UCA 1

KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

COIMBATORE – 641 029

*Course Name: Computer Applications

Curriculum and Scheme of Examination under CBCS

(Applicable to the students admitted during the Academic Year 2023-2024)

Semester	Part	Subject Code	Title of the Paper	Instruction hours/cycle	Exam. Marks			Duration of Exam (hours)	Credits
					CIA	ESE	TOTAL		
I	I	23TML101	Language I@	6	25	75	100	3	3
	II	23ENG101	English -I	6	25	75	100	3	3
	III	23UCA101	Core Paper 1 - C Programming	5	25	75	100	3	4
	III	23UCA1CL	Core Practical 1 - C Programming Lab	5	40	60	100	3	3
	III	23UCA1A1	Allied Paper 1 – Business Accounting	6	25	75	100	3	5
	IV	23EVS101	Environmental Studies **	2	-	50	50	3	2
	Total			**30**	**-**	**-**	**550**	**-**	**20**
II	I	23TML202	Language II@	6	25	75	100	3	3
	II	23ENG202	English –II	6	25	75	100	3	3
	III	23UCA202	Core Paper 2 - Object Oriented Programming with C++	5	25	75	100	3	4
	III	23UCA2CM	Core Practical 2- Object Oriented Programming with C++ Lab	5	40	60	100	3	3
	III	23UCA2A2	Allied Paper 2 – Mathematics I	6	25	75	100	3	5
	IV	23VED201	Value Education- Moral and Ethics**	2	-	50	50	3	2
	Total			**30**	**-**	**-**	**550**	**-**	**20**
III	I	23TML303	Language III@	6	25	75	100	3	3
	II	23ENG303	English –III	6	25	75	100	3	3
	III	23UCA303	Core Paper 3 - Data Structures with Java Programming	4	25	75	100	3	5
	III	23UCA3CN	Core Practical 3 - Data Structures with Java Programming Lab	4	40	60	100	3	4
	III	23UCA3A3	Allied Paper 3 – Mathematics II	6	25	75	100	3	5
	IV	23UGC3S1	Skill Based subject 1- Cyber Security	2	100	-	100	3	3
	IV	23TBT301/ 23TAT301/ 23UHR3N1	Basic Tamil* / Advanced Tamil**/ Non-major elective-I**	2	-	75	75	3	2
	Total			**30**	**-**	**-**	**675**	**-**	**25**

IV	I	23TML404	Language IV@	6	25	75	100	3	3
	II	23ENG404	English –IV	6	25	75	100	3	3
	III	23UCA404	Core Paper 4 -.Net Framework with Oracle	4	25	75	100	3	4
	III	23UCA4CO	Core Practical 4 - .Net Framework with Oracle Lab	5	40	60	100	3	3
	III	23UCA4A4	Allied Paper 4 – Distributed Operating System	5	25	75	100	3	5
	IV	23UCA4SL	Skill Based subject 2- Linux Programming Lab	2	40	60	100	3	3
	IV	23TBT402/ 23TAT402/ 23UWR4N2	Basic Tamil* / Advanced Tamil**/ Non-major elective- II**	2	-	75	75	3	2
	Total			**30**	**-**	**-**	**675**	**-**	**23**
V	III	23UCA505	Core Paper 5 - Software Engineering	6	25	75	100	3	4
	III	23UCA506	Core Paper 6 - Data Mining with R Programming	6	25	75	100	3	4
	III	23UCA507	Core Paper 7 - Artificial Intelligence and Expert Systems	6	25	75	100	3	4
	III	23UCA5CP	Core Practical 5 - Data Mining with R Programming Lab	5	40	60	100	3	3
	III	23UCA5E1	Major Elective 1	5	25	75	100	3	5
	IV	-	EDC	2	100	-	100	3	3
	-	23UCA5IT	Internship Training ****	Grade					
	Total			**30**	**-**	**-**	**600**	**-**	**23**
VI	III	23UCA608	Core Paper 8 - Web Designing	5	25	75	100	3	4
	III	23UCA609	Core Paper 9 – Python Programming	5	25	75	100	3	4
	III	23UCA610	Core Paper 10 – Data Science	5	25	75	100	3	4
	III	23UCA6CQ	Core Practical 6 - Web Designing Lab	6	40	60	100	3	3
	III	23UCA6E2	Major Elective 2	5	25	75	100	3	5
	III	23UCA6Z1	Project and Viva Voce***	4	20	80	100	-	5
	IV	23UCA6SM	Skill Based subject 3- Python Programming Lab	2	40	60	100	3	3
	Total			**30**	**-**	**-**	**700**	**-**	**28**
	V	23NCC $/NSS/YRC /PYE/ECC/RRC/ WEC101#	Cocurricular 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 – 23HIN/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. Project 4 hours will not include in the staff Work load.

**** 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 6 papers)

1. Multimedia System
2. Internet of Things
3. Software Project Management
4. Fuzzy logic
5. Information Security
6. Block Chain

Non-Major Elective Papers

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

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

23UCA5XL – Internet and Office Automation

 # 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)

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 paper.
- The students who complete any **MOOC On learning platforms like SWAYAM, NPTEL, Course era, IIT Bombay Spoken Tutorial etc.,** 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.
- 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	E-commerce Application Development with Mendix
V	Data Analytics using Tableau and Siemens Insight Hub

Components of Continuous Internal Assessment (50 Marks)

Components		Marks	Total
Theory			
CIA I	75	(75+75) converted to 30	50
CIA II	75		
Problem based Assignment**		10	
Attendance		5	
Others*		5	
Practical			
CIA Practical		(50) converted to 30	50
Observation Notebook		15	
Attendance		5	
Practical			
CIA Practical		(25) converted to 10	25
Observation Notebook		10	
Attendance		5	
Project			
Review		15	20
Regularity		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).

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BLOOM'S TAXONOMY BASED ASSESSMENT PATTERN

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

Theory Examination – Part I, II, III & IV (SBS only**)**

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 type)	5 x 5= 25	Short Answers	
K2 – K5 Q16 to 20	C (either or type)	5 x 8 = 40	Descriptive / Detailed	

****For ESE 75 marks converted to 50 marks.**

ESE Practical Examination:

Option 1 :

Knowledge Level	Section	Marks	Total
K3	Experiments	45	50
K4	Record Work	05	
K5			

Knowledge Level	Section	Marks	Total
K3	Experiments	20	25
K4	Record Work	05	
K5			

ESE Project Viva Voce:

Option 1:

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

Sub.Code: 23UCA101

Programme Code:10	**Bachelor of Computer Applications**		
Title of the Paper	**Core Paper 1 – C Programming**		
Batch **2023-2026**	**Hours / Week** **5**	**Total Hours** **75**	**Credits** **4**

Course Objectives

1. To train the student to the basic concepts of the C-programming language.
2. To provide exposure to problem-solving through programming and to develop programming skills.
3. To impart adequate knowledge of programming languages and problem-solving techniques.

Course Outcomes (CO)

K1 to K5	CO1	Developing programs using the control statements, Arrays and Strings.
	CO2	Understanding about the code reusability with the help of user defined functions.
	CO3	Developing programs using pointer, enumerated data types, function, Union and nested structures.
	CO4	Learning the file handling mechanism that is essential for storing and accessing data.
	CO5	Determine efficient techniques in programming to solve various real time problems.

Syllabus

UNIT I **(14 Hours)**

Overview of C: History of C – Importance of C- Sample programs – Basic Structure of C programs – Programming style. Constants, Variables and Data types: Character set – C Tokens – Keywords and Identifiers – Constants – Variables – Data types – Operators and Expressions: Introduction – Arithmetic operator – Relational operators – Logical operators -Assignment-Increment and Decrement-Conditional– Bitwise operators -Special Operators – Type conversions in Expressions – Operator precedence and Associativity. Managing Input and Output operations: Reading and Writing Character-Formatted Input – Formatted Output.

UNIT II **(15 Hours)**

Decision making and Branching: Decision making with if statement – Simple if statement – The if ….else statement-Nested If-Else-If Ladder – The Switch statement-The Ternary Operator. Looping: The while statement – The do statement – The for statement – **Jumps in loops*.**

Sub.Code: 23UCA101

UNIT III **(16 Hours)**

Arrays: Introduction – one dimensional Arrays – Declaration of one dimensional Array – Initialization of one dimensional Arrays – Two dimensional Arrays – Initializing Two dimensional Arrays – Multidimensional Arrays. Character Arrays and Strings: String handling functions. User defined functions: Definition of Functions – Function Declaration – Category of Functions – No Arguments and No Return values – Arguments but No Return values – Arguments with Return values – No Arguments but Returns a value - Functions that Return Multiple Values- Recursion – The Scope, Visibility and Lifetime of Variables.

UNIT IV **(16 Hours)**

Pointers: Understanding pointers –Accessing the Address of the Variables- Declaring pointer variables – Pointer and Arrays- Pointers and Character strings – Array of pointers –Pointers as FunctionArguments- Functions returning pointers. The Preprocessor: Macro Substitution.

UNIT V **(14 Hours)**

Structures and Unions: Introduction – Defining a Structure – Declaring Structure variables – Structure Initialization –Array of Structures-Arrays with in Structures-Structures with in Structures– Unions. File Management in C: Defining and Opening a File – Closing a File – Input/output Operationson Files – Command Line Arguments.

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

Teaching Methods

Smart classroom / Powerpoint presentation / Seminar / Quiz / Discussion

Text Books

1. E. Balagurusamy, (2008), **"Programming in ANSI C",** Eighth Edition -Tata McGraw Hill

Reference Books

1. Ashok N Kamthane, (2007), **"Programming with ANSI and Turbo C",** Pearson Education Publication.
2. P.J.Deitel and H.M.Deitel, (2008**), "C How to Program",** 5th Edition, Tata McGraw Hill.
3. Yeswanth Kanethkar, (2007),**"Let Us C"**, Eigth Edition - BTB Publications.

Sub. Code: 23UCA101

MAPPING

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

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

Sub.Code: 23UCA1CL

Programme Code: 10	**Bachelor of Computer Applications**		
Title of the Paper	**Core Practical 1 - C Programming Lab**		
Batch **2023-2026**	**Hours / Week** **5**	**Total Hours** **75**	**Credits** **3**

Course Objectives

1. To introduce C Programming concepts to develop the programming knowledge.
2. To enhance their analyzing and problem-solving skills and use the same for writingprograms in C.
3. To guide the candidates to explore the fundamental building blocks in the programming language.

Course Outcomes (CO)

K3 to K5	CO1	Learning process helps in deep understanding the concepts of C language.
	CO2	Applying the various basic programming constructs like decision making statements, looping statements, functions, structures, pointers etc.,
	CO3	Developing programs using control statements, Arrays and Strings.
	CO4	Enabling effective usage of arrays, structures, functions and pointers.
	CO5	Implementing the files and command line arguments.

LIST OF PRACTICAL PROGRAMS

1. Write a program to find the median for a given set of numbers.
2. Write a program to find the Standard Deviation for a given set of numbers.
3. Write a program to find the number of palindrome strings in a given sentence.
4. Write a program to generate N Prime and Armstrong numbers.
5. Write a program to perform Matrix addition & Multiplication using Arrays.
6. Write a program to calculate NCR using the formula NCR = N! / (R! * (N-R)!) Using functions.
7. Write a program to print Fibonacci Series using Recursive Function.
8. Write a program to print the student's mark sheet assuming roll number, name, and marks in five subjects in a structure. Create an array of structures and print the mark sheet in the university pattern.
9. Write a program to perform string manipulation operations.
10. Write a program to perform all manipulations like insertion, deletion and modification in filesfor student mark list.

Sub.Code: 23UCA1CL

11. Write a program, which takes a file as command line argument and copy it to another file. At the end of the second file write

    i) Number of characters,
    ii) Number of words and
    iii) Numbers of lines are available in the first file.

Teaching Methods:

Smart Classroom, ~~Projectors,~~ Discussions

Guidelines to the distribution of marks for practical Examinations:

Two questions will be given for each student (3 Hours / 60 Marks)

1. Record Work – 10 Marks
2. Algorithm, Program, Typing and Execution: 50 Marks.

Particulars	Program I (Marks)	Program II (Marks)
Algorithm	5	5
Program Writing	15	15
Typing and Execution	5	5

MAPPING

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

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

Sub.Code: 23UCA202

Programme Code: 10	**Bachelor of Computer Applications**		
Title of the Paper	**Core Paper 2 – Object Oriented Programming with C++**		
Batch **2023-2026**	**Hours / Week** **5**	**Total Hours** **75**	**Credits** **4**

Course Objectives

1. To perform object- oriented programming to develop solutions to problems demonstrating usageof control structures, modularity, I/O and other standard language constructs.
2. To develop an in-depth understanding of functional, logic, and object-oriented programming paradigms.
3. To program using more advanced OOP's features such as objects, operator overloading, dynamicmemory allocation, inheritance and polymorphism, File I/O.

Course Outcomes (CO)

K1 to K5	CO1	Understanding the features of C++ Programming.
	CO2	Understanding the advanced features of C++ specifically, Operator Overloading, Templates, Streams.
	CO3	Applying the major object-oriented concepts to implement programs, Inheritance and Polymorphism
	CO4	Implementing different Operations on Functions, Classes & Object, and Constructors.
	CO5	Evaluate the usage of object oriented programming in terms of software reuse and managing complexity to solve real-world problems.

Syllabus

UNIT I **(15 Hours)**

Procedure Oriented Programming – Basic Concepts of Object-Oriented Programming -Beginning with C++ - Expression & Control Structure: Data Types – Reference Variables – Operators in C++ - Scope Resolution Operator – Type Cast Operator – Branching & Looping.

UNIT II **(15 Hours)**

Functions: Function Prototypes – Call by Reference – Return by Reference – Inline Functions – **Default & Const Argument *-** Function Overloading – Friend Functions.

UNIT III **(15 Hours)**

Classes & Objects – Constructors and Destructors: Constructors – Parameterized Constructors – Multiple Constructors in a Class – Constructors with Default arguments – Copy Constructors – Destructors.

Sub.Code: 23UCA202

UNIT IV **(15 Hours)**

Operator Overloading – Inheritance: Defining derived class – Types of inheritance – Virtual Base Class. Pointers: This pointer – Pointers to Objects – Virtual functions & Polymorphism – Templates.

UNIT V **(15 Hours)**

Working with Files: Classes for file stream operation - Opening and closing a file – File pointers and their manipulations – Command Line Arguments.

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

Teaching Methods

Smart ClassRoom / Powerpoint Presentation / Seminar / Quiz / Discussion

Text Book

1. E.Balagurusamy, (2020), "Object Oriented Programming with C++", Eighth Edition - Mc Graw Hill Publications.

Reference Books

1. Ashok N. Kamthane, (2003) - "Object oriented Programming with ANSI and Turbo C++", FirstEdition - Pearson Education Publication.
2. Yashavanth Kanetkar, (2008), "Let us C++", Fourth Edition - BPB Publications.

MAPPING

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

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

Sub.Code: 23UCA2CM

Programme Code: 10	**Bachelor of Computer Applications**		
Title of the Paper	**Core Practical 2 – Object Oriented Programming with C++ Lab**		
Batch **2023-2026**	**Hours / Week** **5**	**Total Hours** **75**	**Credits** **3**

Course Objectives

1. To develop programming skills using object - oriented concepts.
2. To develop the ability to write a program to solve specific problems.
3. To practice the fundamental methodology to implement file and I/O stream concepts.

Course Outcomes (CO)

K3 to K5	CO1	Apply the various basic programming constructs like decision making statements, Looping statements, functions, concepts like overloading, inheritance, polymorphism, virtual functions, constructors and destructors.
	CO2	Designing programs using appropriate predefined functions and classes in C++.
	CO3	Developing applications using Friend functions, Inheritance and polymorphism.
	CO4	Developing a C++ application using the concepts of Templates, stream I/O, Files and usage of the available classes to handle stream objects.
	CO5	Evaluate the implementation of command line arguments.

LIST OF PRACTICAL PROGRAMS

1. Develop a C++ Program to implement the concept of classes and objects.
2. Write a C++ Program to implement the types of Functions.
3. Develop a C++ Program to implement the concept of Function overloading.
4. Construct a C++ program to implement the concept of Constructors.
5. Develop a C++ Program to implement the concept of Operator overloading.
6. Develop a C++ Program to implement the concept of Inheritance.
7. Construct a C++ Program to implement the concept of Polymorphism using Virtual Functions.
8. Write a C++ program to swap two numbers using the concept of Function Templates.
9. Write a C++ program to perform White Space Suppression in a file.
10. Write a program that performs file copy using command line arguments.

Sub.Code: 23UCA2CM

Teaching Methods

Smart Classroom, Projectors,

Guidelines to the distribution of marks for practical Examinations:

Two questions will be given for each student (3 Hours / 60 Marks)

1. Record Work - 10 Marks
2. Algorithm, Program, Typing and Execution: 50 Marks.

Particulars	Program I (Marks)	Program II (Marks)
Algorithm	5	5
Program Writing	15	15
Typing and Execution	5	5

MAPPING

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

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

Sub.Code: 23UCA303

Programme Code:10	**Bachelor of Computer Applications**		
Title of the Paper	**Core Paper 3 – Data Structures with Java Programming**		
Batch **2023-2026**	**Hours / Week** **4**	**Total Hours** **60**	**Credits** **5**

Course Objectives

1. To obtain the basic knowledge of Data Structures and Object-Oriented Programming using the core Java programming language.
2. To understand the fundamentals of Constructors, Method Overloading, Arrays and Error handling mechanisms in Java and gaining knowledge about Stack and Queue, Sorting Techniques using Data Structures.
3. To inculcate the principles of Interfaces, Packages, Applets, Graphics Programming in Java and concepts in data structures such as Linked lists, Trees and Graphs.

Course Outcomes (CO)

K1 to K5	CO1	Acquiring knowledge java programming language for various programming technologies using data structure concepts.
	CO2	Understanding and applying concepts of Overloading and Interface. Arrays and Exception handling in java programming language.
	CO3	Analyzing the concepts of Stack, Queue with Sorting Techniques.
	CO4	Implementing java concepts with Linked lists, Trees and Sorting Techniques.
	CO5	Evaluating the types of graphs with relevant case studies.

Syllabus

UNIT I **(Hours:12)**

Object Oriented Programming- Classes, Creating Objects, Accessing objects methods, Constructors, Inheritance and Polymorphism. Basics of Arrays in Java- One Dimensional Arrays- Creating Array- Two dimensional Arrays. Managing Errors and Exceptions.

UNIT II **(Hours:12)**

Constructors- Method Overloading- Overriding Methods. Interfaces: Multiple Inheritance. Applet programming: Introduction-How applet differs from other applications-Applet Life cycle- Applet Tag, *Packages. Graphics programming: Introduction- The Graphics Class-Lines and Rectangles-Circles and Ellipses- Drawing Arcs Using Control Loops in Applets.

UNIT III **(Hours:12)**

Overview of Data Structures and Algorithms- Linear Search and Binary Search, Ordered Array. Overview of Stacks and Queues: Stack Class methods, Error Handling, Circular Queue and methods, Deque and Priority Queue .

Sub.Code: 23UCA303

UNIT IV **(Hours:12)**

Overview of Linked List and list operations, Sorted List and Unsorted List- Anagram and Towers of Hanoi. Simple Sorting- Bubble Sort, Selection Sort and Insertion Sort. Binary Trees: Preorder and Post order Traversal - Red Black Trees: Balanced and Unbalanced Trees. Heaps –Heap sort.

UNIT V **(Hours:12)**

Graphs: Overview, Vertices, Edges, Adjacency Matrix, Adjacency List, Depth first Search, Breadth First Search. Weighted Graphs: Minimum Spanning Tree with weighted Graphs, Shortest Path Problem. *** Case Studies for Weighted Graphs using Virtual Lab.**

*** Self Study Topic and Questions for examinations may be taken from Self Study Portions also.**

Teaching Methods

Projectors,Seminar,Discussions

Text Books:

1.E.Balagurusamy, **"Programming with Java**", McGrawHill Publication, 6th Edition, 2019.

2.Robert Lafore, "**Data Structures and Algorithms in Java**", Sams Publications, 2003.

Reference Books:

1. Robert Lafore, "**Data Structures and Algorithms in Java**", Mitchell Waite Publications, 1998.
2. Surbhi Kakar, "Java Programming", Wiley India Publication, 2019.
3. Michael T. Goodrich , Roberto Tamassia, "**Data Structures and Algorithms in Java"** John Wiley & Sons Publication, Fourth Edition.

Sub.Code: 23UCA303

MAPPING

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

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

UCA 19

Sub.Code: 23UCA3CN

Programme Code : 10	**Bachelor of computer applications**		
Title of the paper	**Core Practical 3 – Data Structure with Java Programming Lab**		
Batch **2023-2026**	**Hours / Week** **4**	**Total Hours** **60**	**Credits** **4**

Course Objectives

1. To understand the use of Data Structures and Java Programming.
2. To apply the principle concepts of data structures in Java.
3. To analyze the techniques followed in this practical paper.

Course Outcomes (CO)

K3 to K5	CO1	Designing the basic concepts of Data structures and Java Programming.
	CO2	Implementing types of search in data structures using Java.
	CO3	Validating the various fundamental concepts of Stack and Queue.
	CO4	Implementing concepts of linked lists and sorting techniques.
	CO5	Evaluate the nodes and Tree concepts

LIST OF PRACTICAL PROGRAMS

1. Write a java program to implement linear search.
2. Implement the concept of binary search using java.
3. Write a java program to implement the top element using Stack.
4. Write a java program to implement the concept of Queue Interface.
5. Implement a java program to display the first and the last element of a linked list
6. Write a Java program to demonstrate the working of Priority Queue.
7. Implement the concept of Selection sort using Applets.
8. Write a Java programs for implementing the Bubble sort
9. Write a Java programs for implementing the Insertion sort.
10. Write a java program to delete the nodes and the tree.

Sub.Code: 23UCA3CN

Teaching Methods

Smart Classroom, Projectors, Discussion

Guidelines to the distribution of marks for practical Examinations:

Two questions will be given for each student (3 Hours / 60 Marks)

1. Record Work - 10 Marks
2. Algorithm, Program, Typing and Execution: 45 Marks.

Particulars	Program I (Marks)	Program II (Marks)
Algorithm	5	5
Program Writing	15	15
Typing and Execution	5	5

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	M	S	M
CO5	H	S	S	S	H

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

Sub. Code : 23UCA404

Programme Code : 10	**Bachelor of Computer Applications**		
Title of the Paper	**Core Paper 4 – .NET Framework with Oracle**		
Batch	**Hours / Week**	**Total Hours**	**Credits**
2023-2026	**4**	**60**	**4**

Course Objectives

1. To design and develop the distributed event driven programming in both VB and .Net framework.
2. To analyze the Properties, Events and Methods CLR,
3. To apply .NET framework classes in .Net Environment.
4. To develop the knowledge in various Database concepts, queries, normalization and reports.
5. To be able to construct a new normalized database.

Course Outcomes (CO)

K1 to K5	CO1	Remember the basic Visual basic concepts and advanced features of VB.Net.
	CO2	Understand the concepts of .Net framework Technology and summarize the advantages and disadvantages of .Net framework.
	CO3	Apply the windows forms and menu contols using VB.Net.
	CO4	Apply various DDL and DML statements, joins queries, PL / SQLstatements.
	CO5	Analyze the granting and revoking permissions in cursors and Normalization forms.

Syllabus

UNIT I **(12 Hours)**

Essential Visual Basic – Upgrading from Visual Basic - .Net Frame work and the CLR – IDE– Building VB.Net Applications. Operations – Conditionals and Loops – Procedures, Scope and Exception Handling.

UNIT II **(12 Hours)**

Windows Forms – Adding Controls – Handling Events – Creating MDI applications –Textboxes, Rich Text boxes, Labels – Buttons, Check boxes, Radio buttons, panels and Group boxes – List box, **Checked list box***, Combo box and Picture box

Sub. Code : 23UCA404

UNIT III **(12 Hours)**

Windows Forms – Scroll bars, Splitters, Track Bars, Pickers, Notify Icons, Tool tips and Timers. Menus – Built in Dialog Boxes – Image list, Tree and List view, Toolbars, Status bars and progress bars and tabbed controls.

UNIT IV **(12 Hours)**

Interactive SQL : Invoking SQL * Plus- data definition- data manipulation in DBMS – The oracle data types – DML and DDL statements-Data constraints - arithmetic, logical operators- oracle functions - grouping data from tables - manipulating dates - union, intersect and minus clause - Granting permissions - Revoking permissions - Codd's Rules.

UNIT V **(12 Hours)**

PL/SQL: Introduction, PL/SQL syntax, understanding PL/SQL block structure, oracle transactions, cursors, stored procedures, stored functions, database triggers – **Creating Default Tabular Report***.

SQL: Nested Sub queries - Derived Relations – **Views** * - Joined Relations. Integrity Constraints: Domain Constraints- Referential Integrity Normalization-First Normal Form, Second Normal Form, Third Normal Form and BCNF.

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

Teaching Methods

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

TEXT BOOK

1. Steven Holzner, (2005), **Visual Basic .NET Black Book**, First Edition, Dream Tech Publication. (Unit I,II & III)

2. Ivan Bayross, (2007), **Commercial Application Development Using ORACLE Developer 2000**, First Edition. (Unit IV & V)

3. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, (2006), **Database System Concepts**, Fifth Edition, Tata McGraw Hill Publication. (Unit IV & V)

REFRENCE BOOKS

1. Evangelos Petroustes, (2002), **Mastering Visual Basic .NET**, First Edition, BPB Publication. (Unit I,II & III)

Sub. Code : 23UCA404

2. Bill Evjen Beres, (2002), **Visual Basic .NET Programming Bible** Wiley –DreamTech Publication. (Unit I,II & III)

3. Bipin. C. Desai, (2000), **An Introduction to Database Systems**, First Edition, Galgotia Publication. (Unit IV & V)

4. Ivan Bay Ross(1995), **Oracle 7 - The Complete Reference**, First Edition, BPBPublications, Chennai. (Unit IV & V)

MAPPING

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

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

Sub. Code : 23UCA4CO

Programme Code : 10	**Bachelor of Computer Applications**		
Title of the Paper	**Core Practical 4 – .Net Framework with Oracle Lab**		
Batch	**Hours / Week**	**Total Hours**	**Credits**
2023 - 2026	**5**	**75**	**3**

Course Objectives

1. To make the students to develop the database projects with a back end concept.
2. To construct .NET applications and to maintain the database.
3. To familiarize the students in crystal report creation.
4. To Construct the queries using DDL and DML queries and execute the console, window application, crystal report, PL/SQL triggers.
5. Apply the connectivity to retrieve the data from database.

Course Outcomes (CO)

K3 to K5	CO1	Apply the decision and control structures in .NET and apply the concepts of queries and creation of console applications.
	CO2	Analyze the concept of windows application and project creation and Oracle functions.
	CO3	Construct the queries using DDL and DML queries.
	CO4	Execute the console, window application, crystal report, PL/SQL triggers.
	CO5	Apply the connectivity to retrieve the data from database.

LIST OF PRACTICAL PROGRAMS

. NET FRAMEWORK

1. Perform Matrix Multiplication using Arrays Concept in Console Application
2. Program to simulate a simple calculator in Windows Application.
3. Program to simulate a digital clock with reset option in Windows Application
4. Develop a Simple Project, showing the process (using payroll process)

   1)Move first 2) Move Last 3) Move Previous 4) Move Next
5. Program for a notepad application in Windows Application.
6. Program to maintain student details in Windows Application.
7. Develop a Simple Project for Library Management using VB.NET as front end and ORACLE as back end and create a Crystal report.

Sub. Code : 23UCA4CO

ORACLE

1. Create a student mark list and do the following
   - ✓ Alter the table to add total and average fields with required size.
   - ✓ Modify to increase the total field size.
   - ✓ Calculate the total and average.
2. Create two tables in the name Employee_Personal and Employee_Salary usingPrimary and Foreign key concept and perform necessary operations.
   - ✓ Display the employee details who are all getting salary above15000.
   - ✓ Display the employee name and address who are all coming from city "Coimbatore" or "Chennai".
   - ✓ Display the employee name ,who are all coming from city "Coimbatore" and pin code 641029 or641001.
   - ✓ Display the employee details in descending order based on name.
3. Create a table and perform the queries using comparison, logical, set, sorting and grouping operators.
4. Write necessary queries to perform oracle built-in functions.
5. Write PL/SQL block to prepare electricity bill.
6. Write PL/SQL block:
   - ✓ Find the sum of individual number.
   - ✓ Find the given number is Armstrong number or not.
7. Create a Data base Triggers to check the validity of records.
8. Write PL/SQL block to partition the details of the student into two tables.

Guidelines to the distribution of marks for practical Examinations:

Two questions will be given for each student (3 Hours / 60 Marks)

1. Record Work - 10 Marks
2. Algorithm, Program , Typing and Execution : 50 Marks.

Particulars	**Program I (Marks)**	**Program II (Marks)**
Algorithm	5	5
Program Writing	15	15
Typing and Execution	5	5

Sub. Code : 23UCA4CO

MAPPING

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

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

Sub.Code : 23UCA4A4

Programme Code:10	**Bachelor of Computer Applications**		
Title of the Paper	**Allied Paper 4 : Distributed Operating System**		
Batch **2023-2026**	**Hours / Week** **5**	**Total Hours** **75**	**Credits** **5**

Course objective

1. To Describe basic concepts of Operating System and Computer Networks.
2. To understand about naming, security, distributed file system.
3. To understand about message passing, remote procedure calls.
4. Understand the need of distributed shared memory, synchronization.
5. Understand the scope of resource, process management.

Course Outcome

K1 TO K5	CO1	Gain knowledge of distributed operating system architecture (Knowledge)
	CO2	Illustrate principles and importance of distributed operating system (Understand)
	CO3	Implement distributed client server applications using remote method invocation (Apply)
	CO4	Distinguish between centralized systems and distributed systems (Analyze)
	CO5	Create stateful and state-less applications (Create)

Syllabus

Unit I **(15 Hours)**

Fundamentals of Distributed Operating System: Meaning – Evolution – Models – Issues in designing Distributed Operating System.

Fundamentals of Computer Networks: Introduction – Network Types – LAN, WAN Technologies – Common Protocols.

Unit II **(15 Hours)**

Message Passing: Introduction – Features – Synchronization – Buffering – Multidatagram Message Passing – Encoding and Decoding of Message Data – Process Addressing – Failure Handling – Group Communication. **Remote Procedure Calls**: RPC Model – Transparency of RPC – RPC Messages.

Unit III **(15 Hours)**

Distributed Shared Memory: Introduction – General Architecture – Design and Implementation Issues – Granularity – Structure of shared Memory Space – Consistency Models – Replacement Strategy – Trashing – Heterogenous DSM – Advantages od DSM.

Unit IV **(15 Hours)**

Synchronization: Introduction – Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Election Algorithms. **Resource Management** : Task Assignment Approach – Load Balancing Approach – Load Sharing Approach. **Process Managemen**t : Process Migration – Threads.

Sub.Code : 23UCA4A4

Unit V **(15 Hours)**

Distributed File System: Introduction – Features – File Models – File Accessing Models – File Sharing, File Caching Schemes – File Replication – Fault Tolerance**. Naming:** Features – Fundamental Terminologies and Concepts.

Security: Cryptography – Digital Signatures.

Text Book

1. Pradeep K.Sinha, " Distributed Operating Systems : Concepts and Design", Prentice Hall of India, 2006

Reference Books

1. A.S. Tanenbaum, M. VanSteen, "Distributed Systems", Pearson Education.
2. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems Concepts and Design", Third Edition, Pearson Education.
3. Mukesh Singhal, "Advanced Concepts in Operating Systems", McGraw-Hill Series in Computer Science.
4. Ajay D. Kshemkalyani, Mukesh Singhal, "Distributed Computing: Principles, Algorithms, and Systems", Cambridge University Press

MAPPING

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

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

Sub.Code: 23UCA505

Programme code : 10	**Bachelor of Computer Applications**		
Title of the paper	**Core Paper 5– Software Engineering**		
Batch 2023-2026	**Hours / Week 6**	**Total Hours 90**	**Credits 4**

Course Objectives

1. To understand the basic theory of Software Engineering.
2. To describe software engineering layered technology and Process frame work.
3. To gain knowledge about quality control and how to ensure good quality software.

Course Outcomes (CO)

K1 to K5	CO1	Learning the fundamentals of software engineering concepts.
	CO2	Understanding common lifecycle processes such as waterfall model, spiral model, prototyping model, evolutionary models etc.,
	CO3	Applying the principles and techniques of software engineering in the architectural design, detail design, and implementation of software applications.
	CO4	Developing the software using different testing concepts.
	CO5	Evaluating the ability of students to perform various lifecycle activities like Analysis, Design, Implementation, Testing and Maintenance.

Syllabus

UNIT I **(18 Hours)**

Introduction to Software Engineering: Introduction: Professional Software Development: Software Engineering-Software Engineering diversity-Internet Software Engineering-Software Engineering Ethics: Case Studies-*An insulin pump control system -Software Processes: Software Process Models-Waterfall Model-Incremental development-Integration and Configuration.

UNIT II **(18 Hours)**

Process Activities: Software Specification-Software design and Implementation-Software Validation-Software Evolution-Requirements Engineering: Functional and Non-Functional Requirements-Requirements Engineering Process-Requirements Elicitation-Requirements elicitation Techniques-Stories and Scenarios-Requirements Specification: Natural Language Specification-Structured Specification-Use cases-The Software Requirements document.

UNIT III **(18 Hours)**

Architectural Design: Architectural design decisions: Architectural views-Architectural patterns: Layered Architecture-Repository Architecture-Client-Server Architecture-Pipe and Filter Architecture. Software Testing: Development Testing: Unit Testing-Choosing unit test cases-Component testing-System testing- Test-Driven Development: Release Testing: Requirement based testing-Scenario testing-Performance testing-User Testing.

Sub.Code: 23UCA505

UNIT IV **(19 Hours)**

Software Management: Project Management-Risk Management -Risk Identification-Risk Analysis-Risk Planning-Risk monitoring-Managing People: *Motivating People-Team work: Selecting group members-Group organization-Group Communications. Project Planning: Software Pricing-Plan-driven Development-Project Plans-The Planning Process-Project Scheduling: Schedule Presentation-Estimation Techniques: Algorithmic Cost Modelling-COCOMO Cost Modelling: The Application Composition Model-The early design Model-The reuse Model-Post Architectural level-Project Duration and Staffing.

UNIT V **(17 Hours)**

Quality Management: Software Quality-Software Standards-The ISO 9001 standards framework-Reviews and Inspections: The review process-program Inspections. Quality Management and Agile Development: Software Measurement: Product Metrics-Software Component Analysis-Measurement Ambiguity-Software Analytics.

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

Teaching Methods

Smart ClassRoom/Powerpoint presentation/Seminar/Quiz/Discussion

Text Book

1. Ian Sommerville, Software Engineering 10e", Pearson India Education Services Pvt Ltd-10th Edition 2018

Reference Books

1. Sommerville, (2006), "Software Engineering", Pearson India Education Services Pvt Ltd-10th Edition (reprint)
2. Software Engineering,(2007), "Principles and Practices- Vikas Publishing House Pvt Ltd ,ITL Education Solutions Ltd
3. Software Engineering,(2008),"Principles and Practices-Waman S.Jawadekar-Tata McGrawhill Publishing Company limited , (7th reprint)
4. Rajib Mall,(2007),"Fundamentals of Software Engineering"- Prentice Hall of India private Ltd -Second Edition 20th Printing.

Sub.Code: 23UCA505

MAPPING

PSO / CO	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	S	S	H	H

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

Sub Code: 23UCA506

Programme code:10	**Bachelor of Computer Applications**		
Title of the Paper	**Core Paper 6 – Data Mining with R Programming**		
Batch	**Hours / Week**	**Total Hours**	**Credit**
2023-2026	**6**	**90**	**4**

Course Objectives

1. To learn 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 expose the student to learn the fundamental concepts of R Programming.
4. This course is to equip the students to visualize and analyses the data using R and to communicate statistical results in correct manner

Course Outcomes (CO)

K1 to K5	CO1	Knowing the data mining principles and techniques.
	CO2	Understanding the concept of raw data processing using data mining algorithms.
	CO3	Understand the basics in R programming in terms of constructs, control statements, string functions
	CO4	Create reports using R design and write efficient programs using R (and similar high-level languages) to perform routine and specialized data manipulation/management and analysis tasks
	CO5	Document analytical workflow using R, markdown languages, and version control

Syllabus

UNIT-I (16 Hours)

Expanding Universe of Data- Production Factor-Data Mining-Data Mining versus Query Tools-**Data Mining In Marketing*** Getting started with data mining in R – Introduction to Functions – R Data Structures – Help Functions in R Learning – Vectors – Scalars – Declarations – Recycling – Common Vector Operations – Using all() and any() – Vectorized operations – NA and NULL values.

UNIT-II (18 Hours)

Data preparation – Exploratory data analysis – Clustering– Data Mining and Text Mining Process– Data Visualization – Regression – Classification – Data Mining Necessary Steps. Cost Justification- Knowledge Discovery Process – Data Selection – Cleaning – Enrichment- Coding. **–** Vectorized if-then else – Testing Vector Equality – Vector Element names.

Sub Code: 23UCA506

Unit III **(18 Hours)**

Creating matrices – Matrix Operations – Applying Functions to Matrix Rows and Columns – Adding and deleting rows and columns - Vector/Matrix Distinction – Avoiding Dimension Reduction – Naming Matrix Rows and Columns – Higher Dimensional arrays – lists – Creating lists – General list operations – Accessing list components and values – applying functions to lists – recursive lists.

Unit IV **(19 Hours)**

OLAP Tools – K –Nearest Neighbor –Decision Tree- Association Rule – Neural Networks – **Reporting*-** Different Forms of Knowledge- Ten Golden Rules– Creating Data Frames – Matrix-like operations in frames – merging Data frames – Applying functions to Data Frames – **Factors and Tables** : Factors and levels – Common Functions used with factors – Working with tables – Matrix/Array-Like Operations on Tables – Other factors and table related functions.

Unit V **(19 Hours)**

Control statements – Arithmetic and Boolean operators and values – Default Values for arguments – Return Values – Functions are objects – Recursion – Replacement functions – Tools for Composing function code ***Math and Simulation in R** S3 Classes – S4 Classes – Managing your objects – Input/output – accessing keyboard and monitor – reading and writing files – String Manipulation – Graphics – Creating Graphs – Customizing Graphs – Saving Graphs to files.

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

Text Books

1. Norman Matloff, (2011) "The Art of R Programming: A Tour of Statistical Software Design", No Starch Press.

2. Pieter Adriaans, Dolf Zantinge,(2001), "Data Mining ", Addison Wesley,(

Reference Books

1. Grolemund G, (2014) "Hands-on programming with R: write your own functions and simulations", O' Reilly Media Inc.

2. James G., Witten D, Hastie T., &Tibshirani R,(2013) " An introduction to statistical learning: with Applications in R", Springer.

3. Mark Gardner, (2013) "Beginning R – The Statistical Programming Language", Wiley.

4. Margaret H.Dunham,(2003),**"**Data Mining – Introductory and Advanced Topics", Pearson Education.

Sub Code: 23UCA506

Web Reference

1. https://www.geeksforgeeks.org/data-mining-in-r/

Teaching Methods

Smart ClassRoom/Powerpoint presentation/Seminar/Quiz/Discussion

MAPPING

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

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

Sub.Code: 23UCA507

Programme code : 10	**Bachelor of Computer Applications**		
Title of the paper	**Core Paper7-Artificial Intelligence and Expert Systems**		
Batch **2023-2026**	**Hours / Week** **6**	**Total Hours** **90**	**Credits** **4**

Course Objectives

1. To learn the concepts of Artificial Intelligence.
2. Create awareness of informed search and exploration methods.
3. To demonstrate AI techniques for knowledge representation, planning and uncertainty management.

Course Outcomes (CO)

K1 to K5	CO1	Understand the concept of AI
	CO2	Analyze and evaluate informed search and exploration methods.
	CO3	Apply AI techniques for knowledge representation, planning and uncertainty Management.
	CO4	Analyze and develop knowledge of decision making and learning methods for real time application
	CO5	Explore how AI is already being used and evaluate problem areas of AI

Syllabus

UNIT I **(17 Hours)**

INTELLIGENT AGENTS AND SEARCHING METHODS

Definitions of AI - Intelligent Agents**:** Agents and environments - Good behavior – The nature of environments – structure of agents. Informed search and exploration**:** Informed search strategies – heuristic functions – local search algorithms.

UNIT II **(18 Hours)**

LOGIC

Logical agents: Knowledge-based agents – The Wumpus world. Logic – Propositional logic: A very simple logic. First order logic: Representation revisited – Syntax and semantics for first order logic – Using first order logic – Knowledge engineering in first order logic. Inference in First order logic: propositional versus first order logic –forward chaining – backward chaining.

Sub.Code:23UCA507

UNIT III **(18 Hours)**

PLANNING AND UNCERTAINTY

Planning: The planning problem- planning with state-space search-partial order planning –graphs. Uncertainty: Overview of probability concepts, Representing knowledge in an Uncertain Domain, Semantics of Bayesian Networks, Exact Inference in Bayesian Networks

UNIT IV **(18 Hours)**

DECISION MAKING AND LEARNING

Making Simple Decisions: The basis of Utility theory – Utility and multi-attribute utility functions – decision networks – The value of information – Decision theoretic expert systems**.** Learning from Observations: **Forms of learning*** - Inductive learning - Learning decision trees. Knowledge in Learning – Logical formulation of learning – Explanation based learning – Learning using relevant information – Inductive logic programming.

UNIT V **(19 Hours)**

LEARNING AND COMMUNICATION

Statistical Learning Methods: Introduction to neural networks, Perceptron's, Multi-layer feed forward network, Application of ANN. Reinforcement Learning: Passive reinforcement learning - Active reinforcement learning - Generalization in reinforcement learning. Communication: Communication as action – Formal grammar for a fragment of English – Syntactic analysis – Augmented grammars – Semantic interpretation – Ambiguity and disambiguation.

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

Text Book

1. Stuart Russell, Peter Norvig, (2009) "Artificial Intelligence – A Modern Approach", Third Edition, Pearson Education / Prentice Hall of India.

Reference Books

1. Elaine Rich, Kevin Knight, Shivashankar.B.Nair, (2009), "Artificial Intelligence", Tata Mc GrawHill Publishing Company Limited. Third Edition.
2. Nils J. Nilsson, (2000), "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd...
3. George F. Luger, (2002), "Artificial Intelligence-Structures and Strategies for Complex ProblemSolving", Pearson Education / PHI.

UCA 37

Sub.Code:23UCA507

MAPPING

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

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

UCA 38

Sub Code:23UCA5CP

Programme code:10	**Bachelor of Computer Applications**		
Title of the Paper	**Core Practical 5 - Data Mining with R Programming Lab**		
Batch	**Hours / Week**	**Total Hours**	**Credits**
2023-2026	**5**	**75**	**3**

Course Objectives

1. Perform analytics using R programming.
2. Manipulate data within R and to create simple graphs and charts used in introductory statistics
3. Perform and interpret different distribution using R
4. Use R Graphics and Tables to visualize results of various statistical operations on data

Course Outcomes (CO)

K3 to K5	**CO1**	Understand the basics in R programming in terms of constructs, control statements, string functions
	CO2	To be able to understand the various data structures available in R programming language and apply them in solving computational problems.
	CO3	Understand the use of R for Big Data analytics.
	CO4	Extract data from files and other sources and perform various data manipulation tasks on them.
	CO5	Apply the R programming from a statistical perspective

Syllabus

1. Create a vector in R and perform operations on it.
2. Write a R program to find the area of rectangle, square and triangle by accepting suitable input from user.
3. Write code in R to manipulate text in R using grep(), toupper(), tolower() and substr() functions.
4. Create a function in R to print squares of numbers in sequence.
5. Write a program to get Date and Time in different Formats in R Programming.
6. Write a program to find a maximum and minimum of a list of number.
7. Write a R program to count the number of even and odd numbers from array of N numbers.

7. Write a R program to join columns and rows in a data frame.
8. Create pie chart and bar chart using R.
9. Write a R program to find factorial of the given number using recursive function.
10. Write a R program to perform Operators on Factors
11. Write a R program to work with Graph.

Teaching Methods:

Smart Classroom, Projectors, Discussions

Guidelines to the distribution of marks for practical Examinations:

Two questions will be given for each student (3 Hours / 60 Marks)

1. Record Work - 10 Marks
2. Algorithm, Program, Typing and Execution: 50 Marks.

Particulars	Program I (Marks)	Program II (Marks)
Algorithm	5	5
Program Writing	15	15
Typing and Execution	5	5

MAPPING

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

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

Sub.Code: 23UCA608

Programme Code:10	**Bachelor of Computer Applications**		
Title of the Paper	**Core Paper 8 -Web Designing**		
Batch **2023-2026**	**Hours / Week** **5**	**Total Hours** **75**	**Credits** **4**

Course Objectives

1. To understand website development in a user-friendly manner.
2. To improve the visual design and content structuring.
3. To understand the concept of Bootstrap to develop their web development skill.

Course Outcomes (CO)

K1 to K5	CO1	Understanding the use of HTML tags.
	CO2	Acquiring knowledge of Cascading Style Sheet.
	CO3	Analyzing the concepts of JavaScript.
	CO4	Applying the knowledge to perform calculations using various operators and built-in functions.
	CO5	Evaluate the web application using HTML, CSS, JavaScript and Bootstrap.

Syllabus

UNIT I **(15 Hours)**

HTML:- Introduction- Core Elements and Attribute – Basic Text Formatting-Presentational Elements-Phrase Elements- Lists- Editing Text- Using Character Entities for Special Characters-Comments-Font Elements- Basic Links-Creating Links with the <a> Element-Adding Images to Website- Using Images as Links- Tables-Forms-Frames.

UNIT II **(15 Hours)**

Cascading Style Sheets: Introducing CSS-CSS Rules, Properties, Types of CSS –Controlling Fonts-Text Formatting-Selectors: Type, Class, ID, and Attribute Selectors. Lengths-Percentages, Introducing the Box Model. Links- Backgrounds-Positioning with CSS-Page Layout.

UNIT III **(15 Hours)**

Java Script: Learning JavaScript-How to add a script to your pages-The Document Object Model-Starting to Program with JavaScript- Variables-Operators-Conditional Statements-Looping. Java Script Arrays: Passing Arrays to Functions-Multiple Subscripted Arrays. Java Script Functions: Functions- Function Definition - Duration of Identifiers – **Scope Rules***

Sub.Code: 23UCA608

Java Script Functions: Functions- Function Definition - Duration of Identifiers – **Scope Rules*** Recursion – Java Script Global Functions. Events-Built-In Objects-Writing JavaScript. Working with JavaScript : Form Validation-Image Rollovers.

UNIT IV **(15 Hours)**

Bootstrap: What is Bootstrap? Bootstrap History-Why to use Bootstrap?- Where to get Bootstrap?- Bootstrap Grid System: Basic structure of a Bootstrap Grid- Bootstrap Tables- Bootstrap Images Bootstrap Buttons- Bootstrap Buttons Groups.

UNIT V **(15 Hours)**

Bootstrap List Groups- Bootstrap Form Layouts – Form inputs- Input sizing- Bootstrap dropdowns- Bootstrap collapse- Bootstrap Panels-Tooltip –Tabs and Pills- Scroll spy- **Bootstrap carousel plug-in*.**

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

Teaching Methods

Smart ClassRoom/Powerpoint presentation/Seminar/Quiz/Discussion

Text Books

1. Jon Duckett (2000) – "Beginning Web Programming With HTML, XHTML AND CSS", – Second Edition, Wiley India Pvt Ltd (Unit-I, II, III)
2. Bootstrap 4 Quick Start: A Beginner's Guide to Building Responsive Layouts with Bootstrap (Unit-IV, V)

Reference Books

1. Thomas A. Powell, "The Complete Reference HTML", – Second Edition Tata McGraw Hill Publication.
2. Chris Bates - "Web Programming Building Internet Applications", Second Edition, John Wiley & Sons, Ltd.

UCA 42

Sub.Code: 23UCA608

MAPPING

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

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

UCA 43

Sub.Code: 23UCA609

Programme Code:10	**Bachelor of Computer Applications**		
Title of the Paper	**Core Paper 9 – Python Programming**		
Batch 2023-2026	**Hours / Week 5**	**Total Hours 75**	**Credits 4**

Course Objectives

1. To acquire programming skills in core Python and to learn and understand Python programming basics and paradigm
2. To Learn core Python scripting elements such as variables and flow control structures
3. To learn and understand python looping, control statements and string manipulations.
4. To learn how to use exception handling in Python applications for error handling.
5. To use Python data structures, lists, tuples, dictionaries.
6. To do input/output with files in Python.

Course Outcomes (CO)

K3 to K5	CO1	Develop algorithmic solutions to simple computational problems and Read, write, execute byhand simple Python programs.
	CO2	Structure simple Python programs for solving problems.
	CO3	Decompose a Python program into functions and Discover how to work with lists andsequence data.
	CO4	Represent compound data using Python lists, tuples, dictionaries.
	CO5	Read and write data from/to files in Python Programs.

Syllabus

Unit I (14 Hours)

Computer Hardware Architecture - Overview of Programming Languages - Overview of Programming Languages - Introduction to Python - Python Overview – Comments in Python - Python Identifiers - Reserved Keywords – Variables - Standard Data Types - Python Casting.

Unit II (15 Hours)

Python Operators – Types of Operators - Statement and Expressions - String Operations: Creating String in Python - Strings indexing and splitting - Reassigning Strings- Deleting the String - String Operators - Multiline Strings- Built-in String Methods-Boolean Expressions – Python List – Various List Operation – Loop List - List Methods.

Unit III (15 Hours)

Python Tuples – Various Tuples Operations – Loop Tuples -Tuple Methods – Python Set – Various Set Operations – Loop Set – Set Methods – Python Dictionaries – Various Dictionaries Operations – Nested Dictionaries – Dictionary Methods - Python Dates- Python Conditions and Python IF Statement- Python IF ELIF ELSE Statements - Python nested IF statements- The pass Statement.

Sub.Code: 23UCA609

Unit IV (15 Hours)

Python Loops - Python while Loop Statements-Infinite Loop- for Loop Statements- Iterating by Sequence Index - Python nested loops- Python Numbers- Mathematical Functions- Random Number Functions- Python Functions - Calling a Function - Pass by reference vs value - Function Arguments - The return Statement -Python Lambda functions.

Unit V (16 Hours)

Scope of Variables - Local Scope- Global Scope- Python Exceptions Handling - Assertions in Python - Handling an exception - Python String Formatting - Python User Input- Python Files I/O - File Handling- File Open- Read Only Parts of the File- Read Lines- Close Files- Python File Write- Create a New File -Delete File- Delete Folder- Python Matplotlib.

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

Teaching Methods

Smart ClassRoom/Powerpoint presentation/Seminar/Quiz/Discussion

Text Books

1. Allen B. Downey, (2016) "Think Python: How to Think Like a Computer Scientist'', 2ndedition, Updated for Python 3, Shroff/O'Reilly Publishers, (http://greenteapress.com/wp/think/python/) .
2. Guido van Rossum and Fred L. Drake Jr,(2011) "An Introduction to Python – Revised andupdated for Python 3.2", Network Theory Ltd.

Reference Books

1. John V Guttag, (2013) "Introduction to Computation and Programming Using Python'', Revisedand expanded Edition, MIT Press.
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, (2016) "Introduction to Programming inPython: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd.
3. Timothy A. Budd, (2015) "Exploring Python", Mc-Graw Hill Education (India) Private Ltd.
4. Kenneth A. Lambert, (2012) "Fundamentals of Python: First Programs", CENGAGE Learning.
5. Charles Dierbach, (2013) "Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition.
6. Paul Gries, Jennifer Campbell and Jason Montojo, (2013) "Practical Programming: An Introduction to Computer Science using Python 3", Second edition, Pragmatic Programmers, LLC.

Sub.Code: 23UCA609

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	S	H	H
CO2	M	H	S	S	H
CO3	H	M	S	S	S
CO4	M	M	S	S	S
CO5	H	H	M	M	S

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

UCA 46

Sub.Code: 23UCA610

Programme Code:10	**Bachelor of Computer Applications**		
Title of the Paper	**Core Paper 10 – Data Science**		
Batch **2023-2024**	**Hours / Week** **5**	**Total Hours** **75**	**Credits** **4**

Course Objectives

1. To learn about basics of Data Science and Big data.
2. To learn about overview and building process of Data Science.
3. To learn about various Algorithms in Data Science.
4. To learn about Hadoop Framework.
5. To learn about case study about Data Science.

Course Outcome

K1 to K5	CO1	Understand the basics in Data Science and Big data
	CO2	Understand overview and building process in Data Science.
	CO3	Understand various Algorithms in Data Science.
	CO4	Understand Hadoop Framework in Data Science.
	CO5	Case study in Data Science.

Syllabus

Unit I **(14 Hours)**

Introduction: Benefits and uses – Facts of data – Data science process – Big data ecosystem and data science

Unit II **(15 Hours)**

The Data science process: Overview – research goals - retrieving data - transformation – Exploratory Data Analysis – Model building.

Unit III **(15 Hours)**

Algorithms : Machine learning algorithms – Modeling process – Types – Supervised – Unsupervised – Semi-supervised

Unit IV **(15 Hours)**

Introduction to Hadoop : Hadoop framework – Spark – replacing MapReduce– NoSQL – ACID – CAP – BASE– types

Unit V **(16 Hours)**

Case Study: Prediction of Disease - Setting research goals - Data retrieval – preparation - exploration – Disease profiling - presentation and automation

Sub.Code: 23UCA610

Teaching Methods

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

Text Book

Davy Cielen, Arno D. B. Meysman, Mohamed Ali, "Introducing Data Science", manning publications 2016

Reference Books

1. Roger Peng, "The Art of Data Science", lulu.com 2016.

2. MurtazaHaider, "Getting Started with Data Science – Making Sense of Data with Analytics", IBM press, E-book.

3. Davy Cielen, Arno D.B. Meysman, Mohamed Ali,"Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools", Dreamtech Press 2016

4. Annalyn Ng, Kenneth Soo, "Numsense! Data Science for the Layman: No Math Added", 2017,1st Edition.

5. Cathy O'Neil, Rachel Schutt, "Doing Data Science Straight Talk from the Frontline", O'Reilly Media 2013.

6. Lillian Pierson, "Data Science for Dummies", 2017 II Edition

MAPPING

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

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

UCA 48

Sub.Code: 23UCA6CQ

Programme Code:10	**Bachelor of Computer Applications**		
Title of the paper:	**Core Practical 6- Web Designing Lab**		
Batch **2023-2026**	**Hours / Week** **6**	**Total Hours** **90**	**Credits** **3**

Course Objectives

1. To implement the concepts in visual design and content structuring.
2. To understand the concept of Bootstrap to develop their web development skill.
3. To facilitate students to create a website using HTML and Bootstrap.

Course Outcomes (CO)

K3 to K5	CO1	Applying the HTML tags to design Web Pages.
	CO2	Designing attractive web sites using Cascading Style Sheet.
	CO3	Developing user friendly interactive web application using JavaScript.
	CO4	Implementing different operations on JavaScript Functions and Events.
	CO5	Evaluating the functionality of web pages using HTML, CSS, JavaScript and Bootstrap.

LIST OF PRACTICAL PROBLEMS

1. Design a web page for your Department.
2. Design a new web page, which shows your Biodata using CSS.
3. Design a web page for a company using HTML Formatting Tags.
4. Design a web page for Computing Student Mark list using JavaScript.
5. Design a web page for an Advertising using Style Sheets.
6. Design a web page with the following components using JavaScript.
   a) Image b) Hyperlink c) Scroll Bar d) Animation.
7. Design a web page for Library system using HTML Tags.
8. Design a web page for Payroll Processing using Java Script.
9. Design a web page for Electricity Bill Preparation using JavaScript.
10. Creating a Table using Bootstrap.

UCA 49

Sub.Code: 23UCA6CQ

Guidelines to the distribution of marks for practical Examinations:

Two questions will be given for each student (3 Hours / 60 Marks)

1. Record Work - 10 Marks
2. Algorithm, Program, Typing and Execution: 50 Marks.

Particulars	Program I (Marks)	Program II (Marks)
Algorithm	5	5
Program Writing	15	15
Typing and Execution	5	5

Teaching Methods

Smart Classroom, Projectors, Discussion

MAPPING

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

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

UCA 50

Project and Viva-Voce

Sub.Code: 23UCA6Z1

Programme Code:10	**Bachelor of Computer Applications**		
Core Project – Project and Viva – Voce ***			
Batch	**Hours/Week**	**Total Hours**	**Credits**
2023-2026	**4**	**30**	**5**

Course Objectives

1. To acquire 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 get confidence by implementing the task in a real time project.

Course Outcomes (CO)

K3 to K5	CO1	Apply the programming skills for solving the project.
	CO2	Analyze the task and to collect the necessary information about the software.
	CO3	Evaluate the task based on the software.
	CO4	Test the project for its successful implementation
	CO5	Implement and Maintain the developed system.

Guidelines to the Distribution of Marks:

Knowledge Level	**Particulars**		**Marks**	**Total**
K3	**CIA**	**Review**	**15**	**20**
		Regularity	**05**	
	ESE	**Project report ***	**60**	**80**
		Viva –Voce *	**20**	

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

Teaching Methods

Power Point Presentation/Project Demo

UCA 51

Sub.Code:23UCA6Z1

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	S	S	S	S	S
CO5	S	S	S	H	H

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

ELECTIVE PAPERS

UCA 53

ProgrammeCode:10	Bachelor of Computer Applications		
Title of the Paper	**Major Elective – Multimedia Systems**		
Batch 2022-2023	**Hours / Week 5**	**Total Hours 75**	**Credits 5**

Course Objectives

1. Understand the definition of Multimedia
2. To study about the Image File Formats, Sounds Audio File Formats
3. Understand the concepts of Animation and Digital Video Containers
4. To study about the Stage of Multimedia Project
5. Understand the concept of Ownership of Content Created for Project Acquiring Talent
6.

Course Outcomes (CO)

K1toK5	CO1	To Understand the Concepts of Cyber crime 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 **(15 Hours)**

Multimedia Definition-Use Of Multimedia-Delivering Multimedia- Text: About Fonts and Faces - Using Text in Multimedia -Computers and Text Font Editing and Design Tools –Hyper media and Hypertext.

UNIT II **(15 Hours)**

Images: Plan Approach - Organize Tools - Configure Computer Workspace -Making Still Images - Color - Image File Formats. Sound: The Power of Sound -DigitalAudio-MidiAudio-Midivs.DigitalAudio-MultimediaSystemSounds Audio File Formats -Vaughan's Law of Multimedia Minimums - Adding Sound to Multimedia Project

UNIT III **(15 Hours)**

Animation: The Power of Motion-Principles of Animation-Animation by Computer - Making Animations that Work. Video: Using Video - Working with Video and Displays-Digital Video Containers-Obtaining Video Clips -Shooting and Editing Video.

UNIT IV **(15 Hours)**

Making Multimedia: The Stage of Multimedia Project - The Intangible Needs -The Hardware Needs-

Software Needs - An Authoring Systems Needs-Multimedia Production Team

UCA 54

UNIT V **(15 Hours)**

Planning and Costing: The Process of Making Multimedia-Scheduling-Estimating – RFPs and Bid Proposals. Designing and Producing - Content and Talent: Acquiring Content-Ownership of Content Created for Project – Acquiring Talent

Teaching Methods

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

Text Book

1. TayVaughan,"Multimedia:MakingItWork",8th Edition,Osborne/McGraw-Hill,2001.

Reference Books

1 .Ralf Steinmetz & Klara Nahrstedt "Multimedia Computing, Communication & Applications", Pearson Education, 2012.

2. Introduction to Multimedia Systems (Communications, Networking and Multimedia) 1st Edition by Sugata Mitra , Gaurav Bhatnagar

3. Handbook of Internet and Multimedia Systems and Applications: 6 (Internet and Communications) Hardcover – Import, 29 December 1998, by BorkoFurht

Web References

https://www.geeksforgeeks.org/multimedia-systems-with-features-or-characteristics/
https://www.tutorialspoint.com/multimedia/multimedia_introduction.htm
https://mu.ac.in/wp-content/uploads/2021/04/Multimedia.pdf

MAPPING

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

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

UCA 55

Programme code: 10	Bachelor of Computer Applications		
Title of the Paper	Major Elective – Internet of Things		
Batch 2022-2023	Hours/Week 5	Total Hours 75	Credits 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 analyse the industrial needs
4. To develop IOT infrastructure for popular applications.

Course Outcomes (CO)

K1 to K4	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 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- AdditionalIoT Reference Models.

UNIT II **(15 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 Hours)**

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

UNIT IV **(15 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.

UCA 56

UNIT V **(15 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 selfstudy portions also**

Teaching Methods

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

Text Book

1.David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry (2017), IoT Fundamentals: Networking Technologies, Protocols and Use Cases for InternetofThings, 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 ofThings – 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	S
CO2	M	H	M	S	M
CO3	S	H	M	H	M
CO4	S	M	H	M	S
CO5	H	S	S	H	S

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

UCA 57

Programme code: 10	Bachelor of Computer Applications		
Title of the Paper	Major Elective – Software Project Management		
Batch	Hours/Week	Total Hours	Credits
2022-2023	5	75	5

Course Objectives

1. To Understand the fundamental principles of Software Project management
2. To know the different methods and techniques used for project management.
3. To perform Project Scheduling, tracking, Risk analysis, Quality management and Project Cost estimation using different techniques.

Course Outcomes (CO)

K1	CO1	Understanding the fundamentals of Software Project Management, Phases & Models involved in developing the software.
K2	CO2	Obtaining Project Quality, SQA's Role and Risks.
K3	CO3	Analyzing the Requirements & Software Estimation.
K4	CO4	Maintaining the Software for later implementation.

Syllabus

UNIT I **(Hours: 15)**

Product Life Cycle: Introduction – Idea generation – Prototype development Phase –Alpha phase – Beta phase – Production phase – Maintenance and obsolescence Phase. **Project Life Cycle models:** What is Project Life Cycle Model?-A Framework for studying different life cycle models – The Waterfall model*– The prototyping model – RAD model – The Spiral model and its variants.

UNIT II **(Hours: 15)**

Software Quality Assurance: How do you define quality?-Why is quality important in software? – Quality Control and Quality Assurance – Cost and benefits of quality – Software quality analyst's functions– Some popular misconceptions about the SQA's role-Software quality assurance tools – Organizational structures – Profile of a successful SQA.

UNIT III **(Hours: 15)**

Software requirements gathering: Dimensions of requirements gathering –Steps to be followed during requirements gathering –Outputs and quality records from the requirements phase – Skills sets required during the requirements phase-Challenges during the requirements management phase- Metrics for the requirements phase.

UCA 58

UNIT IV **(Hours: 15)**

Design and development phase: Salient features of design – Design for reusability – Technology choices /constrains – Design to standards – Design for portability – User interface issues –Challenges during design and development phases-Skill sets for design and development- Metrics for design and development phases.

UNIT V **(Hours: 15)**

Project Management in the Maintenance Phase: Introduction – Activities during the maintenance phase-Management issues during the maintenance phase- Configuration management during the maintenance phase – Skill sets for people in the Maintenance phase -Metrics for the Maintenance phase.

Teaching Methods

Power Point Presentation , Assignment, Case Study, Seminar

Text Book

1. Gobalswamy Ramesh,(2007), **"**Managing Global Software Projects**"**, Tata McGraw Hill Publishing Company.

2. Dutt, Chandramouli, "Software Project Management" Pearson India, 2015

Reference Books

1.S.A. Kelkar,(2003),"Software Project Management – A Concise study", PHI.

2. Milk Cotterel, Bob Hughes,,(1955), "Software project Management", Inclination/Thomas Computer press.

3. Derrel Ince, H. Sharp and M. Woodman,(1995), "Introduction to software project management and quality assurance", Tata McGraw Hill.

4. Stephen H. Kan, "Metrices and Models in Software Quality Engineering", Second Edition , Pearson Education Asia,.

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	H	S	H	M
CO4	S	M	H	S	S

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

UCA 59

ProgrammeCode:10	Bachelor of Computer Applications		
Title of the Paper	Major Elective – Fuzzy Logic		
Batch 2022-2023	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To understand the basic concept of Fuzzy logic
2. To learn the various operations on relation properties
3. To study about the membership functions
4. To learn about the Defuzzification and Fuzzy Rule-Based System
5. To learn the concepts of Applications of Fuzzy Logic

Course Outcomes (CO)

K1toK5	CO1	Understand the basics of Fuzzy sets, operation and properties.
	CO2	Apply Cartesian product and composition on Fuzzy relations and use the tolerance and Equivalence relations.
	CO3	Analyze various fuzzification methods and features of membership Functions.
	CO4	Evaluate defuzzification methods for real time applications.
	CO5	Design an application using Fuzzy logic and its Relations

Syllabus

UNIT I **(15 Hours)**

Introduction to Fuzzy Logic- Fuzzy Sets- Fuzzy Set Operations, Properties of Fuzzy Sets, Classical and Fuzzy Relations: Introduction-Cartesian Product of Relation.

UNIT II **(15 Hours)**

Operations on Crisp Relation-Properties of Crisp Relations-Composition Fuzzy Relations, Cardinality of Fuzzy Relations-Operations on Fuzzy Relations-Properties of Fuzzy Relations.

UNIT III **(15 Hours)**

Membership Functions: Introduction, Features of Membership Function, Classification of Fuzzy Sets, Fuzzification, Membership Value Assignments, Intuition, Inference, Rank Ordering.

UNIT IV **(15 Hours)**

Defuzzification: Introduction, Lambda Cuts for Fuzzy Sets, Lambda Cuts for Fuzzy Relations, Defuzzification Methods, Fuzzy Rule-Based System: Introduction, Formation of Rules, Decomposition of Rules.

UCA 60

UNIT V **(15 Hours)**

Applications of Fuzzy Logic: Fuzzy Logic in Automotive Applications, Fuzzy Antilock Brake System-Antilock-Braking System and Vehicle Speed-Estimation Using Fuzzy Logic.

Teaching Methods

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

Text Book

S. N. Sivanandam, S. Sumathi and S. N. Deepa-Introduction to Fuzzy Logic using MATLAB, Springer-Verlag Berlin Heidelberg 2007

ReferenceBooks

1. Guanrong Chen and Trung Tat Pham- Introduction to Fuzzy Sets, Fuzzy Logic and Fuzzy Control Systems
2. Timothy J Ross , Fuzzy Logic with Engineering Applications

Mapping

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

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

UCA 61

Programme Code:10	Bachelor of Computer Applications		
Title of the paper: Major Elective: Information Security			
Batch 2022-2023	**Hours / Week 5**	**Total Hours 75**	**Credits 5**

Course Objectives

1. To enable the students to learn fundamental concepts of Computer Security.
2. To provide an understanding of principal concepts, technologies and basic approaches in information security.
3. To understand the concepts of security policies such as authentication, integrity and confidentiality.

Course Outcomes (CO)

K1 to K5	CO1	Studying the basic concepts of security.
	CO2	Understanding the issues and technologies in information security.
	CO3	Learning various protection mechanisms.
	CO4	Analyzing tools and technology for combating threats to information assets.
	CO5	Evaluate the usage of Legal and Ethical Issues in Computer Security.

Syllabus

UNIT I **(15 Hours)**

Is there Security Problem in Computing? : What does Security mean? –Attacks-The Meaning of Computer Security-Computer Criminals. P**rotection in general purpose operating systems**: Memoryand Address Protection -File Protection Mechanisms-User Authentication.

UNIT II **(15 Hours)**

Program Security: Nonmalicious Program Errors – Viruses and other Malicious Code**:** Kinds of Malicious code, how viruses attach, Home for virus, Virus Signature, Example of malicious codes: Brain Virus, Worm, Code red, Web bugs.

Targeted Malicious Code: Trojans, Trap door, Salami attack, Keystroke Logging, Timing attacks-Controls against Program Threats: Developmental controls.

UNIT III **(15 Hours)**

Database and Data Mining Security: Introduction to Databases*- Security Requirements- Reliability and Integrity- Multilevel Databases – Proposals for Multilevel Security: Separation- Data Mining.

UNIT IV **(15 Hours)**

Security in Networks: Network Concepts-Threats in Networks: Categories of Attack, Who attacks networks? Reconnaissance, Pinging, Threats in transit: Eavesdropping and wiretapping, software based packet sniffing, tools, Microwave-Firewalls-Intrusion Detection Systems.

UNIT V **(15 Hours)**

Legal and Ethical Issues in Computer Security: Protecting Programs and Data*- Information and the Law-Computer Crime: Why computer crime is hard to prosecute, Examples of Statutes, Cyber pornography, Accessing protected system, tampering with source code, Cryptography and the law- Case studies of Ethics: privacy rights, Fraud, Ownership of programs.

*** Self Study Topic and Questions for examinations may be taken from Self Study Portions also.**

Teaching Methods

PowerPoint Presentation, Assignments, Discussions.

Text Book

1. Charles P.Pfleeger, Shari Lawrence Pfleeger, Deven N.Shan, **"Security in Computing",** FourthEdition.

Reference Books

1. Dhiren R.Patel, (2008), **"**Information Security Theory and Practice**"**, PHI publications.

2. Ross J.Anderson and Ross Anderson, (2001), **"**security Engineering: A Guide to Building Dependable Distributed Systems", Wiley.

3. Debby Russell and Sr.G.T.Gangemi, (2006),"Computer Security Basics (paperback)", SecondEdition, O'Reilley Media.

4. Thomas R.Peltier.Juystin Peltier and John Blackley, (2010),"Information Security Fundamentals",Second Edition, Prentice Hall.

MAPPING

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

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

UCA 64

Programme Code: 10	Bachelor of Computer Applications		
Title of the Paper : Major Elective - Block Chain			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2023-2026	**5**	**75**	**5**

Course Objectives

1. To introduce the technical aspects of public distributed ledgers, block chain systems,

Crypto currencies and smart contracts.

2. Students will learn how these systems are built, how to interact with them, how to design and build secure distributed applications.

Course Outcomes (CO)

K1 to K5	CO1	Stating block chain technologies basics are made possible through learning Distributed Database and various types of database.
	CO2	Stating the Mining strategies followed in block chain teach the basic architecture behind the perfect building of block chain for industries.
	CO3	Classifying the limitations and proofs are another essential part of block chain technologies, which are learned for betterment of creating block chain.
	CO4	Describing the history behind the block chain and learning about Vulnerability, Attacks and Side chain gives an additional support for creating a secured block chain.
	CO5	Design a method for solving a problem case study with different perspective.

Syllabus

UNIT I **(15 Hours)**

Distributed Database, Two General Problem, Byzantine General problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete. Cryptography: Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, Zero Knowledge Proof positions.

UNIT II **(15 Hours)**

Introduction, Advantage over conventional distributed database, Block chain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, **Life of Blockchain application***, Soft & Hard Fork, Private and Public block chain.

UNIT III **(15 Hours)**

Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, Sybil Attack, Energy utilization and alternate. History, Distributed Ledger, **Bitcoin protocols*** - Mining strategy and rewards, Ethereum - Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, Namecoin.

UNIT IV **(15 Hours)**

Stakeholders, Roots of Bit coin, Legal Aspects-Crypto currency Exchange, Black Market and Global Economy. Applications: Internet of Things, Medical Record Management System, Domain Name Service and **future of block chain***.

UNIT V **(15 Hours)**

Case study on Naive Block chain construction, Memory Hard algorithm – Hash cash implementation, Direct Acyclic Graph, Play with Go-ethereum, Smart Contract Construction, Toy application using Block chain, Mining puzzles

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

Teaching Methods

Smart classroom / PowerPoint presentation / Seminar / Quiz / Discussion/ Flipped Class

TEXT BOOK

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, **Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction**, Princeton University Press (July 19, 2016).

REFERENCE BOOKS

1. Draft version of "S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, **Block Chain Technology: Cryptocurrency and Applications**, Oxford University Press, 2019.

2. Josh Thompson, **Block chain: The Block chain for Beginnings**, **Guide to Block chain Technology and Block chain Programming**, Create Space Independent Publishing Platform, 2017.

UCA 66

MAPPING

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

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

SKILL BASES SUBJECTS

UCA 68

Sub.Code:23UGC3S1

Programme Code:10	**Bachelor of Computer Applications**		
Title of the Paper	**Skill Based Subject 1 – Cyber Security**		
Batch **2023-2026**	**Hours / Week** **2**	**Total Hours** **30**	**Credits** **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 to 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 **(6 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: 23UGC3S1

UNIT V **(6 Hours)**

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 - Safescrypt
9. www.nic.in – National Informatics Centre
10. https://www.kaspersky.com/resource-center/definitions/what-is-a-digital-footprint
11. https://geekflare.com/digital-footprint/

Sub.Code: 23UGC3S1

Mapping

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

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

UCA 71

Sub.Code:23UCA4SL

Programme code : 10	**Bachelor of Computer Applications**		
Title of the paper	**Skill Based subject 2 - Linux Programming Lab**		
Batch	**Hours / Week**	**Total Hours**	**Credits**
2023-2026	**2**	**30**	**3**

C

Course Objectives

1. To gain knowledge about the usage of shell scripting.
2. To teach the concepts of using arithmetic operations and looping.
3. To impart knowledge about the creation of files and directories.

Course Outcomes (CO)

K3 to K5	CO1	Applying the concepts of control structures in programming.
	CO2	Implementing the concepts of file operations in programming
	CO3	Analyzing the concept of dialog utilities in shell programming.
	C04	Develop solutions for mathematical concept and propose appropriate result.
	C05	Evaluate the programming techniques and tools to design computer programs.

LIST OF PRACTICAL PROGRAMS

1. Write a shell program to display your address.

2. To perform arithmetic operations using shell arithmetic.

3. Print the different patterns using looping operations.

4. To perform simple inventory control operation using read statement.

5. To prepare the student mark statement using necessary controls.

6. Sort the given numbers in both ascending and descending orders.

7. Write a shell program to perform user defined function concept.

8. Write a shell program using dialog utility concept.

9. Write a program to perform file operation.

10. Write a shell script to print ‘Hello Linux’ message in Bold, Blink and different colors.

UCA 72

Sub.Code: 23UCA4SL

Guidelines to the distribution of marks for practical Examinations:

Two questions will be given for each student (3 Hours / 60 Marks)

1. Record Work - 10 Marks
2. Algorithm, Program, Typing and Execution: 50 Marks.

Particulars	Program I (Marks)	Program II (Marks)
Algorithm	5	5
Program Writing	15	15
Typing and Execution	5	5

Teaching Methods:

Smart Classroom, Projector, Discussion

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	S	H	H	M	H

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

UCA 73

Sub.Code: 23UCA6SM

Programme Code:10	**Bachelor of Computer Applications**		
Title of the Paper	**Skill Based Subject 3– Python Programming Lab**		
Batch	**Hours / Week**	**Total Hours**	**Credits**
2023-2026	**2**	**30**	**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.
	C04	Appling the searching algorithm in programming
	C05	Evaluate the functionality of an exception handling mechanism

LIST OF PRACTICAL PROGRAMS

1. Write a program to convert temperature in Celsius to Fahrenheit and Fahrenheit to Celsius.
2. Write a program to display all the prime numbers within an interval.
3. Write a program to multiply two matrices using nested loops.
4. Write a program to accept 5 subject marks and to calculate the total, average and grade of a student.
5. Write a program to generate an electricity bill.
6. Write a Program to perform linear search.
7. Write a Program to perform merge sort.
8. Write a Program to perform binary search.
9. Write a Program to find the maximum of a list of numbers.
10. Write a python program to demonstrate File Input and Output operations.
11. Write a program to demonstrate Exception Handling.
12. Write a program to demonstrate Classes and their Attributes.

UCA 74

Sub.Code: 23UCA6SM

Guidelines to the distribution of marks for practical Examinations:

Two questions will be given for each student (3 Hours / 60 Marks)

1. Record Work - 10 Marks
2. Algorithm, Program, Typing and Execution : 50 Marks.

Particulars	Program I (Marks)	Program II (Marks)
Algorithm	5	5
Program Writing	15	15
Typing and Execution	5	5

Teaching Methods

Smart Classroom , Projectors, Discussion

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	S	H	H	M	H

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

EDC

UCA 76

Sub.Code: 23UCA5XL

Programme Code:10	**Bachelor of Computer Applications**		
Title of the Paper	**Extra Departmental Course – Internet and Office Automation Lab**		
Batch **2023-2024**	**Hours / Week** **2**	**Total Hours** **30**	**Credits** **3**

Course Objectives

1. To gain knowledge about the concepts of Internet
2. To understand the concepts of MS-Word, MS-Excel
3. To develop database using MS-Access and presentation using MS-PowerPoint

Course Outcomes (CO)

K3 to K5	CO1	Understanding and remember various menus in office automation
	CO2	Implementing the concepts of Internet techniques
	CO3	Executing various calculations of MS-Excel
	CO4	Analyzing the applications using MS-Power Point
	CO5	Applying the database components to develop table using MS-Access

LIST OF PRACTICAL

1. Creation of e-mail Id using Internet.
2. Manipulation of mail by sending and receiving using Internet.
3. Create a mail merge using MS-Word.
4. Prepare Resume using MS-Word.
5. Create a front page for Newspaper using MS-Word.
6. Payroll calculation using MS-Excel.
7. Prepare student mark sheet using MS-Excel.
8. Create a slide show for computer components using MS-PowerPoint.
9. Prepare a photo album using MS-PowerPoint.
10. Promote a brand using MS-PowerPoint.
11. Create a database for stock maintenance and generate report.
12. Create a database for employee and apply query to filter the employee's name that have salary.

UCA 77

Sub.Code: 23UCA5XL

Guidelines to the distribution of marks for practical Examinations:

Two questions will be given for each student (3 Hours / 100 Marks)

1. Observation – 30 Marks
2. Record Work - 5 Marks
3. Attendance – 5 Marks
4. Algorithm, Program, Writing and Execution: 60 Marks.
   (CIA Practical I and II – 60 Marks converted into 30 Marks)

Particulars	**Program I (Marks)**	**Program II (Marks)**
Algorithm	5	5
Program Writing	15	15
Typing and Execution	10	10

Teaching Methods

Smart Classroom, Projector, Discussion

Mapping

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	S	H	M	S	H
CO2	H	S	S	H	S
CO3	M	H	M	S	H
CO4	S	H	H	M	H
CO5	S	S	S	S	S

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

PART - IV
GENERAL BOARD PAPERS

UCA 79

Sub.Code: 23EVS101

Programme Code : 10	**Bachelor of Computer Applications**		
Title of the Paper	**Part IV - Environmental Studies****		
Batch 2023-2026	**Hours / Week 2**	**Total Hours 30**	**Credits 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 (CO)

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

K1 to K5	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

UCA 80

Sub.Code: 23EVS101

Syllabus

Unit I **(6 Hours)**

Multidisciplinary Nature of Environment

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 **(6 Hours)**

Ecosystems

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

Unit III **(6 Hours)**

Biodiversity and its Conservation

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 – Insitu Conservation of Biodiversity – Exsitu Conservation of Biodiversity.

Unit IV **(6 Hours)**

Environmental Pollution

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 – Food, Drought, Earthquake, Tsunami, Cyclone and Landslide.

Unit V **(6 Hours)**

Social Issues and the Environment

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 Narmatha 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

UCA 81

Human Health – Human Rights – Value Education – HIV/ AIDS – Women and Child Welfare – Role of Information Technology in Environment and Human Health.

Sub.Code: 23EVS101

Teaching Methods

Smart Class Room / Powerpoint Presentation / Seminar / Quiz / Discussion / Flipped Class

Text Book

1. P.Arul, "**A Text Book of Environmental Studies**", Environmental Agency, No27, Nattarstreet, Velacherry main road, Velacherry, 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"**, PublisherS.K.Kataria & Sons, 424/6, Guru Nanak Street, Vaisarak, Delhi – 110 006.

3. J.Glynn Henry and Gary W Heinke, "**Environmental Science and Engineering"**, PrenticeHall of India Private Ltd., New Delhi – 110 001.

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.

UCA 82

Sub. Code: 23VED201

Programme Code : 10	**Bachelor of Computer Applications**		
Title of the Paper	**Part IV : Value Education – Moral and Ethics****		
Batch 2023-2026	**Hours / Week 2**	**Total Hours 30**	**Credits 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)

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 Analyze 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-Thillaiaadi Valliammai – Velu Nachiyar – Vanchinathan.

Sub. Code: 23VED201

Unit IV **(8 Hours)**

Physical Fitness and Mental Harmony: Simplified Physical Exercise – Hand Exercises Leg Exercises – Neuro Muscular Breathing Exercises – Eye Exercises – Kabalabathi Maharasana A & B – Massage - Acupressure – Relaxation – Kayakalpa Yogam Life Force– Aim & Objectives - Principle – Methods. Introspection – Analysis of Thoughts Moralization of Desires - Neutralization of Anger – Eradication of Worries.

Unit V **(8 Hours)**

Yoga and Meditation – The Asset of India: Yogasanam – Rules & Regulations – Surya Namaskar– Asanas –Sitting – Stanging – Prone - Supine - Pranayama – Naadi Sudhi – Ujjayi– Seethali – Sithkari -Benefits. Meditation – Thanduvasudhi - Agna – Shanthi – Thuriyam – Benefits.

Teaching Methods

Smart Class Room / Powerpoint Presentation / Seminar / Quiz / Discussion / Flipped Class

Text Book

1. **Value Based Education – Moral and Ethics** – compiled by **Kongunadu Arts and Science College** (Autonomous), 2nd Edition (2021).

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).
5. **Yoga Practices - 1 – The World Community Service Centre** – Vethathiri Publications, Sixth Edition (2017), Erode.
6. **Yoga Practices - 2 – The World Community Service Centre** – Vethathiri Publications –Eighth Edition(2017), Erode.

UCA 84

Sub. Code: 23VED201

MAPPING

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

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

Value Education – Moral & Ethics

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.

NON-MAJOR ELECTIVE

UCA 86

Sub.Code: 23UHR3N1

Programme Code : 10	**Bachelor of Computer Applications**		
Title of the Paper	**Part IV - Non-Major Elective 1- Human Rights****		
Batch **2023-2026**	**Hours / Week** **2**	**Total Hours** **30**	**Credits** **2**

Course Objectives

1. To prepare for responsible citizenship with awareness of the relationship between HumanRights, 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)

K1toK5	CO1	To understand the hidden truth of Human Rights by studying various theories
	CO2	To acquire overall knowledge regarding Human Rights given by United Nation Commission (UNO).
	CO3	To gain knowledge about various organs responsible for Human Rights such as National Human Rights Commission and State Human Right Commission (UNHCR).
	CO4	To get habits of how to treat aged person, others and positive social responsibilities.
	CO5	To treat and confirm, child, refugees and minorities with positive social justice.

UNIT – I **(6 Hours)**

Definition, Meaning, Concept ,Theories and Kinds of Human Rights- Evaluation and Protection of Human Rights in India- Development of Human Rights under the United Nations.

UNIT – II **(6 Hours)**

United Nations Charter and Human Rights - U.N.Commission on Human Rights- Universal Declaration of Human Rights - International Covenant on

- Civil & Political Rights
- Economic, Social and Cultural Rights

Sub code: 23UHR3N1

UNIT – III **(6 Hours)**

Human Rights and Fundamental Rights (Constitution) - Enactments regarding Human Rights Laws in India - National Human Rights Commission and State Human Rights Commission.

UNIT – IV **(6 Hours)**

Aged persons and their Human Rights - Human Rights of Persons with Disabilities - Tribal Human Rights in India - Three Generation Human Rights -Social Awareness and Responsibilities of Individuals.

UNIT – V **(6 Hours)**

Rights of Women, Child, Refugees and Minorities –Social media and Human Rights -NGO's in protection of Human Rights - Right to Election.

Text Book

1. Human Rights (2019), Compiled by Kongunadu Arts and Science College,Coimbatore –29.

Reference Book:

1.Human Rights, (2018) Jaganathan,MA.,MBA.,MMM.,ML.,ML., Humanitarian Law andJ.P.Arjun Proprietor,Usha Jaganathan Refugee Law law series, 1st floor, Narmatha Nanthi Street, Magathma Gandhi Nagar, Madurai – 625014.

NON-MAJOR ELECTIVES I – HUMAN RIGHTS

QUESTION PAPER PATTERN
(External only)

Duration: 3 Hours **Max. Marks: 75**

Answer ALL Questions

SECTION A (5 x 5 = 25 marks)

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

SECTION B (5 x 10 = 50 marks)

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

UCA 88

Sub.Code:23UWR4N2

Programme Code: 10	**Bachelor of Computer Applications**		
Title of the Paper	**Part IV -Non- Major Elective 2 - Women's Rights****		
Batch **2023-2026**	**Hours / Week** **2**	**Total Hours** **30**	**Credits** **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)

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, India 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 womenin media status of women land rights, Women entrepreneurs, National policy for the empowerment of women.

Sub.Code: 23UWR4N2

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 / Powerpoint Presentation / Seminar / Quiz / Discussion / Flipped Class

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.

UCA 90

NON-MAJOR ELECTIVES – WOMEN'S RIGHTS

23UWR4N2

Question Paper Pattern

(External only)

Duration: 3 hrs Max: 75 marks

Answer ALL Questions

Section A (5x5=25)

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

Section B (5X10=50)

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

UCA 91

Programme Code : 10	**Bachelor of Computer Applications**		
Title of the Paper : **Part IV- Non Major Elective 3 – Consumer Affairs**			
Batch 2023 - 2024	**Hours / Week** 2	**Total Hours** 30	**Credits** 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 10000suite

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 **(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. Telecommunication: 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.

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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

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 PvtLtd.
3. G. Ganesan and M. Sumathy. (2012). Globalisation and Consumerism: Issues and Challenges, Regal Publications
4. Suresh Misra and Sapna Chadah (2012). Consumer Protection in India: Issues and Concerns, IIPA, NewDelhi
5. Rajyalaxmi Rao (2012), Consumer is King, Universal Law Publishing Company
6. Girimaji, Pushpa (2002). Consumer Right for Everyone Penguin Books.
7. E-books :-www.consumereducation.in
8. Empowering Consumers e-book,www.consumeraffairs.nic.in
9. ebook,www.bis.org
10. The Consumer Protection Act, 2086 and its later versions.

NON-MAJOR ELECTIVES – CONSUMER AFFAIRS

Question Paper Pattern
(External only)

Duration: 3 hrs Max: 75 marks

Answer ALL Questions

Section A (5x5=25)

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

Section B (5X10=50)

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