - Standardization and Alliances - Competitive Technologies - IEEE 802.15.4 - IEEE 802.15.4g and 802.15.4e - IEEE 1901.2a - IEEE 802.11ah- LoRa WAN - NB - IoT and Other LTE Variations.

Unit IV**(15/18 Hours)**

IP as the IoT Network Layer - The Business Case for IP - Optimizing IP for IoT - Authentication And Encryption on Constrained Nodes - ACE - DICE - Application Protocols for IoT - The Transport Layer - IoT Application Transport Methods - SCADA - Generic Web - Based Protocols - IoT Application Layer Protocols - CoAP.

Unit V**(15/18 Hours)**

IoT in Industry - Transportation- Transportation Challenges - IoT Use Cases for Transportation – An IoT Architecture for Transportation- Extending the Roadways IoT Architecture to Bus Mass Transit - Extending Bus IoT Architecture to Railways - **Public Safety***- Public and Private Partnership for Public Safety IoT - An IoT Blueprint for Public Safety Emergency Response IoT Architecture – **School Bus Safety*** - School Bus Safety Network Architecture.

***Self Study and questions for examinations may be taken from the self study portions also.**

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Books:

1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry (2017), IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, Cisco Press

Reference Books:

1. Arshdeep Bahga, Vijay Madisetti (2015), Internet of Things – A hands-on approach, Universities Press.
2. Olivier Hersent, David Boswarthick, Omar Elloumi (2012) , The Internet of Things – Key Applications and Protocols, Wiley.
3. Honbo Zhou (2012), The Internet of Things in the Cloud: A Middleware Perspective, CRC Press.

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	H	S	H
CO2	S	H	M	S	H
CO3	S	S	H	H	M
CO4	M	H	S	H	M
CO5	S	H	S	M	M

S – Strong**H** – High**M** – Medium**L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the paper : Elective–Mobile Computing				
Batch	Hours/Week	Total Hours	Credits	Entrepreneurship
2025 – 2028	5 / 6	75 / 90	5	

Course Objectives

1. To explain fundamental of mobile computing.
2. To discuss a comprehensive understanding of TCP/IP protocols
3. To outline current and emerging trends in Telecommunication systems.
4. To analyze energy management in ad-hoc wireless networks.
5. To understand about the operating systems used in mobile platforms.

Course Outcomes (CO)

K1 to K5	CO1	Understand the several communication access techniques and determine the functionality of MAC.
	CO2	Perceive knowledge about TCP and IP method
	CO3	Illustrate technical format, addressing and transmission strategies of packets
	CO4	Apply and Identifying a routing protocol for given Adhoc Networks Evaluate
	CO5	Understanding the platforms and mobile operating system techniques

Syllabus

Unit I (15/18 Hours)

Introduction - Mobile Computing – Mobile Computing Vs Wireless Networking – Mobile Computing Applications –Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.

Unit II (15/18 Hours)

Mobile Internet Protocol and Transport Layer - Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP-Adaptation of TCP Window – Improvement in TCP Performance.

Unit III (15/18 Hours)

Mobile Telecommunication System - Introduction to Cellular Systems - GSM -Services & Architecture - Protocols - Connection Establishment - Frequency Allocation -Routing - Mobility Management - Security - GPRS- UMTS - Architecture - Handover - Security.

Unit IV**(15/18 Hours)**

Mobile Ad-Hoc Networks -Mobile IP- DHCP -Ad-Hoc Basic Concepts – Characteristics Applications – Design Issues –Routing – Essential of Traditional Routing Protocols -Popular Routing Protocols – Vehicular Ad Hoc networks (VANET) - **MANET Vs VANET*** - Security.

Unit V**(15/18 Hours)**

Mobile Platforms and Applications -Mobile Device Operating Systems – Special Constrains & Requirements – Commercial Mobile Operating Systems – Software Development Kit: IOS, Android, BlackBerry, Windows Phone – M-Commerce – Structure – Pros & Cons – **Mobile Payment System – Security Issues***.

*** Self-study and questions for examinations may be taken from the self-study portions also.**

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Book:

1. Jochen Schiller, “Mobile Communications”, Second edition Addison-Wesley, 2008.

Reference Books:

1. Reza Behravanfar, “Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML”, Cambridge University Press, October 2004.
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden, Schwiebert, Loren, “Fundamentals of Mobile and Pervasive Computing”, McGraw-Hill Professional, 2005.

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	S	M	H	H	H
CO4	S	S	S	S	M
CO5	H	S	H	S	M

S – Strong**H** – High**M** – Medium**L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Elective – Cloud Computing				
Batch	Hours/Week	Total Hours	Credits	Entrepreneurship
2025 – 2028	5 / 6	75 / 90	5	

Course Objectives

1. To teach the basics of cloud computing.
2. To understand the broad perspective of cloud architecture
3. To gain the knowledge of cloud services and cloud security.

Course Outcomes (CO)

K1 to K5	CO1	Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud.
	CO2	Understand the core issues of cloud computing such as security, privacy, and interoperability.
	CO3	Apply the appropriate technologies and approaches for the related issues.
	CO4	Analyze the appropriate cloud computing solutions and recommendations according to the applications used.
	CO5	Evaluate the Risk, Security and data loss prevention in cloud.

Syllabus

Unit I (15/18 Hours)

Introduction: Cloud Computing at a Glance – Historical developments – Building Cloud Computing Environments – Computing Platforms and Technologies. Principles of Parallel Computing: Eras of computing – Parallel Vs Distributed Computing – Elements of Parallel Computing.

Unit II (15/18 Hours)

Principles of Distributed Computing: Elements of Distributed Computing – Technologies for Distributed Computing. Virtualization: Introduction – Characteristics of Virtualized Environments – Taxonomy of Virtualization Techniques - Virtualization and Cloud Computing – Pros and Cons of Virtualization – Technology Examples.

Unit III (15/18 Hours)

Cloud Computing Architecture: Introduction – Cloud reference model – Types of clouds – Economics of the Cloud – **Open Challenges***.

Unit IV (15/18 Hours)

Cloud Applications: Scientific Applications: Healthcare – Geoscience - Business and Consumer Applications: CRM and ERP – Productivity – Social Networking - Media Applications – **Multiplayer Online gaming***.

Cloud Security – Cloud Computing Concepts – Moving to the Cloud - Cloud Security Tools and Techniques – Cloud Identity Management - Securing IaaS.

* - Self Study and questions for examinations may be taken from the self-study portions also.

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Books:

1. Rajkumar Buyya, Christian vecchiola, Thamarai selvi, (2013), **Mastering Cloud computing**, Mc Gram Hill Publication. (Unit – I to Unit –IV)
2. Charles P.Pfleeger, Shari Lawrence Pfleeger, Deven N.Shan, (2007), **Security in Computing**, Fifth Edition, Prentice Hall Publication. (Unit –V)

Reference Books:

1. Judith Hurwitz, Robin Bloon, (2009), **Cloud Computing for Dummies**.

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	H	S	H
CO2	S	H	M	S	H
CO3	S	S	H	H	M
CO4	M	H	S	H	M
CO5	S	H	S	M	M

S – Strong

H – High

M – Medium

L – Low

Programme Code: 12		B.Sc. Information Technology		
Title of the Paper: Elective - Data Mining				
Batch	Hours/Week	Total Hours	Credits	Employability
2025 – 2028	5 / 6	75 / 90	5	

Course Objectives

1. To introduce the basic concepts of Data Mining algorithms, methods and tools.
2. To develop and apply critical thinking, problem-solving, and decision-making skills.
3. To discover interesting patterns, analyze supervised and unsupervised models and Estimate the accuracy of the algorithms.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the data mining principles and techniques.
	CO2	Understanding the concept of raw data processing using data mining algorithms.
	CO3	Applying data mining algorithms to build analytical applications.
	CO4	Analyzing large amount of data to extract patterns and to solve problems.
	CO5	Evaluate the performance of various algorithms by comparing different approaches.

Syllabus

Unit I

(15/18 Hours)

Basic Data Mining Tasks – Data Mining Versus Knowledge Discovery in Data Bases – Data Mining Issues – Data Mining Matrices – **Social Implications of Data Mining *** – Data Mining from Database Perspective.

Unit II

(15/18 Hours)

Data Mining Techniques – A Statistical Perspective on data mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.

Unit III

(15/18 Hours)

Classification: Introduction – Statistical – Based Algorithms – Distance Based Algorithms – Decision Tree – Based Algorithms – Neural Network Based Algorithms – Rule Based Algorithms – **Combining Techniques***.

Unit IV

(15/18 Hours)

Clustering: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms - Partitional Algorithms.

Association Rules : Introduction - Large Item Sets – Basic Algorithms – Parallel & Distributed Algorithms – Comparing Approaches – Incremental Rules – Advanced Association Rules Techniques – **Measuring the Quality of Rules ***.

* - Self Study and questions for examinations may be taken from the self study portions also.

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Book:

1. Margaret H.Dunbam, (2008), **Data Mining Introductory and Advanced Topics**, First Edition, Pearson Education.

Reference Book:

1. Jiawei Han & Micheline Kamber, (2006), **Data Mining Concepts & Techniques**, Third Edition, Academic Press.

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	H	S	H
CO2	H	S	M	M	S
CO3	S	M	S	H	M
CO4	H	H	H	S	H
CO5	M	S	S	H	H

S – Strong

H – High

M – Medium

L – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Elective – Artificial Intelligence				
Batch	Hours/Week	Total Hours	Credits	Employability
2025 – 2028	5 / 6	75 / 90	5	

Course Objectives

1. To understand the basic concepts of Artificial Intelligence (AI) and identify the AI problems and domains.
2. To provide search techniques to solve the problems.
3. To represent and access the domain specific knowledge.

Course Outcomes (CO)

K1 to K5	CO1	Remember the techniques of Artificial Intelligence in Problem Solving.
	CO2	Understand the nature of AI problems and task domains of AI.
	CO3	Apply the appropriate search procedures to solve the problems by using best algorithms.
	CO4	Analyze and select the suitable knowledge representation method.
	CO5	Evaluate the techniques of representing knowledge using rules.

Syllabus

Unit I (15/18Hours)

Artificial Intelligence – Introduction – Intelligent Agent – Solving Problems by Searching: Uninformed Search Strategies - Informed Search Strategies – Heuristic Functions.

Unit II (15/18 Hours)

Logical Agent : Knowledge based Agent – Logic – Propositional Logic – First Order Logic – Inference in First Order Logic.

Unit III (15/18 Hours)

Classical Planning – Definition of Classical Planning – Algorithms for Planning as State Space Search –Planning Graphs – Probabilistic Reasoning – Representing Knowledge in Uncertain Domain – The Semantics of Bayesian Network – Exact Inference in Bayesian Network.

Unit IV (15/18 Hours)

Making Simple Decision – The Basic of Utility Theory – Utility Function – Multi attributes Utility Function – Decision Network – The Value of Information – Decision – Theoretic Expert System – Learning : Forms of Learning – Supervised Learning – Learning Decision Tree – Knowledge in Learning : A logical Formulation of Learning – Knowledge in Learning – Explanation – **Based Learning***.

Learning Probabilistic Models : Statistical Learning – Reinforcement Learning : Passive
Reinforcement Learning – **Active Reinforcement Learning***– Natural Language Processing.

*** - Self Study and questions for examinations may be taken from the self-study portions also.**

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped
Class / peer Learning / Experiential Learning / Blended learning

Text Book:

1. Stuart J. Russell and Peter Norving, 2015, 2023 Impression, “Artificial Intelligence: A Modern Approach”, Third Edition, Pearson.

Reference Books:

1. Lavika Goel, 2021, “Artificial Intelligence: Concepts and Applications”, First Edition, Wiley.
2. Denis Rothman, 2020, “Artificial Intelligence by Example”, Second Edition, Kindle.

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	S	H	M	H	H
CO4	S	S	S	S	H
CO5	M	S	H	S	H

S – Strong

H – High

M – Medium

L – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Elective – Big Data Analytics				
Batch	Hours/Week	Total Hours	Credits	Entrepreneurship
2024 – 2025	5 / 6	75 / 90	5	

Course Objectives

1. To learn the basic concepts of Big Data and its technologies.
2. To learn about NoSQL and Big data Management
3. To gain knowledge about Hadoop and HDFS.
4. To learn about web mining, graph mining and social network mining.

Course Outcomes (CO)

K1 to K5	CO1	Remember big data and use cases from selected business domains
	CO2	Understand NoSQL big data management
	CO3	Apply map-reduce analytics using Hadoop.
	CO4	Analyze Graph Mining, Web Mining and Social Network Mining.
	CO5	Evaluate the usage of web mining in social networks.

Syllabus

Unit I (15/18 Hours)

Introduction to Big Data Analytics: Big data characteristics, Designing data architecture, Data Sources, Preprocessing, Data storage and analysis, Big data analytics Applications. Introduction to Hadoop: Hadoop and its Ecosystem, Hadoop Distributed File System, MapReduce Framework and programming model, Hadoop Yarn.

Unit II (15/18 Hours)

NoSQL Database: Data store, Data architecture patterns, Managing big data, Shared-nothing architecture for big data tasks, MongoDB Database - Features, Dynamic schema, Auto sharing, Query language and commands. MapReduce: Map tasks, Reduce tasks, Execution, Composing MapReduce for calculations, Matrix vector multiplication by MapReduce, Relational algebra operations, Matrix multiplication.

Unit III (15/18 Hours)

Hive: Architecture, Data types, Formats, Data model, Integration and workflow steps Built-in functions, Data definition language, Data manipulation language, Aggregation, Join, Group by clause. Spark: Spark SQL, Data analysis operations, Programming using RDDs, Data ETL process, **Reporting and visualizing***.

Unit IV**(15/18 Hours)**

Data Stream Mining: Data stream concepts, Model, Architecture, Data stream management system, stream queries, Stream processing issues, Stream computing, Sampling data, Filtering, Estimating moments, Decaying windows, Frequent Itemsets - Finding frequent itemsets, Limited passes algorithm, Counting frequent itemsets in a stream; Apache Spark streaming architecture.

Unit V**(15/18 Hours)**

Graph Model: Representing graph as triples, Resource description framework for graph databases, Naïve DB graph database, Property graph model, Probabilistic Graphical Network Organization - Bayesian and Markov networks. Graph Analytics: Use cases, Stats Model and Probabilistic based analytics, Technical complexity in analyzing graphs; Spark GraphX platform – Features of graph analytics platform. Text Mining: What is Text Mining? Web mining- Web Content Mining, Web Usage mining. **Social Networks: Social networks as graphs ***.

*** - Self Study and questions for examinations may be taken from the self-study portions also.**

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Books:

1. Raj Kamal, Preeti Saxena (2018), **Big Data Analytics: Introduction to Hadoop, Spark, and Machine-Learning**, , McGraw Hill.

Reference Books:

1. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj (2013), Big Data, Big Analytics: Emerging Business intelligence and Analytic trends for Today's Business, John Wiley & Sons.
2. Jeffrey Aven, (2018), **Data Analytics with SPARK using Python**, Pearson, Addison-Wesley Data & Analytics Series.
3. Tom White (2014), **Hadoop: The Definitive Guide**, O'Reilly Publications, 4th Edition.

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	H	S	H
CO2	S	H	M	S	H
CO3	M	S	H	H	M
CO4	S	H	S	M	M
CO5	S	M	S	S	M

S – Strong **H** – High **M** – Medium **L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Elective – Machine Learning				
Batch	Hours/Week	Total Hours	Credits	Employability
2025 – 2028	5 / 6	75 / 90	5	

Course Objectives

1. To understand pattern classification algorithms to classify multivariate data
2. To understand the Implementation of genetic algorithms
3. To gain knowledge about Q-Learning
4. To create new machine learning techniques.

Course Outcomes (CO)

K1 to K5	CO1	Develop and apply pattern classification algorithms to classify multivariate data.
	CO2	Understand and apply regression algorithms for finding relationships between data variables.
	CO3	Apply reinforcement learning algorithms for learning to control complex systems.
	CO4	Analyze and select the suitable methods for Decision Tree Algorithm
	CO5	Evaluate the scientific reports on computational machine learning methods, results and conclusions.

Syllabus

Unit I

(15/18Hours)

Introduction to Machine Learning – Learning – Learning of Input / Output Function – Machine Learning – Application and Examples – Intelligent agent – Reasoning by knowledge : Knowledge Management – First Order Logic – Reasoning – Rule Based Reasoning – Model Based Reasoning System.

Unit – II

(15/18Hours)

Supervised and Unsupervised Learning – Supervised Learning Model – Unsupervised Learning Model – Semi – Supervised Learning – Reinforcement Learning : Reinforcement Learning Model – Q- Learning – Learning Automata – Association Rule Mining : Aprior Algorithm – FP Growth Algorithm.

Unit – III

(15/18Hours)

Clustering: k-means Clustering – Fuzzy Clustering – Hierarchical Clustering – Cluster Similarity – Artificial Neural Networks : ANN Basic – ANN Learning Process – Self Organising Maps – Recurrent Neural Network.

Unit – IV

(15/18 Hours)

Deep Learning : Deep Belief Network – Deep Reinforcement Learning – Fuzzy Network: Fuzzy Network Basic – Fuzzy Logic and Fuzzy Set – Fuzzy Control – Fuzzy Reasoning – **Application of Fuzzy System***.

Unit – V

(15/18 Hours)

Nearest Neighborhood: Distance Measure – KNN Algorithm – Applications – Decision Tree: Decision Tree Construction – Types of Decision Tree – Decision Tree Algorithm – **Random Forest***.

*** - Self Study and questions for examinations may be taken from the self-study portions also.**

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Book:

1. Vinod Chandra and Anand Hareendran.S, “Machine Learning : A Practitioner’s Approach”, 2024, PHI Learning Private Limit, Delhi.

Reference Book:

1. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, 2021, “Machine Learning”, Eighth Edition, Pearson.
2. Oliver Theobald, 2024, “Machine Learning for Absolute Beginners”, Third Edition, Sanage Publishing House LLP.

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	H	S	H
CO2	S	H	M	S	H
CO3	M	S	H	H	M
CO4	S	H	S	M	M
CO5	S	M	S	S	M

S – Strong **H** – High **M** – Medium **L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the paper : Elective–Network Security				
Batch 2025 – 2028	Hours/Week 5 / 6	Total Hours 75 / 90	Credits 5	Employability

Course Objectives

1. To Understand OSI security architecture.
2. To Understand various block cipher and stream cipher models.
3. To Study the principles of symmetric & public key crypto systems.
4. To learn the system security practices.

Course Outcomes (CO)

K1 to K5	CO1	Remember the OSI Security Architecture.
	CO2	Understanding Number theory and finite fields.
	CO3	Apply Block Ciphers and Data Encryption Standard.
	CO4	Evaluate Public Key Cryptography and RSA.
	CO5	Implement Hash functions.

Syllabus

Unit I

(15/18 Hours)

OSI Security Architecture – Security attacks, services and mechanisms – Network security Model – Classical encryption techniques: Symmetric cipher model, Substitution techniques – Transposition techniques – Rotor machines – **Steganography***

Unit II

(15/18 Hours)

Number theory and finite fields: The Euclidean algorithm – Modular arithmetic - Groups, Rings and Fields – Finite fields of the Form $GF(p)$ – Polynomial arithmetic – prime numbers – Fermat's and Euler's theorems

Unit III

(15/18 Hours)

Block Ciphers and Data Encryption Standard: Traditional block cipher structure – Data Encryption – Strengths of DES – Block Cipher Design Principles – Advanced Encryption Standard – AES structure – AES transformation functions – AES Key expansion – implementation.

Unit IV

(15/18 Hours)

Public Key Cryptography and RSA – Principles of Public-key Crypto systems – RSA algorithm - Diffie – Hellman Key exchange - Elgamal Cryptographic System.

Unit V**(15/18 Hours)**

Hash functions – Applications – **Two simple hash functions*** – Hash functions based on Cipher block chaining - Secure Hash Algorithm (SHA).

*** -Self-study and questions for examinations may be taken from the self-study portions also.**

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Books:

1. William Stallings, —Cryptography and Network Security: Principles and Practicel, Pearson Education 2013,6th Edition.

Reference Books:

1. Behrouz A. F-erouzan, —Cryptography & Network Securityll, Tata McGraw Hill 2007.
2. Man Young Rhee, —Internet Security: Cryptographic Principles, Algorithms and Protocolsll, Wiley Publications 2003.

Mapping

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	M	H	M	S	H
CO2	H	S	M	H	S
CO3	M	H	M	M	H
CO4	M	H	M	M	H
CO5	S	M	H	S	H

S – Strong**H** – High**M** – Medium**L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Skill Based Subject 1 – Cyber Security				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	2	30	3	

Course Objectives

1. The course introduces the basic concepts of Cyber Security.
2. To develop an ability to understand about various modes of Cyber Crimes and Preventive measures.
3. To understand about the Cyber Legal laws and Punishments.

Course Outcomes (CO)

K1 - K5	CO1	To Understand the Concepts of Cybercrime and Cyber Frauds
	CO2	To Know about Cyber Terrorism and its preventive measures
	CO3	To Analyze about the Internet, Mobile Phone and E-commerce security issues
	CO4	To Understand about E-mail and Social Media Issues
	CO5	To Describe about various legal responses to Cybercrime

Syllabus

Unit I

(6 Hours)

Introduction to Cyber Security: Definition of Cyber Security- Why is Cyber Security important? Layers of Cyber Security- Evolution of Cyber Security. Cyber hacking - Cyber fraud: Definition - Different modes of cyber fraud - Cyber fraud in India. Cyber pornography.

Unit II

(6 Hours)

Cyber Terrorism: Modes of cyber terrorism. Cybercrime: What is Cybercrime? Cybercrime preventive methods - Preventive steps for individuals & organizations - Kinds of cybercrime - Malware and its types – Cyber-attacks.

Unit III

(5 Hours)

Internet Mobile Phone and E-commerce Security issues: Data theft - Punishment of data theft- Theft of internet hours - Internet safety tips for children & parents. Mobile phone privacy- E-Commerce security issues.

Unit IV

(6 Hours)

Email and Social media issues: Aspects of Social Media - The Vicious Cycle of unhealthy social media use- Modifying social media use to improve mental health. Computer Virus -

Antivirus – Firewalls.

Sub. Code: 25UGC3S1
(7 Hours)

Unit V

Cyber Forensics and Digital Evidence: What does Digital Footprint Mean? - Web Browsing and Digital Footprints- Digital Footprint examples – How to Protect Your Digital Footprints? - How to erase your Footprints? - Browser Extensions and Search Engine Deletion - Cyber Crime and Cyber Laws – Common Cyber Crimes and Applicable Legal Provisions: A Snapshot - Cyber Law (IT Law) in India – The Information Technology Act of India 2000 - Cyber Law and Punishments in India - Cyber Crime Prevention guide to users – Regulatory Authorities.

Teaching Methods:

- Chalk and Talk, Presentation, Seminar, Quiz, Discussion & Assignment

Text Book:

1. **“Cyber Security”, Text Book** prepared by **“Kongunadu Arts and Science College”, Coimbatore -29, 2022.**

Reference Books:

1. Mayank Bhushan, Rajkumar Singh Rathore, Aatif Jamshed, **“Fundamental of Cyber Security”,** BPB Publications, 1st Edition, 2017.
2. Anand Shinde, **“Introduction to Cyber Security-Guide to the world of Cyber Security”,** Notion Press, 2021.
3. Paul Grishman, **“Cyber Terrorism- The use of the Internet for Terrorist Purpose”,** Axis Publication, 1st Edition, 2010.
4. Shilpa Bhatnagar, **“Encyclopaedia of Cyber and Computer Hacking”,** Anmol Publications, 1st Edition, 2009.

Web References:

1. <http://deity.gov.in/> - Department of Electronics and Information Technology,
2. Govt. of India
3. <http://cybercellmumbai.gov.in/> - Cybercrime investigation cell
4. <http://ncrb.gov.in/> - National Crime Records Bureau
5. <http://catindia.gov.in/Default.aspx> - Cyber Appellate Tribunal
6. <http://www.cert-in.org.in/> - Indian Computer Emergency Response Team
7. <http://cca.gov.in/rw/pages/index.en.do> - Controller of Certifying Authorities
8. www.safescrypt.com – Safes crypt
9. www.nic.in – National Informatics Centre
10. <https://www.kaspersky.com/resource-center/definitions/what-is-a-digital-footprint>

Question Paper Pattern

Duration: 3 hrs

Max: 75 marks

Section - A (10x1=10)

Choose the correct answer

Section - B (5x5=25)

Short answer questions, either or type, one question from each unit.

Section - C (5x8=40)

Essay answer questions, either or type, one question from each unit.

CIA EXAMINATION MARK BREAKUP

S. NO	DISTRIBUTION COMPONENT	MARKS
1.	CIA I – 75 Marks Converted to 30	30
2.	CIA II – 75 Marks Converted to 30	30
3.	Assignment I	10
4.	Assignment II	10
5.	Attendance	05
6.	Any Case Study related to Cyber Security	15
Total		100

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Skill Based Subject 2 – R Programming Lab				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	2	30	3	

Course Objectives

- To acquire programming skills in core R Programming
- To acquire Object-oriented programming skills in R Programming.
- To develop the skill of designing graphical-user interfaces (GUI) in R Programming

Course Outcomes (CO)

K3 to K5	CO1	Familiarize with the constructs and running of R programs
	CO2	Apply control structures of R for several suitable problems
	CO3	Demonstrate the working of various data structures supported by R
	CO4	Understand the role of R in data handling and visualization
	CO5	Recognize the type of problem and solve it using R

LIST OF PRACTICAL PROGRAMS

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
3. Write a program to find list of even numbers from 1 to n using R-Loops.
4. Create a function to print squares of numbers in sequence.
5. Write a program to join columns and rows in a data frame using cbind() and rbind() in R.
6. Implement different String Manipulation functions in R.
7. Create pie chart and bar chart using R.
8. Program to find factorial of the given number using recursive function.
9. Program to find list of R Operators are used to multiple functions.
10. Program to find K-Means Clustering in R Programming.
11. Program to find R Statistics are used to categorize data.
12. Create Data Visualization in R using different plots

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3 Hours / 60 marks)

Record: 10 Marks

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	5	5
Program Coding	15	15
Execution & Modifications	5	5

Teaching Methods:

Presentation and Program Demonstration using Projector
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Mapping

<div>PSO</div> <div>CO</div>	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	M	H	M	S	H
CO2	H	S	M	H	S
CO3	M	H	M	M	H
CO4	M	H	M	M	H
CO5	S	M	H	S	H

S – Strong **H** – High **M** – Medium **L** – Low

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Skill Based Subject 3 – Basics of Intellectual Property Right's				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	2	30	3	

Course Objectives

- To create awareness about recent trends in IPR and Innovation
- To explore the basic concepts IPR
- To focus upon trademarks, copyrights, patents, industrial designs and traditional knowledge.
- To learn more about managing IP rights and legal aspects.

Course Outcomes (CO)

On successful completion of the course, the students will be able to

<div style="display: flex; align-items: center; justify-content: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">K1</div> <div style="margin: 0 10px;">↑</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">K5</div> <div style="margin: 0 10px;">↓</div> </div>	CO1	Know about basic concepts of IPR and patent
	CO2	Understand copyrights, industrial designs and geographical indication of goods.
	CO3	Differentiate between trademarks and trade secrets
	CO4	Acquire knowledge on protection of traditional knowledge and plant varieties.
	CO5	Manage and protect IP Rights

UNIT – I

(6 hours)

Introduction -origin and development of Intellectual Property Rights (IPR), need for protecting IP,

Patents: Foundation of patent law, patent searching process, basic criteria of patentability. Patentable and non - patentable subject matters in India. Patent prior art search, drafting the patent specification and filing procedure

UNIT – II

(6 hours)

Copyrights: Fundamentals of copyright law, originality of material, right of reproduction, right to perform the work publicly, copyright ownership issues, notice of copyright. **Industrial Designs:** Kind of protection provided in Industrial design. **Geographical Indication of Goods:** Basic aspects and need for the registration.

UNIT – III

(6 hours)

Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, transfer of rights, selecting and evaluating trademark, registration of trademarks, claims. **Trade Secrets:** Trade secret law, determination of trade secret status, liability form is appropriation of trade secrets, trade secret litigation.

UNIT – IV

(6 hours)

Protection of traditional knowledge - Objectives, concept of traditional knowledge, issues concerning, bioprospecting and biopiracy. **Protection of Plant Varieties** - Objectives, international position, plant varieties protection in India. Rights of farmers, breeders and researchers.

UNIT- V

(6 hours)

Managing IP Rights: Acquiring IP Rights: letters of instruction, joint collaboration agreement, protecting IP Rights: non-disclosure agreement, cease and desist letter, settlement memorandum. **Transferring IP Rights:** Assignment contract, license agreement, deed of assignment. Infringement and enforcement.

Teaching Methods

Smart Class Room/PowerPoint presentation/Seminar/Quiz/Discussion

TEXT BOOKS

1. Ramakrishna Chintakunta and M. Geethavani (2022). A Textbook of Intellectual Property Rights. Blue Hills publications.
2. N.K Acharya (2021).Intellectual property rights(8thEdn). Asia Law House.
3. Craig Allen Nard, Michael J. Madison, and Mark P. McKenna. (2017). Law of Intellectual Property (5thEdn). New York Aspen publishers.
4. Barrett and Margreth (2009). Intellectual Property. New York Aspen publishers.
5. Deborah E.Bouchoux(2013). Intellectual property:The Law of Trademarks, Copyrights, Patents, and Trade Secrets. Publisher: Cengage India

REFERENCES

1. B.Ramakrishna and H.S.Anil Kumar (2017). Fundamentals of Intellectual Property Rights: For Students, Industrialist and Patent Lawyers.Notion Press.

2. V. K. Ahuja(2013). Law relating to Intellectual Property rights (2nd Edn). LexisNexis.
3. R. Radhakrishnan and S. Balasubramanian (2008), Intellectual property rights: Text and Cases, Excel Books India.
4. D. Goeland S. Parashar (2013). IPR Biosafety and Bioethics. Pearson Education India.

CIA EXAMINATION MARK BREAKUP

The CIA Examination mark breakup for the course **Basics of IPR** is given below:

S.No.	Distribution Component	Marks
1	CIA I – 75 Marks Converted to 30	30
2	CIA II – 75 Marks Converted to 30	30
3	Assignment I	10
4	Assignment II	10
5	Attendance	05
6	Any Case Study related to IPR (as a Group)	15
	Total	100

QUESTION PAPER PATTERN

The following question paper pattern will be followed for the above said courses:

Section A - Multiple Choice ($10 \times 1 = 10$ Marks)

Section B - Either or Type ($5 \times 5 = 25$ Marks)

Section C - Either or Type ($5 \times 8 = 40$ Marks)

Maximum Marks : 75

Duration : 3 Hours

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Extra Departmental Course (EDC) – Advanced Excel Lab				
Batch	Hours /Week	Total Hours	Credits	Employability
2025 – 2028	2	30	3	

Course Objectives

1. To include advanced functions in Excel.
2. To understand the concepts of Range, Pivot Chart and Mathematical Functions in Excel.
3. To introduce the basic concepts of Data Validation and Data Sorting.

Course Outcomes (CO)

K3 to K5	CO1	Apply Mathematical and Logical Functions.
	CO2	Analyze the use of Range Function.
	CO3	Implement the spreadsheet using Excel Tools.
	CO4	Apply Statistical and Reference functions.
	CO5	Create a Chart for the Table data.

LIST OF PRACTICAL PROGRAMS

1. Create a Spreadsheet to perform Range function.
2. Create a Spreadsheet to perform Mathematical functions.
3. Create a Spreadsheet to perform Logical functions.
4. Create a Spreadsheet to perform Date and Time functions.
5. Create a Payroll in Excel.
6. Create a Spreadsheet to perform Text and String functions.
7. Create a Spreadsheet using some Excel Tools.
8. Create a Spreadsheet using Lookup and Reference functions.
9. Create a Pivot Chart for the data.
10. Create a Spreadsheet to perform Statistical Functions.

Teaching Methods:

Presentation and Program Demonstration using Projector

CIA EXAMINATION MARK BREAKUP**(For Practical Only)**

S. NO	DISTRIBUTION COMPONENT	MARKS
1.	CIA Practical I – 60 Marks Converted to 30	30
2.	CIA Practical I – 60 Marks Converted to 30	30
3.	Continuous Assessment of Practical (Observation to be Submitted*) (15 Experiments/Programs \times 2 = 30Marks)	30
4.	Record	05
5.	Attendance	05
Total		100

* In case a student is absent for an Experiment/Program conducted on a particular day, the Student will not be allowed to compensate that Experiment/Program and will be awarded zero for that particular Experiment/Program and shall be marked absent. In case any students has an attendance lack; the concerned faculty handling the course in consultation with HoD may permit the student who has an attendance lack to compensate one or two Experiments/Programs as the case may be to enable them to become eligible with mandate of 75% attendance to appear for the Continuous Internal Practical Examinations. However, the compensated Experiments/Programs will not be awarded any marks whatsoever.

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Part – IV - Environmental Studies				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	2	30	2	

Course Objectives

1. The course will provide students with an understanding and appreciation of the complex interactions of man, health and the environment. It will expose students to the multi-disciplinary nature of environmental health sciences.
2. To inculcate knowledge and create awareness about ecological and environmental concepts, issues and solutions to environmental problems.
3. To shape students into good “Eco citizens” thereby catering to global environmental needs.
4. This course is designed to study about the types of pollutants including gases, chemicals petroleum, noise, light, global warming and radiation as well as pollutant flow and recycling and principles of environmental pollution such as air, water and soil.
5. The course will address environmental stress and pollution, their sources in natural and workplace environments, their modes of transport and transformation, their ecological and public health effects, and existing methods for environmental disease prevention and remediation.

Course Outcomes

On successful completion of the course, the students will be able to

<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">K1</div> <div style="flex-grow: 1; border-left: 1px solid black; border-right: 1px solid black; position: relative;"> <div style="position: absolute; top: -10px; left: 50%; transform: translateX(-50%);">↑</div> <div style="position: absolute; bottom: -10px; left: 50%; transform: translateX(-50%);">↓</div> </div> </div>	CO1	Understand how interactions between organisms and their environments drive the dynamics of individuals, populations, communities and ecosystems
	CO2	Develop an in-depth knowledge on the interdisciplinary relationship of cultural, ethical and social aspects of global environmental issues
	CO3	Acquiring values and attitudes towards complex environmental socio-economic challenges and providing participatory role in solving current environmental problems and preventing the future ones
	CO4	To gain inherent knowledge on basic concepts of biodiversity in an ecological context and about the current threats of biodiversity
	CO5	To appraise the major concepts and terminology in the field of environmental pollutants, its interconnections and direct damage to the wildlife, in addition to human communities and ecosystems

UNIT I MULTIDISCIPLINARY NATURE OF ENVIRONMENT

(6 Hours)

Definition: scope and importance – Need for public awareness - Natural resources – Types of resources – Forest Resources – Water Resources – Mineral Resources – Food Resources – Energy Resources – Land Resources.

UNIT II ECOSYSTEMS

(6 Hours)

Concept of an ecosystem – Structure and functions of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, foodweb and ecological pyramids – Structure and function of the following ecosystem – Forest Ecosystem – Grassland Ecosystem – Desert Ecosystem – Aquatic Ecosystem.

UNIT III BIODIVERSITY AND ITS CONSERVATION

(6 Hours)

Introduction – Definition – Genetic – Species and ecosystem diversity- Bio geographical classification of India – Value of biodiversity – Biodiversity at global, national and local levels – India as a mega - diversity Nation - Hot spot of biodiversity – Threats to biodiversity - Endangered and endemic species of India – Conservation of Biodiversity – *In situ* Conservation of Biodiversity – *Ex situ* Conservation of Biodiversity.

UNIT IV ENVIRONMENTAL POLLUTION

(6 Hours)

Definition - Causes, effects and control measures of : Air Pollution – Water Pollution – Soil Pollution – Marine Pollution – Noise Pollution – Thermal Pollution – Nuclear Pollution – Solid Waste Management: Causes, effects, control measures of urban and industrial wastes – Role of individual in prevention of pollution – Pollution case studies – domestic waste water, effluent from paper mill and dyeing, cement pollution – Disaster Management – Flood, Drought, Earthquake, Tsunami, Cyclone and Landslide.

UNIT V SOCIAL ISSUES AND THE ENVIRONMENT

(6 Hours)

Sustainable Development – Smart City, Urban planning, Town Planning , Urban problems related to energy – Water Conservation: Rain Water Harvesting and Watershed Management – Resettlement and rehabilitation of people, its problems and concerns, case studies Narmada Valley Project – Environmental ethics, issues and possible solutions – Climate change, global warming, ozone layer depletion, acid rain, nuclear accidents and holocaust, case studies – Hiroshima and Nagasaki, Chernobyl – Consumerism and waste products – Environmental Protection Act – Air Pollution Act (Prevention and Control) – Water Pollution Act (Prevention and control) – Wild Life Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental

legislation – Public awareness – Human Population and the environment – Population Growth and Distribution – Population Explosion – Family Welfare Programme – Environment and Human Health – Human Rights – Value Education – HIV/ AIDS – Women and Child Welfare – Role of Information Technology in Environment and Human Health.

Teaching Methods:

Smart Class Room / Power point presentation/Seminar/Quiz/Discussion

Text Book:

1. P.Arul, “**A Text Book of Environmental Studies**”, Environmental Agency, No27, Nattarstreet, Velacheery main road, Velacheery, Chennai – 42, First Edition, Nov. 2004.

Reference Books:

1. Purohit Shammi Agarwal, “**A Text Book of Environmental Sciences**”, Publisher Mrs. Saraswati Prohit, Student Edition, Behind Naswan Cinema Chopansi Road, Jodhpur.
2. Dr.Suresh and K.Dhameja, “**Environmental Sciences and Engineering**”, Publisher S.K.Kataria & Sons, 424/6, Guru Nanak Street, Vaisarak, Delhi – 110 006.
3. J.Glynn Henry and Gary W Heinke, “**Environmental Science and Engineering**”, Prentice Hall of India Private Ltd., New Delhi – 110 001.

Question Paper Pattern for General Papers**Environmental Studies****25EVS101****Question Paper Pattern****(External only)****Duration: 3 hours****Total Marks: 50**

Answer all Questions (5 x 10 = 50 Marks)

Essay type, either or type questions from each unit.

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Value Education – Moral and Ethics				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	2	30	2	

Course Objectives

1. To impart Value Education in every walk of life.
2. To help the students to reach excellence and reap success.
3. To impart the right attitude by practicing self-introspection.
4. To portray the life and messages of Great Leaders.
5. To insist the need for universal brotherhood, patience and tolerance.
6. To help the students to keep them fit.
7. To educate the importance of Yoga and Meditation.

Course Outcomes (CO)

After completing the course, the students will be able to:

K1 to K5	CO1	Will be able to recognize Moral values, Ethics, contribution of leaders, Yoga and its practice.
	CO2	Will be able to differentiate and relate the day to day applications of Yoga and Ethics in real life situations.
	CO3	Can emulate the principled life of great warriors and take it forward as a message to self and the society.
	CO4	Will be able to Analyse the Practical outcome of practicing Moral values in real life situation.
	CO5	Could Evaluate and Rank the outcome of the pragmatic approach to further develop the skills.

Syllabus

Unit I (4 Hours)

Moral and Ethics: Introduction – Meaning of Moral and Ethics – Social Ethics – Ethics and Culture– Aim of Education.

Unit II (6 Hours)

Life and Teachings of Swami Vivekananda: Birth and Childhood days of Swami Vivekananda – At the Parliament of Religions – Teachings of Swami Vivekananda.

Unit III (4 Hours)

Warriors of our Nation: Subhas Chandra Bose – Sardhar Vallabhbhai Patel – Udham Singh – V.O. Chidambaram Pillai – Bhagat Singh – Tiruppur Kumaran – Dheeran Chinnamalai- Thillaiyadi Valliammai – Velu Nachiyar – Vanchinathan.

Unit IV

(8 Hours)

Introduction -yoga and its benefits - Ardhasiddhasana- Yoga for peace- Yoga for health - Yoga for wellbeing - Yoga for success - Brain yoga benefits - The science of Yoga.

Unit V

(8 Hours)

Isha kriya -Surya Shakthi and it's benefits.

Teaching Methods:

Smart Class Room/PowerPoint presentation/Seminar/Quiz/Discussion
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Text Book:

1. Value Based Education – Moral and Ethics – compiled by Kongunadu Arts and Science College (Autonomous), 3rd Edition (2024).

Reference Books:

1. **Swami Vivekananda – A Biography**, Swami Nikhilananda, Advaita Ashrama, India, 24th Reprint Edition (2010).
2. **Gandhi, Nehru, Tagore and other eminent personalities of Modern India**, Kalpana Rajaram, Spectrum Books Pvt. Ltd., revised and enlarged edition(2004).
3. **Freedom Fighters of India**, Lion M.G. Agrawal, Isha Books Publisher, First Edition (2008).
4. **Easy steps to Yoga by Swami Vivekananda**, A Divine Life Society Publication (2000).

Sub. Code: 25VED201

Question Paper Pattern

(External only)

Duration: 3 hours

Total Marks: 50

Answer all Questions (5 x 10 = 50 Marks)

Essay type, either or type questions from each unit.

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Part IV - Non - Major Elective 1 - Human Rights				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	2	30	2	

Course Objectives

1. To prepare for responsible citizenship with awareness of the relationship between Human Rights, democracy and development.
2. To impart education on national and international regime on Human Rights.
3. To sensitive students to human suffering and promotion of human life with dignity.
4. To develop skills on human rights advocacy
5. To appreciate the relationship between rights and duties
6. To foster respect for tolerance and compassion for all living creature.

Course Outcomes (CO)

K1 to K5	CO1	To understand the hidden truth of Human Rights by studying various provisions in the Constitution of India.
	CO2	To acquire overall knowledge regarding the Feminist perspectives in the Liberative Empowerment of Women.
	CO3	To gain knowledge about various gender roles and stereotypes involved in the comprehension of gender equality and women's rights.
	CO4	To comprehend the legal provisions and policies that foreground the safety of children in the society and to promote awareness.
	CO5	To gain enhanced knowledge about sexual and gender minorities to recognize, celebrate and acknowledge the diversified forms of gender expressions and rights.

Syllabus**UNIT I (6 Hours)**

HUMAN RIGHTS HUMANS RIGHTS CONSTITUTION OF INDIA: Humans Rights - Constitution Of India

UNIT II (6 Hours)

WOMEN EMPOWERMENT IN INDIA: Feminism And Sexual Violence - Women And Liberation

UNIT III (6 Hours)

GENDER EQUALITY AND WOMEN'S RIGHTS: Stereotype Gender Roles - Women's Education, Power And Science

UNIT IV**(6 Hours)**

RIGHTS OF THE CHILD IN INDIA: Status of child in contemporary Indian society -
Special Laws and Policies for protection of children

UNIT V**(6 Hours)**

SOGIESC RIGHTS: Understanding SOGIESC- basic Definitions- inclusivity of SOGIESC- importance of studying SOGIESC- presence of SOGIESC in Indian Traditions- temples and cultural practices that exemplify SOGIESC in India- Genetics of Sex determination- Genetics of Intersex community- Successful SOGIESC Personalities and achievers – Alan Turing- Sally Ride- Leonardo da Vinci- Alan Hart- Virginia Woolf- Bayard Rustin- Padmini Prakash- Akkai Padmashali- K Prithika Yashini- Laxmi Narayan Tripathi- Madhu Bai Kinnar- Manabi Bandhopadhyay- SOGIESC Rights and laws

Teaching Methods:

Smart Class Room/PowerPoint presentation/Seminar/Quiz/Discussion

Books for Study:

1. Human Rights (2024) Compiled by Kongunadu Arts and Science College, Coimbatore –29.

Book for References:

1. Human Rights, (2018) by Jaganathan, MA., MBA., MMM., ML., ML., (Humanitarian Law) and J.P. Arjun Proprietor: Usha Jaganathan, Refugee Law Law series, 1st floor, Narmatha Nanthi Street, Magathma Gandhi Nagar, Madurai – 625014.
2. Country Report on SOGIESC Rights In India: An Unfinished Agenda.
Weblink: <https://www.ilgaasia.org/publications/india-country-report-an-unfinished-agenda>
3. Intersex.
Weblink: <https://my.clevelandclinic.org/health/articles/16324-intersex>
4. SOGIESC Personalities:
<https://www.bbc.com/news/world-asia-india-29357630>
https://en.wikipedia.org/wiki/Laxmi_Narayan_Tripathi
https://en.wikipedia.org/wiki/Akkai_Padmashali
<https://www.indiatoday.in/india/story/prithika-yashini-india-first-transgender-police-officer-tamil-nadu-969389-2017-04-04>
<https://yourstory.com/2018/03/first-transgendre-college-principal-west-bengal>

5. SOGIESC Rights and laws

<https://www.openglobalrights.org/lgbtqia-to-sogiesc-reframing-sexuality-gender-human-rights/>

<https://static1.squarespace.com/static/5a84777f64b05fa9644483fe/t/625ead0484f9005d75b92dd0/1650371887436/ILGA+Asia+India+Report+2021.pdf>

Non-Major Elective 1 – Human Rights

25UHR3N1

Question Paper Pattern

(External Only)

Duration: 3 Hours

Max.Marks: 75

Answer ALL Questions

Section - A (5x5=25)

Short answer questions, either or type, one question from each unit.

Section - B (5x10=50)

Essay answer questions, either or type, one question from each unit.

Programme Code: 12		B.Sc. Information Technology		
Title of the Paper: Part IV- Non- Major Elective 2 - Women’s Rights**				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	2	30	2	

Course Objectives

1. To know about the laws enacted to protect women against violence.
2. To impart awareness about the hurdles faced by women.
3. To develop a knowledge about the status of all forms of women to access to justice.
4. To create awareness about women's rights.
5. To know about laws and norms pertaining to protection of women.
6. To understand the articles which enables the women's rights.
7. To understand the Special Women Welfare laws.
8. To realize how the violence against women puts an undue burden on healthcare services.

Course Outcomes (CO)

After Completion of the Course the student will be able to

K1 to K5	CO1	Appraise the importance of Women's Studies and incorporate Women's Studies with other fields
	CO2	Analyze the realities of Women Empowerment, Portrayal of Women in Media, Development and Communication
	CO3	Interpret the laws pertaining to violence against Women and legal consequences
	CO4	Contribute to the study of the important elements in the Indian Constitution, Indian Laws for Protection of Women
	CO5	Spell out and implement Government Developmental schemes for women and create awareness on modernization and impact of technology on Women

Syllabus

Unit I

(6 Hours)

Women Studies:

Basic concepts of Women's studies in Higher education, Women's studies perspectives- Socialization- Patriarchy- Women's studies as an academic discipline- Growth and development of Women's studies as a discipline internationally and in India.

Unit II

(6 Hours)

Socio-economic Development of Women:

Family welfare measures, role of women in economic development, representation of women in media status of women land rights, women entrepreneurs, National policy for the empowerment of women.

Unit III**(6 Hours)****Women's rights – Access to Justice:**

Crime against women, domestic violence – physical abuse- verbal abuse – emotional abuse - economic abuse – minorities, dowry- harassment and death, code of conduct for work place, abetment of suicide.

Unit IV**(6 Hours)****Women protective acts:**

Protective legislation for women in the Indian constitution- Anti dowry, SITA, PNDT, and Prevention Sexual Harassment at Workplace (Visaka case), Domestic violence (Prevention) Act.

Unit V**(6 Hours)****Women and Child welfare:**

Safety provisions - various forms of mass media, radio, visual, internet, cyber space, texting, SMS and smart phone usage. Healing measures for the affected women and child society by private and public sector, NGO and society.

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Text Book:

1. **Women's Rights** (2021), Compiled by Kongunadu Arts & Science College, Coimbatore 641 029.

Reference Books:

1. **Rights of Indian women** by Vipul Srivatsava. Publisher: Corporate Law Advisor, 2014.
2. **Women's security and Indian law** by Harsharam Singh. Publisher : Aabha Publishers and Distributors, 2015
3. **Women's Property Rights in India** by Kalpaz publications, 2016.

Non Major Elective 2 – Women's Rights**25UWR4N2****Question Paper Pattern (External Only)****Duration: 3 hours****Max. Marks: 75****Answer ALL Questions****SECTION A****(5x5=25 Marks)**

Short answers, either or type, one question from each unit

SECTION B**(5X10=50 Marks)**

Essay type questions, either or type, one question from each unit

UIT -90

Programme Code: 12	B.Sc. Information Technology			
Title of the Paper: Part IV- Non- Major Elective 3 – Consumer Affairs				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	2	30	2	

Course Objectives

1. To familiarize the students with their rights and responsibilities as a consumer.
2. To understand the procedure of redress of consumer complaints.
3. To know more about decisions on Leading Cases by Consumer Protection Act.
4. To get more knowledge about Organizational set-up under the Consumer Protection Act.
5. To impart awareness about the Role of Industry Regulators in Consumer Protection.
6. To understand Contemporary Issues in Consumer Affairs.

Course Outcomes (CO)

K1 to K5	CO1	Able to know the rights and responsibility of consumers.
	CO2	Understand the importance and benefits of Consumer Protection Act.
	CO3	Applying the role of different agencies in establishing product and service standards.
	CO4	Analyse to handle the business firms' interface with consumers.
	CO5	Assess Quality and Standardization of consumer affairs

Syllabus**Unit I****(6 Hours)**

Conceptual Framework - Consumer and Markets: Concept of Consumer, Nature of markets: Liberalization and Globalization of markets with special reference to Indian Consumer Markets, E-Commerce with reference to Indian Market, Concept of Price in Retail and Wholesale, Maximum Retail Price (MRP), Fair Price, GST, labeling and packaging along with relevant laws, Legal Metrology. Experiencing and Voicing Dissatisfaction: Consumer buying process, Consumer Satisfaction/dissatisfaction-Grievances-complaint, Consumer Complaining Behaviour: Alternatives available to Dissatisfied Consumers; Complaint Handling Process: ISO 10000 suite

Unit II**(6 Hours)**

The Consumer Protection Law in India - Objectives and Basic Concepts: Consumer rights and UN Guidelines on consumer protection, Consumer goods, defect in goods, spurious goods and services, service, deficiency in service, unfair trade practice, restrictive trade practice. Organizational set-up under the Consumer Protection Act: Advisory Bodies: Consumer Protection Councils at the Central, State and District Levels; Adjudicatory Bodies: District Forums, State Commissions, National Commission: Their Composition, Powers, and Jurisdiction (Pecuniary and Territorial), Role of Supreme Court under the CPA with important case law.

Unit III**UIT -91****(6 Hours)**

Grievance Redressal Mechanism under the Indian Consumer Protection Law - Who can file a complaint? Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy available; Temporary Injunction, Enforcement of order, Appeal, frivolous and vexatious complaints; Offences and penalties.

Leading Cases decided under Consumer Protection law by Supreme Court/National Commission: Medical Negligence; Banking; Insurance; Housing & Real Estate; Electricity and Telecom Services; Education; Defective Products; Unfair Trade Practices.

Unit IV**(6 Hours)**

Role of Industry Regulators in Consumer Protection

- i. Banking: RBI and Banking Ombudsman
- ii. Insurance: IRDA and Insurance Ombudsman
- iii. Tele communication: TRAI
- iv. Food Products: FSSAI
- v. Electricity Supply: Electricity Regulatory Commission
- vi. Real Estate Regulatory Authority

Unit V**(6 Hours)**

Contemporary Issues in Consumer Affairs - Consumer Movement in India: Evolution of Consumer Movement in India, Formation of consumer organizations and their role in consumer protection, Misleading Advertisements and sustainable consumption, National Consumer Helpline, Comparative Product testing, Sustainable consumption and energy ratings.

Quality and Standardization: Voluntary and Mandatory standards; Role of BIS, Indian Standards Mark (ISI), Ag-mark, Hallmarking, Licensing and Surveillance; Role of International Standards: ISO an Overview.

Note: Unit 2 and 3 refers to the Consumer Protection Act, 2086. Any change in law would be added appropriately after the new law is notified.

Teaching Methods:

Smart Class Room / Power point presentation / Seminar/Quiz / Discussion / Flipped Class / peer Learning / Experiential Learning / Blended learning

Suggested Readings:

1. Khanna, Sri Ram, Savita Hanspal, Sheetal Kapoor, and H.K. Awasthi. (2007) Consumer Affairs, Universities Press.
2. Choudhary, Ram Naresh Prasad (2005). Consumer Protection Law Provisions and Procedure, Deep and Deep Publications Pvt Ltd.
3. G. Ganesan and M. Sumathy. (2012). Globalization and Consumerism: Issues and Challenges, Regal Publications
4. Suresh Misra and Sapna Chadah (2012). Consumer Protection in India: Issues and Concerns, IIPA, New Delhi
5. Rajyalaxmi Rao (2012), Consumer is King, Universal Law Publishing Company
6. Girimaji, Pushpa (2002). Consumer Right for Everyone Penguin Books.
7. E-books: -**
8. Empowering Consumers e-book, www.consumeraffairs.nic.in
9. ebook, www.bis.org
10. The Consumer Protection Act, 1986 and its later versions.

Non Major Elective 3 – Consumer Affairs

Question Paper Pattern

Duration: 3 hrs

Max: 75 marks

Section A (5 X 5=25)

Short notes - Either – Or/ Type - Question from each unit

Section B (5 X 10=50)

Essay type - Either – Or/ Type - Question from each unit

Programme Code: 12		B.Sc. Information Technology		
Title of the Paper: Part IV- Non- Major Elective 4 - Health and Wellness				
Batch	Hours/Week	Total Hours	Credits	Skill Development
2025 – 2028	2	30	2	

Skill Areas:

Physical Fitness, Nutrition, Mental Health, Awareness on Drug addiction and its effects

Purpose:

The Health & Wellness course focuses on teaching the elements of physical, mental, emotional, social, intellectual, environmental well-being which are essential for overall development of an individual. The course also addresses the dangers of substance abuse and online risks to promote emotional and mental health.

Learning Outcomes:

Upon completion of the Health & Wellness course, students will be able to:

1. Demonstrate proficiency in sports training and physical fitness practices.
2. Improve their mental and emotional well-being, fostering a positive outlook on health and life.
3. Develop competence and commitment as professionals in the field of health and wellness.
4. Awareness on drug addiction and its ill effects

Focus:

During the conduct of the Health & Wellness course, the students will benefit from the following focus areas:

1. Stress Management.
2. Breaking Bad Habits.
3. Improving Interpersonal Relationships.
4. Building Physical Strength & Inner Strength.

Role of the Facilitator:

The faculty plays a crucial role in effectively engaging with students and guiding them towards achieving learning outcomes. Faculty participation involves the following areas:

1. **Mentorship & Motivation:** The Facilitator mentors students in wellness and self-discipline while inspiring a positive outlook on health. Faculty teach stress management, fitness, and daily well-being.
2. **Promoting a Safe and Inclusive Environment:** The facilitator ensures a safe, inclusive, and respectful learning environment for active student participation and benefit.
3. **Individualised Support and Monitoring Progress:** The facilitator plays a crucial role in providing personalized support, monitoring and guidance to students.

Guided Activities:

In this course, several general guided activities have been suggested to facilitate the achievement of desired learning outcomes. They are as follows:

1. Introduction to Holistic Well-being.
2. Holistic Wellness Program- Nurturing Body and Mind
3. Breaking Bad Habits Workshop.
4. Improving the elements of physical, emotional, social, intellectual, environmental and mental well-being.
5. Creating situational awareness, digital awareness.
6. Understanding substance abuse, consequences and the way out.

Period Distribution

The following are the guided activities suggested for this Audit course.

The Physical Director should plan the activities by the students.

Arrange the suitable Mentor / Guide for the wellness activities.

Additional activities and programs can be planned for Health and Wellness.

S.No	Guided Activities	Period
1	Introduction to Holistic Well-being <ol style="list-style-type: none"> 1. Introduce the core components of Health & Well-being namely Physical, mental and emotional well-being 2. Provide worksheets on all the four components individually and explain the interconnectedness to give an overall understanding. 	
2	Wellness Wheel Exercise (Overall Analysis)	

	<ul style="list-style-type: none"> ● Guide students to assess their well-being in various life dimensions through exercises on various aspects of well – being, and explain the benefits of applying wellness wheel. ● Introduce Tech Tools: ● Explore the use of technology to support well-being. ● Introduce students to apps for meditation, sleep tracking, or healthy recipe inspiration. 	
3	Breaking Bad Habits (Overall Analysis) <ul style="list-style-type: none"> ● Open a discussion on bad habits and their harmful effects. ● Provide a worksheet to the students to identify their personal bad habits. ● Discuss the trigger, cause, consequence and solution with examples. ● Guide them to replace the bad habits with good ones through worksheets. 	
4	Physical Well-being 1. Fitness Introduce the different types of fitness activities such as basic exercises, cardiovascular exercises, strength training exercises, flexibility exercises, so on and so forth. (Include theoretical explanations and outdoor activity). 2. Nutrition Facilitate students to reflect on their eating habits, their body type, and to test their knowledge on nutrition, its sources and the benefits. 3. Yoga & Meditation Discuss the benefits of Yoga and Meditation for one's overall health. Demonstrate different yoga postures and their benefits on the body through visuals (pictures or videos)	

	<p>4. Brain Health</p> <p>Discuss the importance of brain health for daily life.</p> <p>Habits that affect brain health (irregular sleep, eating, screen time).</p> <p>Habits that help for healthy brains (reading, proper sleep, exercises).</p> <p>Benefits of breathing exercises and meditation for healthy lungs.</p> <p>5. Healthy Lungs</p> <p>Discuss the importance of lung health for daily life.</p> <p>Habits that affect lung health (smoking, lack of exercises).</p> <p>Benefits of breathing exercises for healthy lungs.</p> <p>6. Hygiene and Grooming</p> <p>Discuss the importance of hygienic habits for good oral, vision, hearing and skin health.</p> <p>Discuss the positive effects of grooming on one's confidence level and professional growth.</p> <p><u>Suggested Activities (sample):</u></p> <p>Nutrition:</p> <p>Invite a nutritionist to talk among the students on the importance of nutrition to the body or show similar videos shared by experts on social media. Organize a 'Stove less/fireless cooking competition' for students where they are expected to prepare a nutritious dish and explain the nutritive values in parallel.</p>	
5	<p>Emotional Well-being</p> <p>1. Stress Management</p> <p>Trigger a conversation or provide self-reflective worksheets to identify the stress factors in daily life and their impact on students' performance.</p> <p>Introduce different relaxation techniques like deep breathing, progressive muscle relaxation, or guided imagery.</p> <p>(use audio recordings or visuals to guide them through these techniques).</p> <p>After practicing the techniques, have them reflect on how these methods can help manage stress in daily life.</p> <p>2. Importance of saying 'NO'.</p>	

	<p>Explain the students that saying 'NO' is important for their Physical and mental well-being, Academic Performance, Growth and Future, Confidence, Self-respect, Strong and Healthy Relationships, building reputation for self and their family (avoid earning a bad name).</p> <p>Factors that prevent them from saying 'NO'.</p> <p>How to practice saying 'NO'.</p> <p>3. Body Positivity and self-acceptance</p> <p>Discuss the following with the students.</p> <ul style="list-style-type: none"> • What is body positivity and self-acceptance? • Why is it important? • Be kind to yourself. • Understand that everyone's unique. <p><u>Suggested Activities(Sample):</u></p> <p>(Importance of saying 'NO')</p> <p>Provide worksheets to self-reflect on...</p> <p>...how they feel when others say 'no' to them</p> <p>...the situations where they should say 'no'</p> <p>Challenge students to write a song or rap about the importance of saying no and how to do it effectively.</p> <p>Students can perform their creations for the class.</p>	
6	<p>Social Well-Being</p> <p>1. Practicing Gratitude</p> <p>Discuss the importance of practicing gratitude for building relationships with family, friends, relatives, mentors and colleagues. Discuss how one can show gratitude through words and deeds. Explain how practicing gratitude can create 'ripple effect'.</p> <p>2. Cultivating Kindness and Compassion</p> <p>Define and differentiate between kindness and compassion. Explore practices that cultivate these positive emotions. Self-Compassion as the Foundation.</p>	

	<p>The power of small gestures. Understanding another's perspective. The fruits of compassion.</p> <p>3. Practising Forgiveness Discuss the concept of forgiveness and its benefits. Forgiveness: What is it? and What it isn't? Benefits of forgiveness. Finding forgiveness practices.</p> <p>4. Celebrating Differences Appreciate the value of individual differences and foster inclusivity. The World: A Tapestry of Differences (cultures, backgrounds, beliefs, abilities, and appearances). Finding strength in differences (diverse perspectives and experiences lead to better problem-solving and innovation). Celebrating differences, not ignoring them (respecting and appreciating the unique qualities). Activities for celebrating differences (share culture, learn about others, embrace new experiences).</p> <p>5. Digital Detox Introduce the students to: The concept of a digital detox and its benefits for social well-being. How to disconnect from devices more often to strengthen real-world connections.</p> <p><u>Suggested Activities (sample):</u> (Practicing Gratitude) Provide worksheets to choose the right ways to express gratitude. Celebrate 'gratitude day' in the college and encourage the students to honour the house keeping staff in some way to express gratitude for their service.</p>	
7.	<p>Intellectual Well-being 1. Being a lifelong Learner Give students an understanding on: The relevance of intellectual well-being in this 21st century to meet</p>	

	<p>the expectations in personal and professional well-being</p> <p>The Importance of enhancing problem-solving skills</p> <p>Cultivating habits to enhance the intellectual well-being (using the library extensively, participating in extra-curricular activities, reading newspaper etc.)</p> <p>2. Digital Literacy</p> <p>Discuss:</p> <p>The key aspects of digital literacy and its importance in today's world.</p> <p>It is more than just liking and sharing on social media.</p> <p>The four major components of digital literacy (critical thinking, communication, problem-solving, digital citizenship).</p> <p>Why is digital literacy important?</p> <p>Boosting one's digital skills.</p> <p>3. Transfer of Learning</p> <p>Connections between different subjects – How knowledge gained in one area can be applied to others.</p> <p><u>Suggested Activities(sample):</u></p> <p>Intellectual Well-being.</p> <p>Provide worksheets to students for teaching them how to boost intellectual well-being.</p> <p>Ask the students to identify a long-standing problem in their locality, and come up with a solution and present it in the classroom. Also organize an event like 'Idea Expo' to display the designs, ideas, and suggestions, to motivate the students to improve their intellectual well-being.</p>	
8	<p>Environmental Well-being</p> <p>1.The Importance of initiating a change in the environment.</p> <p>The session could be around:</p> <p>Defining Environmental well-being (physical, chemical, biological, social, and psychosocial factors) – People's behaviour, crime, pollution, political activities, infra-structure, family situation etc.</p> <p>Suggesting different ways of initiating changes in the environment (taking responsibility, creating awareness, volunteering,</p>	

	<p>approaching administration).</p> <p><u>Suggested Activities (sample):</u></p> <p>Providing worksheets to self-reflect on how the environment affects their life, and the ways to initiate a change.</p> <p>Dedicate a bulletin board or wall space (or chart work) in the classroom for students to share their ideas for improving environmental well-being.</p> <p>Creating a volunteers' club in the college and carrying out monthly activities like campus cleaning, awareness campaigns against noise pollution, (loud speakers in public places), addressing anti-social behaviour on the campus or in their locality.</p>	
9	<p>Mental Well-being</p> <p>1. Importance of self-reflection</p> <p>Discuss:</p> <p>Steps involved in achieving mental well-being (self-reflection, self-awareness, applying actions, achieving mental well-being).</p> <p>Different ways to achieve mental well-being (finding purpose, coping with stress, moral compass, connecting for a common cause).</p> <p>The role of journaling in mental well-being.</p> <p>2. Mindfulness and Meditation Practices</p> <p>Benefits of practicing mindful habits and meditation for overall well-being.</p> <p>1. Connecting with nature</p> <p>Practising to be in the present moment – Nature walk, feeling the sun, listening to the natural sounds.</p> <p>Exploring with intention – Hiking, gardening to observe the nature.</p> <p>Reflecting on the emotions, and feeling kindled by nature.</p> <p>2. Serving people</p> <p>Identifying the needs of others.</p> <p>Helping others.</p> <p>Volunteering your time, skills and listening ear.</p> <p>Finding joy in giving.</p> <p>3. Creative Expressions</p>	

	<p>Indulging in writing poems, stories, music making/listening, creating visual arts to connect with inner selves.</p> <p><u>Suggested Activities(Sample):</u> (Mindfulness and Meditation) – Conducting guided meditation every day for 10 minutes and directing the students to record the changes they observe.</p>	
10	<p>Situational Awareness (Developing Life skills)</p> <p>1. Being street smart</p> <p>Discuss: Who are street smart? Why is it important to be street smart? Characteristics of a street smart person: Importance of acquiring life skills to become street smart – (General First-aid procedure, CPR Procedure, Handling emergency situations like fire, flood etc).</p> <p>2. Digital Awareness</p> <p>Discuss: Cyber Security Information Literacy Digital Privacy Fraud Detection</p> <p><u>Suggested Activities</u> (sample): (Street Smart) Inviting professionals to demonstrate the CPR Procedure Conducting a quiz on Emergency Numbers</p>	
11	<p>Understanding Addiction</p> <p>Plan this session around: Identifying the environmental cues, triggers that lead to picking up this habit. Knowing the impact of substance abuse – Adverse health conditions, social isolation, ruined future, hidden financial loss and damaging the family reputation. Seeking help to get out of this addiction.</p> <p><u>Suggested Activities:</u></p>	

	Provide Worksheets to check the students' level of understanding about substance addiction and their impacts. Share case studies with students from real-life. Play/share awareness videos on addiction/de-addiction, experts talk. *Conduct awareness programmes on Drugs and its ill effects. (Arrange Experts from the concerned government departments and NGOs working in drug addiction issues) and maintain the documents of the program.	
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Closure:

Each student should submit a Handwritten Summary of their Learnings & Action Plan for the future.

Assessments:

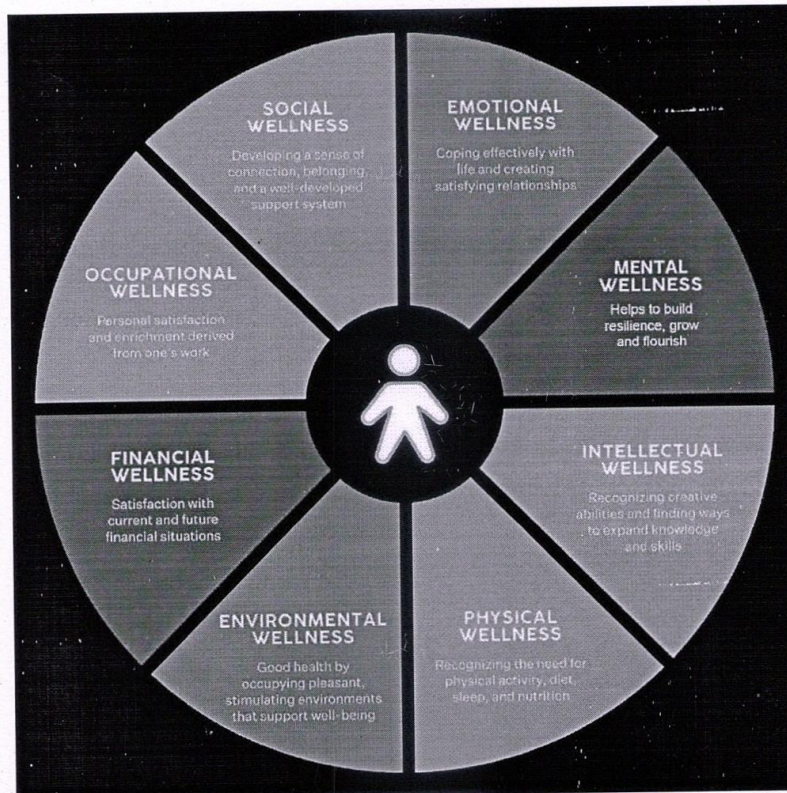
- Use Self-reflective worksheets to assess their understanding.
- Submit the worksheets to internal audit/external audit.
- Every student's activities report should be documented and the same have to be assessed by the Physical Director with the mentor. The evaluation should be for 100 marks. No examination is required.

Scheme of Evaluation

Part	Description	Marks
A	Report	40
B	Attendance	20
C	Activities (Observation During Practice)	40
Total		100

References/Resource Materials:

The course acknowledges that individual needs for references and resources may vary. However, here are some general reference materials and resources that may be helpful:

1. The Well-Being Wheel:

2. Facilities & Spaces: Some activities may require access to specific facilities, resources or spaces. Students may need to coordinate with the college administration to reserve these as required.

3. Online Resources:

1. United Nations Sustainable Development Goals - Goal 3 - Good Health & Well-Being: <https://www.un.org/sustainabledevelopment/health/>
2. Mindfulness and Meditation: Stanford Health Library offers mindfulness and meditation resources: <https://healthlibrary.stanford.edu/books-resources/mindfulness-meditation.html>

3. Breaking Bad Habits: James Clear provides a guide on how to build good habits and break bad ones: <https://jamesclear.com/habits>
4. 6 Ways to Keep Your Brain Sharp
<https://www.lorman.com/blog/post/how-to-keep-your-brain-sharp>
5. What Is Social Wellbeing? 12+ Activities for Social Wellness
<https://positivepsychology.com/social-wellbeing/>
6. How Does Your Environment Affect Your Mental Health?
<https://www.verywellmind.com/how-your-environment-affects-your-mental-health-5093687>
7. How to say no to others (and why you shouldn't feel guilty)
<https://www.betterup.com/blog/how-to-say-no>

**Certificate Programme
on
Technical Writing**

UIT -106

KONGUNADU ARTS AND SCIENCE COLLEGE
(AUTONOMOUS)
COIMBATORE – 641 029



DEPARTMENT OF INFORMATION TECHNOLOGY (UG)

Certificate Programme
on
Technical Writing

CURRICULUM AND SCHEME OF EXAMINATIONS
(2025 - 2026 onwards)

DEPARTMENT OF INFORMATION TECHNOLOGY

Vision:

- To achieve excellent standards of quality education by keeping pace with rapidly changing technologies.
- To create technical manpower of global standards with capabilities of accepting new challenges in Information Technology.
- Integral Formation and Empowerment of students for social transformation through Information Technology.

Mission:

- To provide outstanding education and training to our graduate students for their productive careers in industry, academia, and government.
- To impart quality and value-based education to raise the satisfaction level of all stakeholders.
- To empower students with academic excellence, knowledge and training.
- To enable critical thinking among students towards development in IT with reference to social transformation.
- To apply new developments in Information Management and provide all possible support to promote research & development.
- To serve as a platform whereby the student enrich their personalities to assume greater responsibilities.

PROGRAMME OUTCOME (PO)

- PO1** To emphasise the importance of Technical in writing
- PO2** To train students in specified types of creative writing
- PO3** To develop various real time writing skills using latest technologies
- PO4** To understand the concept of knowledge representation and transform the real-life information into different representations.
- PO5** To bring out students originality in writing

PROGRAMME SPECIFIC OUTCOME (PSO)

On successful completion of this programme you will have knowledge and understanding of:

PSO1 An ability to apply scientific and technical principles in technical writing

PSO2 An ability to explore the distinctive features of creativity

PSO3 An ability to apply and independently write within academic institutions

PSO4 An ability to be generative to release fresh energy and to influence mind

PSO5 Use different techniques to reflect the writing methodology with creativity

KONGUNADU ARTS AND SCIENCE COLLEGE [Autonomous]**COIMBATORE - 641 029.****CERTIFICATE PROGRAMME IN TECHNICAL WRITING (Six Months)****CURRICULUM & SCHEME OF EXAMINATION****[APPLICABLE TO THE STUDENTS ADMITTED DURING THE ACADEMIC YEAR 2025-2026 & ONWARDS]**

	Subject code	Title of the Paper	Instruction Hours / Cycle	Exam. Marks			Duration of Exam (hrs)	Credits
				CIA	ESE	Total		
Semester	25CTW101	Core Paper 1 – Introduction to Technical Writing	3	25	75	100	3	2
	25CTW102	Core Paper 2 – Social Media Content Writing	3	25	75	100	3	2
	25CTW103	Core Paper 3 – Foundation of Creative Writing	3	25	75	100	3	2
	25CTW1CL	Core Practical 1 – Authoring tools Lab	3	40	60	100	3	2
	Total		12	-	-	400	-	8

Part-wise Total Marks:

SUBJECT	MARKS	TOTAL CREDITS
Core Theory	300	6
Core Practical	100	2

CIA – Continuous Internal Assessment**ESE - End of Semester Examination****50% CIA is applicable to all subjects for both Theory and Practical.**

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Components of Continuous Internal Assessment (50 Marks)

Components		Marks	Total
Theory			
CIA I	75	(75+75) Converted to 15	25
CIA II	75		
Assignment/Seminar		5	
Attendance		5	
Practical			
CIA Practical		25	40
Observation Notebook		10	
Attendance		5	

* Class Participation, Case Studies Presentation, Field Work, Field Survey, Group Discussion, Term Paper, Workshop/Conference Participation. Presentation of Papers in Conferences, Quiz, Report/Content writing. Etc.

** Two Assignments to be given. (Each 5 marks).

BLOOM'S TAXONOMY BASED ASSESSMENT PATTERN

K1-Remembering; **K2**-Understanding; **K3**-Applying; **K4**-Analyzing; **K5**-Evaluating

1. Theory Examination:

(i) CIA I & II and ESE: 75 Marks

Knowledge Level	Section	Marks	Description	Total
K1 Q1 to 10	A (Answer all)	10 x 1 = 10	MCQ	75
K1 – K5 Q11 to 15	B (Either or pattern)	5 x 5 = 25	Short Answers	
K2 – K5 Q16 to 20	C (Either or pattern)	5 x 8 = 40	Descriptive / Detailed	

****For ESE 50 marks converted to 25 marks.**

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2. ESE Practical Examination:

Knowledge Level	Section	Marks	Total
K3	Experiments Record Work	50	60
K4		10	
K5			

Programme Code: 12		CERTIFICATE PROGRAMME ON TECHNICAL WRITING	
Title of the Paper: Core Paper 1 – Introduction To Technical Writing			
Batch	Hours / Week	Total Hours	Credits
2025-2026	3	45	2

Course Objectives

1. To teach technical writing concepts.
2. To learn the Principles of technical writing.
3. To understand the development process in technical writing.

Course Outcomes (CO)

K1 to K5	CO1	Remember the basis of technical writing.
	CO2	Understand about Roles and responsibilities of writers.
	CO3	Apply the Stages of Technical writing.
	CO4	Analyze the use of Technical Reports, project proposals etc.
	CO5	Evaluate and assess the writing process .

Syllabus

Unit I

(9 Hours)

What is technical writing? Difference between technical writing and other forms of writing. Qualities and qualifications of technical writers. End products of technical writing. professionals involved - project manager/editor, writers, graphic artists; liaison with product engineers/scientists and clients.

Unit II

(9 Hours)

Roles and responsibilities of writers, editors/project managers. 7 Cs of effective writing: Document formats – hard and soft copy versions designs. Principles of technical writing; styles in technical writing; clarity, precision, coherence and logical sequence in writing.

Unit III**(9 Hours)**

Stages of Technical writing. Document development process, Technical documentation, Planning, Tools, architecture, templates, content development, technical reviews, editorial reviews. Quality control.

Unit IV**(9 Hours)**

Technical reports, project proposals, project abstracts, project documents and manual writing, proposal writing, writing resumes and cover letters. Creating a technical Document. Translation techniques of translation, manual translation, translating advertisements, press releases, copy and reports.

Unit V**(9 Hours)**

The writing process-aim of writing, knowing the writing assignment, its clients and end users; gathering of facts/date. Technical writing software tools, Microsoft word, Macro media robohelp, adobe frame maker, snag IT, MS Visio, Powerpoint, Photoshop.

Teaching Methods:

Chalk and Talk, Smart Class Room, Powerpoint Presentation, Seminar, Quiz & Discussion

Text Books :

1. Dan Jones , Sam Dragga, **Technical writing style**, Preason Publication, 1997.
2. Walter.E.Ollu, **Handbook of Technical writing**, St. Martin's Press , 2011.
3. Kieran Morgan and Sanja Spejic, **Technical writing process**, Illustrated Publications, 2015.
4. Tyagi .K, **Advanced Technical Communication**, Prentice Hall India Learning Private Limited, 2011.
5. Mike Markel, **Technical Communication**, Bedford St. Martins, 2009.

Mapping

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	S	H	M	S
CO3	H	S	H	S	H
CO4	S	S	H	S	H
CO5	S	H	H	S	M

S – Strong**H** – High**M** – Medium**L** – Low

Programme Code: 12		CERTIFICATE PROGRAMME ON TECHNICAL WRITING	
Title of the Paper: Core Paper 2 – Social Media Content Writing			
Batch	Hours / Week	Total Hours	Credits
2025-2026	3	45	2

Course Objectives

1. To teach the writing process.
2. To learn the basics of media writing.
3. To understand the about ABCD Media writing and journalism.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the basis of writing process.
	CO2	Understand about Media Writing.
	CO3	Applying Grammar and Vocabulary.
	CO4	Analyzing the use of New Media and Journalism.
	CO5	Evaluate and assess the Writing for Web.

Syllabus

Unit I (9 Hours)

Understanding Writing Process -Writing Process: Brainstorming for Ideas, Idea Organization and Audience Analysis - Writing Mechanism: Opening, Developing and Winding up the Argument/ Narrative - Editing, redrafting and Formatting - Abstract, Essay and Column Writing.

Unit II (9 Hours)

Introduction to Media Writing- Fundamentals of Media Writing: Descriptive, Narrative, Objective and Reflective – Case studies and examples.

Unit III (9 Hours)

ABCD of Media Writing: Grammar and Vocabulary - Writing for News and Non-news Mediums for Print media - Writing for News and Non-news Mediums for Electronic media.

Unit IV**(9 Hours)**

New Media and Journalism - Concept and definition of online journalism - Features of online journalism -Types of online journalism A. News websites B. Blogs: Creation and writing C. Citizen Journalism - Social Media: Facebook, Twitter, Instagram, LinkedIn etc.

Unit V**(9 Hours)**

Writing for Web - Writing news stories, features and articles for Web- Interview and chats on the web as news source - Mobile digital news formats - Computer Assisted Journalism (CAJ) - Introduction to CMS (Content Management System).

Teaching Methods:

Chalk and Talk, Smart Class Room, Powerpoint Presentation, Seminar, Quiz & Discussion

Text Books:

1. Choudhary, R, **Media Writing**, Centrum Press, 2010.
2. Howard, P, **Perfect your Punctuation**, Longman Cheshire, 1986.
3. Sinha, P. K, **Media Writing**, Indian Distributors, 2006.
4. Vander Mey, R. **The College Writer: A guide to Thinking, Writing and Researching**, Houghton Mifflin, 2004.
5. Wren & Martin, **High School English: Grammar &Composition**, Crescent News, 2008.

Mapping

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	S	H	H	S	H
CO4	S	S	S	S	M
CO5	S	S	S	H	M

S – Strong **H** – High **M** – Medium **L** – Low

Programme Code: 12		CERTIFICATE PROGRAMME IN TECHNICAL WRITING	
Title of the Paper: Core Paper 3 – Foundation Of Creative Writing			
Batch	Hours / Week	Total Hours	Credits
2025-2026	3	45	2

Course Objectives

1. To teach the features of Interpreting Pictures.
2. To learn the Tools and Techniques.
3. To understand Writing Advertisements.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the Features of creativity.
	CO2	Understand Various Dialog Writing.
	CO3	Developing Imagination.
	CO4	Analyzing the use of Advertisements for business .
	CO5	Evaluate and assess the Writing for Media.

Syllabus

Unit I

(9 Hours)

Features of creativity -Writing Imaginary Poems, Stories and Essays Visualization- Quick Writing- Interpreting Pictures- Writing poetry using metaphor, simile - Writing with Rhyme scheme.

Unit II

(9 Hours)

Various Kinds of Writing-Genres - Tools and Techniques - Using video clippings as creative writing resources-Writing Drama – Dialogues-story and Character Development.

Unit III

(9 Hours)

Developing Imagination- Writing strategies: Description, narration, instructions, recommendations, comparison and contrast, cause and effect, definition, classification-Number of generative exercises.

Unit IV

(9 Hours)

Writing Advertisements-for business- Taboo words in writing- writing autobiography- writing a short story- Writing about improbable conditions.

Unit V**(9 Hours)**

Political news Sports -Health issues- Business enquiry- Educational- Local Problems and Solutions given by the Government-current issues.

Text Books:

1. Daniel Wessel, **Organizing Creativity**, Amazon Asia-Pacific Holdings Private Limited, 2023.
2. Ed Swick, **Writing Better English for ESL Learners**, Second Edition Paperback 2009.
3. Jordan, R. R. **Academic Writing Course: Study Skills in English**, Pearson Education Ltd., 1999.
4. Stephen King, **On Writing Well**, Hodder Paperbacks, 2012.
5. Tara Mokhtari, **The Bloomsbury Introduction to Creative Writing**, The Bloomsbury Publication, 2015.

Mapping

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	S	H	H	S	H
CO4	S	S	S	S	M
CO5	S	S	H	S	S

S – Strong**H** – High**M** – Medium**L** – Low

Programme Code: 12		CERTIFICATE PROGRAMME ON TECHNICAL WRITING	
Title of the Paper: Core Practical 1 – Authoring Tools Lab			
Batch	Hours / Week	Total Hours	Credits
2025-2026	3	45	2

Course Objectives

1. To teach the various on line software tools for creating web page.
2. To learn the techniques of content management.
3. To understand creation of Advertisements and other Web contents.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the Features of creativity.
	CO2	Understanding Various Drawing and Writing tools.
	CO3	Developing Imagination.
	CO4	Analyzing the use of Advertisements for business.
	CO5	Evaluating and assessing the media potential.

List of Practical Programs

1. Create animated GIF files, image maps using Canva / Makeagif / Figma.
2. Plan and design a small Web site using HTML Basic Tags.
3. Create and Web page using templates from Canva/AI tools.
4. Create and add animation, marquees, and page transitions to the Web site using HTML/Figma/Canva.
5. Draw a landscape using multiple Layers using Easy Generator/Course Lab Free.
6. Use Effective Cropping Techniques to design a collage using online tools.
7. Pick any picture of a magazine cover page and make changes using selection tool using online tools.
8. Add content to a Webpage using online tools.
9. Create a Newspaper content using any of the tools using online tools.
10. Design a poster for 2024 election and show the difference in resolution and quality for Print and Web using online tools.

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3 Hours / 60 marks)

Record: 10 marks

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	5	5
Program Coding	15	15
Execution & Modifications	5	5

Teaching Methods:

Presentation and Program Demonstration using Projector
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Mapping

<div>PSO</div> <div>CO \</div>	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	M	S	H
CO4	S	S	S	S	S
CO5	S	S	S	S	H

S – Strong

H – High

M – Medium

L – Low

Job Oriented Course

Title of the Paper: JOC – 1- Mobile Application Development Lab		
Hours / Week 2	Total Hours 30	Credits 2

Course Objectives

1. To Understand the Mobile Development Landscape.
2. To Learn Mobile Development Frameworks and Languages.
3. Design User-Friendly Interfaces.
4. Develop Functional Mobile Applications
5. Test and Debug Mobile Apps and Understand App Deployment.

Syllabus

1. Write a program for Mobile Application that creates Alarm Clock.
2. Write a program for Mobile application to rotating an image.
3. Write a program to develop an application that uses GUI Components, Font and Colors.
4. Write a program to develop a native Calculator Application.
5. Write a program to implement an application that creates an alert upon receiving a message.
6. Write a program to develop an application for working with Graphics and Animation.
7. Write a program to develop an application for working with location-based services.
8. Write a program to develop an application for working with device camera.
9. Write a program to develop an application for connecting to the Internet and sending mail.
10. Write a program to design a simple To-do list application using SQLite.

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Title of the Paper: JOC – 2 - Quantitative Aptitude		
Hours / Week 2	Total Hours 30	Credits 2

Course Objectives

1. Understand about Master Fundamental Mathematical Concepts
2. To Develop Analytical and Logical Thinking.
3. Understand about Data Interpretation and Analysis, Master Time, Work, and Speed Problems
4. Solve the Probability and Permutation/Combination Problems.
5. Improve Speed and Accuracy in Solving Problems

Syllabus

UNIT – I

5 Hours

Numbers - Simplification - BODMAS rule - Number Systems - LCM and HCF - Decimal Fractions – Simplification - Square Roots and Cube Roots - Average - Problems on Ages - Surds & Indices - Percentages - Problems on Numbers.

UNIT – II

5 Hours

Permutation and Combinations - Probability - Profit and Loss - Simple and Compound Interest – Time, Speed and Distance - Time & Work Ratio and Proportion Area - Mixtures and Allegation

UNIT – III

5 Hours

Data Interpretation - Tables - Column Graphs - Bar Graphs - Line Charts - Pie Chart - Venn Diagrams

UNIT – IV

5 Hours

Analogy - Blood Relation - Directional Sense - Number and Letter Series - Coding – Decoding - Calendars - Clocks - Venn Diagrams - Seating Arrangement - Syllogism - Mathematical Operations.

UNIT – V

5 Hours

Problems on Trains - Heights and Distances – Discount – Partnership - Stocks & Shares - Odd Man Out & Series.

Text Book :

1. “R S Agarwal”, 2015, Quantitative aptitude for Competitive examination.
2. “Abhijit Guha”, 4th edition, Quantitative Aptitude by Competitive Examinations.

Title of the Paper: JOC –3 - Linux Lab		
Hours / Week 2	Total Hours 30	Credits 2

Course Objectives

1. Describe the architecture and features of Linux Operating System
2. To create programs in the Linux environment using Linux utilities and commands.
3. Student is given an introduction of Linux shell commands and they will be able to write own shell scripts.
4. Shell programming is dealt in depth which can be used to develop applications.

List of Practical Programs

1. Write a shell script to stimulate the file commands: rm, cp, cat, mv, cmp, wc, split, diff.
2. Write a shell script to show the following system configuration :
 - a. currently logged user and his log name
 - b. current shell , home directory , Operating System type , current Path setting , current working directory
 - c. show currently logged number of users, show all available shells
 - d. show CPU information like processor type , speed
 - e. show memory information
3. Write a Shell Script to implement the following: pipes, Redirection and tee commands.
4. Write a shell script for displaying current date, user name, file listing and directories by getting user choice.
5. Write a shell script to implement the filter commands.
6. Write a shell script to remove the files which has file size as zero bytes.
7. Write a shell script to find the sum of the individual digits of a given number.
8. Write a shell script to find the greatest among the given set of numbers using command line arguments.
9. Write a shell script for palindrome checking.
10. Write a shell script to print the multiplication table of the given argument using for loop.

Title of the Paper: JOC – 4 - Network Security and Management Lab		
Hours / Week 2	Total Hours 30	Credits 2

Course Objective

1. To enable the students to learn security attacks, policies and guidelines.
2. To learn and apply the data encryption methods in network security.
3. To understand the intrusion detection systems.
4. To understand the concept of security management, email and internet banking security policies.

List of Practical Programs

1. Write a program to encrypt the data using the encryption methods:
 - ☐ Substitution Ciphers
 - ☐ Transposition Ciphers
2. Write a program to implement DES algorithm.
3. Write a program to implement the Public Key Cryptography using Diffie –Hellman Algorithm.
4. Write a program to implement the Public Key Cryptography using RSA algorithm.
5. Write a program to secure the Database using User Authentication Security.
6. Write a server security program for Dynamic Page Generation.
7. Write a C program that contains a string (char pointer) with a value \Hello World'.
The program should AND or and XOR each character in this string with 127 and display the result.
8. Write a C/JAVA program to implement the Blowfish algorithm logic
9. Write a C/ JAVA program to implement the Diffie-Hellman Key Exchange mechanism.
10. Write a program to implement format string vulnerabilities.