RAJAH SERFOJI GOVERNMENT COLLEGE(AUTONOMOUS), THANJAVUR 613 005

B.Sc. Computer Science COURSE STRUCTURE (From the Academic Year 2023-2024 onwards)

SL. No.	PART	COURSE	Sub-Code	Course Title	Hrs.	Credits	CIA	Sem. Exam	Total
				I SEMESTER					
1	Part I	LT1	T1T1	Tamil – I	6	3	25	75	100
2	Part II	LE1	T1E1	English - I	6	3	25	75	100
3	Part III	CC1	T1CS1	C Programming	5	5	25	75	100
4		CC2	T1CS2	C Programming – Lab	3	3	25	75	100
5		EC1		Generic Electives from the list	4	3	25	75	100
6		EC2		Generic Electives from the list(To be continued next semester)	2				
7	Part IV	SEC1	T1CSSE1	Fundamentals of Information Technology	2	2	25	75	100
8		FC	CSFC	Problem Solving Techniques	2	2	25	75	100
				Total	**30**	**21**			**700**
				II SEMESTER					
9	Part I	LT2	T2T2	Tamil – II	6	3	25	75	100
10	Part II	LE2	T2E2	English - II	6	3	25	75	100
11	Part III	CC3	T2CS3	Java Programming	5	5	25	75	100
12		CC4	T2CS4	Java Programming lab	3	3	25	75	100
13		EC2		Generic Electives from the list (continued from the previous semester)	2	3	25	75	100
14		EC3		Generic Electives from the list	4	4	25	75	100
15	Part IV	SEC2	T2CSSE2	Office Automation	2	2	25	75	100
16		SEC3	T2CSSE3	Understanding Internet	2	2	25	75	100
				Total	**30**	**25**			**800**
				III SEMESTER					
17	Part I	LT3	T3T3	Tamil	6	3	25	75	100
18	Part II	LE3	T3E3	English	6	3	25	75	100
19	Part III	CC5	T3CS5	Python programming	5	5	25	75	100
20		CC6	T3CS6	Python programming - Lab	3	3	25	75	100
21		EC4		Generic Electives from the list	3	3	25	75	100
22		EC5		Generic Electives from the list(To be continued next semester)	3				
23	Part IV	SEC4	T3CSSE4	Multimedia System	1	1	25	75	100
24			T3HW	Health & Wellness		1			
25		SEC5	T3CSSE5	Web Designing/Naan Mudhalvan	2	2	25	75	100
26		NCC	T3NCC1	Introduction To NCC(For NCC Students Only)		2			
				Total	**30**	**21**	**230**	**570**	**700**
				IV SEMESTER					
27	Part I	LT4	T4T4	Tamil	6	3	25	75	100
28	Part II	LE6	T4E4	English	6	3	25	75	100
29	Part III	CC7	T4CS7	.NET programming	4	4	25	75	100
30		CC8	T4CS8	.NET Lab	3	3	25	75	100
31		EC5		Generic Electives from the list (continued from the previous semester)	2	3	25	75	100
32		EC6		Generic Electives from the list	4	4	25	75	100
33	Part IV	SEC6	T4CSSE5	Soft skill Development	2	2	25	75	100
34		SEC7	T4CSEC6	Cybercrime and its Security/Naan Mudhalvan	2	2	25	75	100
35		EVS	T4ES	Environmental studies	1	2	25	75	100
36		NCC	T4NCC2	Specialized Subject-ARMY(For NCC Students Only)		2			
				Total	**30**	**26**			**900**

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B.Sc. Computer Science COURSE STRUCTURE (From the Academic Year 2023-2024 onwards)

SL. No.	PART	COURSE	Sub-Code	Course Title	Hrs.	Credits	CIA	Sem. Exam	Total
				V SEMESTER					
37	Part III	CC9	T5CS9	Software Engineering	6	4	25	75	100
38		CC10	T5CS10	Database Management System	6	4	25	75	100
39		CC11	T5CS11	Data structure and algorithms	5	4	25	75	100
40		CC12	T5CS12	Database Management System - Lab	3	3	25	75	100
41		EC7	TCSECA	Discipline Specific from the list	4	3	25	75	100
42		EC8	TCSECB	Discipline Specific from the list	4	3	25	75	100
43	Part IV	VE	T5VE	Value education	2	2	25	75	100
44		Internship		(to be done during the vacation of IV semester)		2			
				Total	**30**	**25**			**700**
				VI SEMESTER					
45	Part III	CC13	T6CS13	Computer networks	6	5	25	75	100
46		CC14	T6CS14	Microprocessor and Micro controller	6	5	25	75	100
47		CC15	T6CS15	Microprocessor Lab	4	4	25	75	100
48		EC9	TCSECC	Discipline Specific from the list	6	3	25	75	100
49		EC10	TCSECD	PHP programming	4	3	25	75	100
50	Part IV	GS	T6GS	Gender Studies	2	2	25	75	100
51		PCS	T6PCS	Professional Competency Skill	2	2			
52	Part V	EA		Extension Activity		1			-
				Total	**30**	**25**			**600**
				Grand Total	**180**	**143**			**4400**

Course -Type	Total
Tamil & English	8
Core courses (CC)	15
Elective courses (EC)	10
Skill Enhancement Courses (SEC)/Naan Mudhalvan(NM)	7
Foundation course (FC)	1
Environmental studies (EVS)	1
Value education (VE)	1
Gender Studies(GS)	1
Professional Competency Skill	1
Health and Wellness	1
Total	**46**

Parts	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Total Credits
Part I	3	3	3	3	-	-	12
Part II	3	3	3	3	-	-	12
Part III	11	15	11	14	21	20	92
Part IV	4	4	4	6	4	4	26
Part V	-	-	-	-	-	1	1
Total	21	25	21	26	25	25	**143**

RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS), THANJAVUR -613005
B.Sc., COMPUTER SCIENCE COURSE STRUCTURE
(for the candidates admitted from the academic year **2023-2024** onwards)

List of Elective courses

Part -A (Generic)

S.No	Course Code	Title of the Course
1	T1GMCS1	Numerical methods and Operation Research
2	T2GMCS2	Probability and statistics
3	T2GMCS3	Vector calculus and Matrices
4	T3GPHCS1	Applied Physics I
5	T4GPHCS2	Applied Physics Practical
6	T4GPHCS3	Applied Physics II
7	TGMCS4	Statistical Methods and its applications
8	TGMCS5	Introduction to Linear Algebra
9	TGMCS6	Graph Theory and its Applications
10	TGMCS7	Numerical Methods
11	TGMCS8	Optimization Techniques
12	T3GPHCS1	Applied Physics - I
13	T4GPHCS3	Applied Physics - II
14	T4GPHCS2P	Applied Physics – Practical

Part -B (Discipline)

S.No	Course Code	Title of the Course
1	TCSECA	Operating system
2	TCSECB	Digital computer Fundamentals and Architecture
3	TCSECC	IOT and its Applications
4	TCSECD	PHP
5	TCSECE	Natural Language Processing
6	TCSECF	Introduction to data science
7	TCSECG	Big Data Analytics
8	TCSECH	Software Project Management
9	TCSECI	Human Computer Interaction
10	TCSECJ	Artificial Intelligence
11	TCSECK	Robotics and its Applications
12	TCSECL	Computer Graphics
13	TCSECM	Cloud Computing
14	TCSECN	Artificial Neural Network
15	TCSECO	Virtual reality

Credits: 5
Hours/Week: 5
Medium of instruction: English

Code: T1CS1

B.Sc (Computer Science) - Semester: I
(For students admitted from 2023-2024 onwards)

C PROGRAMMING

Learning objectives	
LO1	To familiarize the students with the Programming basics and the fundamentals of C, Data types in C, Mathematical and logical operations.
LO2	To understand the concept using if statements and loops.
LO3	To know the concept of Arrays and Functions.
LO4	To acquire the knowledge of Structures and unions and Pre-processors.
LO5	To understand the concept of implementing pointers.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge about basic concepts of C, data types and operators in C.	K1,K2
CO2	Gain good understanding of conditional control statements and looping.	K2,K3
CO3	Able to describe about arrays and functions	K3,K4
CO4	Demonstrate the concept of Structures and unions and Preprocessors	K5,K6
CO5	Explore the concept of pointers and implementation.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 15**

Overview of C: Importance of C, sample C program, C program structure, executing C program. Constants, Variables, and Data Types: Character set, C tokens, keywords and identifiers, constants, variables, data types, declaration of variables, Assigning values to variables-Assignment statement, declaring a variable as constant, as volatile. Operators and Expression: Arithmetic, Relational, logical, assignment, increment, decrement, conditional, bitwise and special operators, arithmetic expressions, operator precedence, type conversions, mathematical functions. Managing Input and Output Operators: Reading and writing a character, formatted input, formatted output.

UNIT II: **No. of hours: 15**

Decision Making and Branching: Decision making with If, simple IF, IF ELSE, nested IF ELSE, ELSE IF ladder, switch, GOTO statement.Decision Making and Looping: While, Do-While, For, Jumps in loops.

UNIT III: **No. of hours: 15**

Arrays: Declaration and accessing of one & two-dimensional arrays, initializing two-dimensional arrays, multidimensional arrays. Functions: The form of C functions, Return values and types, calling a function, categories of functions, Nested functions, Recursion, functions with arrays, call by value, call by reference, storage classes-character arrays and string functions.

UNIT IV: **No. of hours: 15**

Structures and Unions: Defining, giving values to members, initialization and comparison of structure variables, arrays of structure, arrays within structures, structures within structures, structures and functions, unions. Pre-processors: Macro substitution, file inclusion.

UNIT V: **No. of hours: 15**

Pointers: definition, declaring and initializing pointers, accessing a variable through address and through pointer, pointer expressions, pointer increments and scale factor, pointers and arrays, pointers and functions, pointers and structures.

Total Hours: 75

Text Book

1. E. Balagurusamy, Programming in ANSI C, Fifth Edition, Tata McGraw-Hill, 2010.

Reference books

1. Byron Gottfried, Schaum's Outline Programming with C, Fourth Edition, Tata McGraw-Hill, 2018.
2. Kernighan and Ritchie, The C Programming Language, Second Edition, Prentice Hall, 1998
3. YashavantKanetkar, Let Us C, Eighteenth Edition, BPB Publications,2021

Web Resources

1. https://codeforwin.org/
2. https://www.geeksforgeeks.org/c-programming-language/
3. http://en.cppreference.com/w/c
4. http://learn-c.org/
5. https://www.cprogramming.com/

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	2	3	3
CO 3	2	3	2	3	3	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	2
Weightage of course contributed to each PSO	14	15	14	14	15	13

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

துறைத்தலைவர்
கணினி அறிவியல் துறை
முன்னர் சரபோசி அரசுக் கல்லூரி
(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 3
Hours/Week : 3
Medium of instruction: English

Code: T1CS2

B.Sc (Computer Science) - Semester: I
(For students admitted from 2023-2024 onwards)

C PROGRAMMING LAB

Learning objectives	
LO1	To familiarize the students with the Programming basics and the fundamentals of C, Data types in C, Mathematical and logical operations.
LO2	To understand the concept using if statements and loops
LO3	To understand the concept of Arrays and Functions
LO4	To apply the concept of Structures and unions and Preprocessors
LO5	To understand the concept of implementing pointers and files.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Understand the programming basics and fundamentals.	K1,K2
CO2	Do programs in decision making and looping statements.	K2,K3
CO3	Able to know how to write programs with arrays and functions	K3,K4
CO4	Understand the concept of Structures to create files	K5,K6
CO5	Create programs with pointers and files.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: Variables, Data types, Constants and Operators **No. of hours: 12**

1. Evaluation of expression ex: ((x+y) ^2 * (x+z))/w
2. Temperature conversion problem (Fahrenheit to Celsius)
3. Program to convert days to months and days (Ex: 364 days = 12 months and 4 days)
4. Solution of quadratic equation
5. Salesman salary (Given: Basic Salary, Bonus for every item sold, commission on the total monthly sales)

UNIT II: Decision making Statements **No. of hours: 12**

6. Maximum of three numbers

7. Calculate Square root of five numbers (using goto statement)

8. Pay-Bill Calculation for different levels of employee (Switch statement)

9. Fibonacci series

10. Floyds Triangle

11. Pascal's Triangle

UNIT III: Arrays, Functions and Strings **No. of hours: 12**

12. Prime numbers in an array

13. Sorting data (Ascending and Descending)

14. Matrix Addition and Subtraction

15. Matrix Multiplication

16. Function with no arguments and no return values

17. Function that convert lower case letters to upper case

18. Factorial using recursion.

19. Perform String Operations using Switch Case.

UNIT IV: Structures and Macros **No. of hours: 12**

20.Structure that describes a Hotel (name, address, grade, avg room rent, number of rooms) Perform some operations (list of hotels of a given grade etc.)

21. Using Pointers in Structures.

22. Cricket team details using Union.

23. Write a macro that calculates the max and min of two numbers

24. Nested macro to calculate Cube of a number.

UNIT V: Pointers and Files **No. of hours: 12**

25. Evaluation of Pointer expressions

26. Function to exchange two pointer values

27. Creation, insertion and deletion in a linked list

28. Program to read a file and print the data.

29. Program to receive a file name and a line of text as command line arguments and write the text to the file

30. Program to copy the content of one file to another file.

Total Hours: 60

Text Book

1. E. Balagurusamy, Programming in ANSI C, Fifth Edition, Tata McGraw-Hill, 2010.

Reference books

1. Byron Gottfried, Schaum's Outline Programming with C, Fourth Edition, Tata McGraw-Hill, 2018.
2. Kernighan and Ritchie, The C Programming Language, Second Edition, Prentice Hall, 1998
3. YashavantKanetkar, Let Us C, Eighteenth Edition, BPB Publications,2021

Web Resources

1. https://codeforwin.org/
2. https://www.geeksforgeeks.org/c-programming-language/
3. http://en.cppreference.com/w/c
4. http://learn-c.org/
5. https://www.cprogramming.com/

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	2	3	3
CO 3	2	3	2	3	3	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	2
Weightage of course contributed to each PSO	14	15	14	14	15	13

S-Strong-3 M-Medium-2 L-Low-1

Semester Question paper Pattern

Maximum Marks: 75Exam Duration: Three Hours

Section A-Answer All Questions (Two questions from each unit)	10x2=20
Section B- Answer All questions (Either or Type – Two questions from each unit)	5x5=25
Section C- Answer any THREE questions (One question from each unit)	3x10=30

Signature of the HOD

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மன்னர் சரபோசி அரசுக் கல்லூரி
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COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 2 **Code: T1CSSE1**
Hours/Week : 2
Medium of instruction: English

B.Sc(Computer Science) - Semester: I
(For students admitted from 2023-2024 onwards)

Skill Enhancement Course - 1

FUNDAMENTALS OF INFORMATION TECHNOLOGY

Learning objectives	
LO1	To learn the basic computer terminology.
LO2	To familiarize about computer hardware and software.
LO3	To possess the knowledge about computer networks.
LO4	To know about internet concepts.
LO5	To learn the concept about web pages and search engines.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Understand the basic computer terminology.	K1,K2
CO2	Know about computer hardware and software.	K2,K3
CO3	Able to know about the basics of computer networks.	K3,K4
CO4	Understand the concept internet and WWW.	K5,K6
CO5	Gain knowledge about web pages and search engines.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I **No. of hours: 6**

Introduction to computers: Introduction-Importance of computers- Characteristics of computers- classification of computers- What computers can do- can't do - Uses of computers - Five Generations of Modern Computers- Classification of Digital computer Systems – Anatomy of a digital computer.

UNIT II **No. of hours: 6**

Central Processing Unit (CPU) and Memory: Introduction - Central processing Unit (CPU)- Memory- RAM, ROM, Registers- factors affecting processor speed- Input Devices: Keyboard- Mouse- Trackball- Game Controllers- Scanners- Barcode Reader- Card Reader- Digitizer - Voice Recognition – Webcams - Digital Cameras- Video Cameras- OCR- OMR- ICR- MICR.

UNIT III **No. of hours: 6**

Output devices: Introduction – monitor – printer- plotter – Introduction to computer software: Introduction- computer software- Hardware/software interaction- classification of software- operating system- utilities- compilers and interpreters- word processors – Spreadsheets- presentation software- image processors.

UNIT IV **No. of hours: 6**

Internet & World Wide Web: Introduction, internet access – internet basic –internet protocol- internet addressing- World wide web (www). Overview of Electronic mail- Introduction- How E-mail works? – Why use e-mail- e-mail- name and addresses- mailing basics.

UNIT V **No. of hours: 6**

Computer in Education and Training- Introduction-computer in schools- distance learning- Computers in Entertainment, science, Medicine and Engineering.

Total No. of hours: 30

BOOK FOR STUDY:

Alexix Leon and Mathews Leon "*Fundamentals of Information Technology*" - 2ND Edition, , Leon Vikas publishing House Pvt Ltd, Chennai

Unit I: Chapter 1,2,3,4

Unit II: Chapter 7, 9

Unit III: Chapter 10, 11

Unit IV: Chapter 24, 25

Unit V: Chapter 47, 48

Web Resources

1. https://www.tutorialspoint.com/computer_fundamentals/index.htm
2. https://www.javatpoint.com/computer-network-transmission-modes
3. https://www.tutorialspoint.com/internet_technologies/internet_overview.htm
4. https://www.tutorialspoint.com/computer_programming/computer_programming_decisions.htm

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	2
CO 2	3	3	3	2	2	3
CO 3	2	2	1	3	3	3
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	1
Weightage of course contributed to each PSO	14	14	13	14	14	11

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

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COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 2 **Code: CSFC**
Hours/Week : 2
Medium of instruction: English

B.Sc (Computer Science) - Semester: I
(For students admitted from 2023-2024 onwards)

PROBLEM SOLVING TECHNIQUES

Learning objectives	
LO1	To familiarize programming languages, assembly language, algorithms and basic terminology.
LO2	To use data flow diagram, Pseudo code to implement solutions.
LO3	To know about Selection Structures.
LO4	To define and use of arrays with simple applications
LO5	To understand about Data Flow Diagrams.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Know about programming languages, assembly language, algorithms and basic terminology.	K1,K2
CO2	Understand the program development cycle, data flow diagram and pseudo code.	K2,K3
CO3	Know about Selection Structures.	K3,K4
CO4	Understand the concept of arrays and types.	K5,K6
CO5	Gain knowledge about DFD and functions.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 6**

Introduction: History, characteristics and limitations of Computer. Hardware/ Anatomy of Computer: CPU, Memory, Secondary storage devices, Input Devices and Output devices. Types of Computers: PC, Workstation, Minicomputer, Main frame and Supercomputer. Software: System software and Application software. Programming Languages: Machine language, Assembly language, High-level language,4 GL and 5GL-Features of good programming language. Translators: Interpreters and Compilers.

UNIT II: **No. of hours: 6**

Data: Data types, Input, Processing of data, Arithmetic Operators, Hierarchy of operations and Output. Different phases in Program Development Cycle (PDC).Structured Programming: Algorithm: Features of good algorithm, Benefits and drawbacks of algorithm. Flowcharts: Advantages and limitations of flowcharts, when to use flowcharts, flowchart symbols and types of flowcharts. Pseudo_code: Writing a pseudocode. Coding, documenting and testing a program: Comment lines and types of errors. Program design: Modular Programming.

UNIT III: **No. of hours: 6**

Selection Structures: Relational and Logical Operators -Selecting from Several Alternatives – Applications of Selection Structures. Repetition Structures: Counter Controlled Loops –Nested Loops– Applications of Repetition Structures.

UNIT IV: **No. of hours: 6**

Data: Numeric Data and Character Based Data. Arrays: One Dimensional Array - Two Dimensional Arrays – Strings as Arrays of Characters.

UNIT V: **No. of hours: 6**

Data Flow Diagrams: Definition, DFD symbols and types of DFDs. Program Modules: Subprograms-Value and Reference parameters- Scope of a variable - Functions – Recursion. Files: File Basics-Creating and reading a sequential file-Modifying Sequential Files.

Total Hours: 30

Text Book

1. Stewart Venit, "Introduction to Programming: Concepts and Design", Fourth Edition, 2010, Dream Tech Publishers.

Web Resources

1. https://www.codesansar.com/computer-basics/problem-solving-using-computer.html
2. http://www.nptel.iitm.ac.in/video.php?subjectId=106102067
3. http://utubersity.com/?page_id=876

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	3	3
CO 3	3	2	3	3	3	3
CO 4	3	3	2	3	3	3
CO 5	3	3	3	3	3	2
Weightage of course contributed to each PSO	15	14	14	15	15	14

S-Strong-3 M-Medium-2 L-Low-1

Semester Question paper Pattern

Maximum Marks: 75Exam Duration: Three Hours

Section A-Answer All Questions (Two questions from each unit)	10x2=20
Section B- Answer All questions (Either or Type – Two questions from each unit)	5x5=25
Section C- Answer any THREE questions (One question from each unit)	3x10=30

Signature of the HOD

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COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 5
Hours/Week : 5
Medium of instruction: English

Code: T2CS3

B.Sc (Computer Science) - Semester: II
(For students admitted from 2023-2024 onwards)
JAVA PROGRAMMING

	Learning objectives
LO1	To provide fundamental knowledge of object-oriented programming
LO2	To equip the student with programming knowledge in Core Java from the basics up.
LO3	To enable the students to use the concepts of threads and packages..
LO4	To provide fundamental knowledge of exceptions in java programming.
LO5	To equip the student with programming knowledge in Applet.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Gain knowledge about object-oriented programming.	K1,K2
CO2	Familiarize with programming knowledge in methods and overloading.	K2,K3
CO3	Know about the concepts of threads and packages.	K3,K4
CO4	Understand the concept exception handling.	K5,K6
CO5	Get knowledge about Applet and graphics classes.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I:

No. of hours: 15

Fundamentals of Object Oriented Programming: Introduction – Object oriented paradigm – OOP Concepts - Benefits and Applications of OOP. Overview of Java Language: Java Program Structure – Implementing a Java Program – Java virtual Machine – Constants, Variables and Data types - Operators and expressions – Decision making and branching - Decision making and looping.

UNIT II:

No. of hours: 15

Classes, Objects and Methods : Introduction – Defining a Class – Field and Method declaration – Creating Objects – Accessing Class Members – Constructors – Method Overloading – Static Members – Inheritance – Overriding Methods – Final Variables and Methods – Final Classes – Finalizer Method - Arrays, Strings and Vectors.

UNIT III: **No. of hours: 15**

Interfaces: Multiple Inheritances - Defining, Extending, Implementing and Accessing Interfaces. Packages: Introduction – Java API Packages - Using System Packages – Naming Conventions - Creating, Accessing and using a Package. Multithreaded Programming: Creating Thread – Life cycle of a Thread – Using Thread methods – Thread Exceptions – Thread Priority.

UNIT IV: **No. of hours: 15**

Managing Errors and Exceptions: Type of Errors - Syntax of Exception Handling Code – Multiple Catch Statements – Throwing our own Exceptions. Managing Input / Output files in Java: Concept of Stream – Stream Classes – Using the File Class.

UNIT V: **No. of hours: 15**

Graphics Programming: The Graphics Class - Applet Programming: Introduction – Building Applet Code - Applet Life Cycle – Designing Web Page – Applet Tag – Passing Parameters to Applet.

Total hours: 75

Text Book:

1. E.Balagurusamy, *Programming with Java*, Tata McGraw Hill, and 4th Edition.

Reference Book:

1. Herbert Schildt, *The Complete Reference Java*, Tata McGraw Hill, 4th Edition.

Web Resources

1. https://javabeginnerstutorial.com/core-java-tutorial
2. http://docs.oracle.com/javase/tutorial/
3. https://www.coursera.org/

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	2
CO 2	3	3	3	2	2	3
CO 3	2	2	1	3	3	3
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	1
Weightage of course contributed to each PSO	14	14	13	14	14	11

S-Strong-3 M-Medium-2 L-Low-1

Semester Question paper Pattern

Maximum Marks: 75Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

துறைத்தலைவர்
கணினி அறிவியல் துறை
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(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 3
Hours/Week : 3
Medium of instruction: English

Code: T2CS4

B.Sc (Computer Science) - Semester: II
(For students admitted from 2023-2024 onwards)

JAVA PROGRAMMING LAB

Learning objectives	
LO1	To provide fundamental knowledge of object-oriented programming.
LO2	To equip the student with programming knowledge in Core Java from the basics up.
LO3	To enable the students to know about Event Handling.
LO4	To enable the students to use String Concepts.
LO5	To equip the student with programming knowledge in to create GUI using AWT controls.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Write basic programs in object-oriented programming.	K1,K2
CO2	Understand programming knowledge using methods and overloading.	K2,K3
CO3	Know how to create Event Handling in java.	K3,K4
CO4	Gain knowledge about exception handling in java programming.	K5,K6
CO5	Create graphics programs in Java with applet.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

1. Write a program to sort the given numbers using arrays.
2. Write a program to implement the FIND and REPLACE operations in the given multiple text.
3. Write a program to implement a calculator to perform basic arithmetic Operations.
4. Write a program to find out sum of digits of given number
5. Write a program to find the area of a rectangle using constructor
6. Write a Java program to display the count of all commands line arguments and list each in a line
7. Write a program to find the student's percentage and grade using command line arguments.
8. Write a program to draw circle or triangle or square using polymorphism and inheritance.

9. Implement multiple inheritance concepts in java using interface, you can choose your own example of a company or education institution or a general concept which requires the use of interface to solve a particular problems.

10. Write a program to create threads and assign priorities to them

11. Write a program to develop an applet to play multiple audio clips using multithreading.

12. Write a program to create a window with three check boxes called red, green and blue. The applet should change the colors according to the selection.

Total Hours: 60

Text Book

1. Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010.
2. Gary Cornell, *Core Java 2 Volume I – Fundamentals,* Addison Wesley, 1999.

Reference books

1. Head First Java, O'Rielly Publications,
2. Y. Daniel Liang, *Introduction to Java Programming*, 7th Edition, Pearson Education India, 2010.

Web Resources

1. https://www.w3schools.com/java/
2. http://java.sun.com
3. http://www.afu.com/javafaq.html

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	2
CO 2	3	3	3	2	2	3
CO 3	2	2	1	3	3	3
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	2
Weightage of course contributed to each PSO	14	14	13	14	14	12

S-Strong M-Medium L-Low

Semester Question paper Pattern

Maximum Marks: 75Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C- Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

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(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 2
Hours/Week : 2
Medium of instruction: English

Code: T2CSSE2

B.Sc (Computer Science) - Semester: II
(For students admitted from 2023-2024 onwards)
OFFICE AUTOMATION

	Learning objectives
LO1	To understand the basics of MS-Word.
LO2	To familiarize about text boxes, frames and mail merge.
LO3	To understand and apply the basic concepts of electronic spreadsheet software.
LO4	To understand and create a presentation using PowerPoint tool.
LO5	To understand and apply the basic concepts of database management system.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Gain knowledge the about basics of MS-Word.	K1,K2
CO2	Familiarize about text boxes, frames and mail merge.	K2,K3
CO3	Know about the concepts of electronic spreadsheets.	K3,K4
CO4	Understand the basic concepts of Power Point Presentation.	K5,K6
CO5	Acquire knowledge about table, databases, forms and queries.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 6**

Features of MS-Word 2000 - Getting Started - Components of Word Window - Creating Document - Typing Text, Saving and Closing - Opening Existing - Printing & Previewing Documents - Switch between Multiple Documents - Quitting Word. Using Cut, Copy & Paste

Find & Replace -Fonts & Paragraphs - Styles--Bulleting & Numbering Text - Headers & Footers - Inserting Page numbers.

UNIT II: **No. of hours: 6**

Working with Text boxes & frame - Working with Pictures - Working with Objects - Inserting Place Comments - Working with Tables - Working with Mail Merge - Working with Main – Document - Merging Envelops & Labels.

UNIT III: **No. of hours: 6**

Spreadsheets: Understanding Books & Sheets - Entering Work Sheet Data - Auto Fill - Editing Work sheet data - Working with Work Sheets - Working With Ranges - Types Of

References - Working with Formulas. What to Print - Producing Charts - Using Template - Using View - Linking With Work Books - About Formula Arrays.

UNIT IV: **No. of hours: 6**

What is Power Point - Auto Content Wizard - Creating Presentation - Using Design Templates - Creating Blank Presentation - Inserting Objects - PowerPoint Views - Saving & Printing Your Works - Working With Colors & Transitions - About Slide Show Timings - Navigating During Presentation.

UNIT V: **No. of hours: 6**

Introduction - Terms and Definitions – Database – Tables – Forms – Query – Reports - Data Access Page.

Total Hours: 30

Text Book

1. Peter Norton, "Introduction to Computers" – Tata McGraw-Hill.

Reference books

1. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "Microsoft 2003", Tata McGrawHill.

Web Resources

1. https://www.udemy.com/course/office-automation-certificate-course/
2. https://www.javatpoint.com/automation-tools

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	3	3	3
CO 2	3	3	3	3	3	3
CO 3	3	3	3	3	3	3
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3
Weightage of course contributed to each PSO	15	14	14	15	15	15

S-Strong-3 M-Medium-2 L-Low-1

Semester Question paper Pattern

Maximum Marks: 75Exam Duration: Three Hours

Section A-Answer All Questions (Two questions from each unit)	10x2=20
Section B- Answer All questions (Either or Type – Two questions from each unit)	5x5=25
Section C- Answer any THREE questions (One question from each unit)	3x10=30

Signature of the HOD

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தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 2
Hours/Week : 2
Medium of instruction: English

Code: T2CSSE3

B.Sc (Computer Science) - Semester: II
(For students admitted from 2023-2024 onwards)
UNDERSTANDING INTERNET

	Learning objectives
LO1	To knowledge about concept of the Internet.
LO2	To learn about classification of computers by internetwork.
LO3	To learn about the features of Internet Technology.
LO4	To know about wireless transmission media and network protocol.
LO5	To study about the Internet Service Provider.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Gain knowledge basics of internet.	K1,K2
CO2	Familiarize about network classification and benefits of internet.	K2,K3
CO3	Know about the concepts internet services, cyber café, and connectivity.	K3,K4
CO4	Understand the basic concepts transmission media and network protocols.	K5,K6
CO5	Acquire knowledge about ISP and domain name system.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 6**

Concept of Internet: The concept of the Internet - Historical background of the Internet - Intranet and Extranet - Differences between Internet, Intranet and Extranet. Data Transmission: Data Transmission methods - Data transmission rate and bandwidth - Various Data transmission media. Computer Network Techniques: Simple computer network techniques - Distinguish between ARPANET, NSFNET and MILNET.

UNIT II: **No. of hours: 6**

Classification of Computer Networks: Classification of computers by internetwork - classification of computers by connection method - Classification of computers by functional relationship (network architectures) - Classification of computers by geographical coverage. **Benefits of the Internet:** The economic benefit of the Internet - The Social benefit of the Internet - The political benefit of the Internet - The Educational benefit of the Internet - The cultural benefit of the Internet. **Internet Services:** E-commerce - WWW (World Wide Web) - E-mail.

UNIT III: **No. of hours: 6**

Internet Services: Newsgroups - File Transfer Protocol (FTP) - Bulletin Board services - Audio Communication - Audio Communication - Digital Library – Telnet. **The Concept of Cybercafé:** The concept of cyber-café - The steps involved in Cybercafé operations - Personnel requirements of a Cybercafé - Security devices in a cybercafé. **Internet Connectivity:** Basic hardware required for Internet connectivity - Modem and its function - Data transfer rate of various modem - Internet connection methods.

UNIT IV:

No. of hours: 6

Connecting to the Internet: Set up an Internet connection - Choices of Internet access - Concept of broadband - Wireless broadband and bandwidth - Wireless Internet connection option. **Wireless Transmission Media:** VSAT (Very Small Aperture Terminal) Internet connection - Wireless Radio Frequency Internet connection - Obstacles to effective transmission. **Network Protocol:** Network protocol - Typical Properties of protocols - Importance of network protocols - Types of network protocols - Advantages of TCP/IP for Internet connectivity.

UNIT V:

No. of hours: 6

Concept of Internet Service Provider (ISP): Internet Service Provider (ISP) - Factors to be considered when choosing an ISP - **Domain Name System:** Domain name - Uniform Resource Locator (URL) - Internet Protocol (IP) address - Web server and how it works - Domain Name System (DNS) - Domain Name Space - Domain Name server.

Total Hours: 30

Text Book

1. Barnouw, E and Krishnaswamy S [1990] Indian Film. New York, OUP.
2. Kumar, Keval [1999] Mass Communication in India. Mumbai, Jaico.
3. Srivastava, K M [1992] Media Issues. Sterling Publishers Pvt Ltd.

Reference books

1. Acharya, R N [1987] Television in India. Manas Publications, New Delhi.
2. Barnouw, E [1974] Documentary – A History of Nonfiction. Oxford, OUP
3. Luthra, H R [1986] Indian Broadcasting. Ministry of I& B, New Delhi.
4. Vasudev, Aruna [1986] The New Indian Cinema. Macmillan India, New Delhi.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	2	3	3	3
CO 3	2	3	3	3	3	3
CO 4	3	3	3	3	3	3
CO 5	3	3	3	2	3	3
Weightage of course contributed to each PSO	14	15	14	14	15	15

S-Strong-3 M-Medium-2 L-Low-1

Semester Question paper Pattern

Maximum Marks: 75Exam Duration: Three Hours

Section A-Answer All Questions (Two questions from each unit)	10x2=20
Section B- Answer All questions (Either or Type – Two questions from each unit)	5x5=25
Section C- Answer any THREE questions (One question from each unit)	3x10=30

Signature of the HOD

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(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 5
Hours/Week : 5
Medium of instruction: English

Code: T3CS5

B.Sc (Computer Science) - Semester: III
(For students admitted from 2023-2024 onwards)

PYTHON PROGRAMMING

	Learning objectives
LO1	To make students understand the concepts of Python programming.
LO2	To apply conditional and branching statements.
LO3	To know about the concepts of functions and modules in python.
LO4	To understand about list and dictionaries.
LO5	To acquire knowledge about python file handling.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Gain knowledge about basics of python programming.	K1,K2
CO2	Familiarize about conditional and branching statements.	K2,K3
CO3	Know about the concepts of functions and modules in python.	K3,K4
CO4	Understand about list and dictionaries.	K5,K6
CO5	Acquire knowledge about python file handling.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 15**

Basics of Python Programming: History of Python - Features of Python – Literal – Constants - Variables – Identifiers – Keywords - Built-in Data Types - Output Statements – Input Statements - Comments – Indentation – Operators – Expressions - Type conversions. Python Arrays: Defining and Processing Arrays – Array methods.

UNIT II: **No. of hours: 15**

Control Statements: Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative Statements: while loop, for loop, else suite in loop and nested loops. Jump Statements: break, continue and pass statements.

UNIT III: **No. of hours: 15**

Functions: Function Definition – Function Call – Variable Scope and its Lifetime- Return Statement. Function Arguments: Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments- Recursion. Python Strings: String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison. Modules: import statement- The Python module – dir() function – Modules and Namespace – Defining our own modules.

UNIT IV: **No. of hours: 15**

Lists: Creating a list -Access values in List-Updating values in Lists-Nested lists - Basic list operations-List Methods. Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples – Difference between lists and tuples. Dictionaries: Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions and Methods - Difference between Lists and Dictionaries.

UNIT V: **No. of hours: 15**

Python File Handling: Types of files in Python - Opening and Closing files-Reading and Writing files: write() and writelines() methods- append() method – read() and readlines() methods – with keyword – Splitting words – File methods - File Positions-Renaming and deleting files.

Total Hours: 75

Text Book

1. ReemaThareja, "Python Programming using problem solving approach", First Edition, 2017, Oxford University Press.
2. Dr. R. NageswaraRao, "Core Python Programming", First Edition, 2017, Dream tech Publishers.

Reference books

1. Vamsi Kurama, "Python Programming: A Modern Approach", Pearson Education.
2. Mark Lutz, "Learning Python", Orielly.
3. Adam Stewarts, "Python Programming", Online.
4. Fabio Nelli, "Python Data Analytics", APress.
5. Kenneth A. Lambert, "Fundamentals of Python – First Programs", CENGAGE Publication.

Web Resources

1. https://www.programiz.com/python-programming
2. https://www.guru99.com/python-tutorials.html
3. https://www.w3schools.com/python/python_intro.asp
4. https://www.geeksforgeeks.org/python-programming-language/
5. https://en.wikipedia.org/wiki/Python_(programming_language)

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	2	3
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	14	15	15	13	14

S-Strong-3 M-Medium-2 L-Low-1

Semester Question paper Pattern

Maximum Marks: 75Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C- Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD
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மன்னர் சரபோசி அரசுக் கல்லூரி
(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 3
Hours/Week : 3
Medium of instruction: English

Code: T3CS6

B.Sc (Computer Science) - Semester: III
(For students admitted from 2023-2024 onwards)
PYTHON PROGRAMMING LAB

	Learning objectives
LO1	To get knowledge about basic programming in python.
LO2	To write programs in python using functions.
LO3	To know how to use arrays and strings in python programs.
LO4	To understand the programs with list and dictionaries.
LO5	To acquire knowledge to create files in python.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge about basic programming in python.	K1,K2
CO2	Write programs in python using functions.	K2,K3
CO3	Know how to use arrays and strings in python programs.	K3,K4
CO4	Understand the programs with list and dictionaries.	K5,K6
CO5	Acquire knowledge to create files in python.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 12**

1. Program using variables, constants, I/O statements in Python.
2. Program using Operators in Python.
3. Program using Conditional Statements.

UNIT II: **No. of hours: 12**

4. Program using Loops.
5. Program using Jump Statements.
6. Program using Functions.

UNIT III: **No. of hours: 12**

7. Program using Recursion.
8. Program using Arrays.

9. Program using Strings.

UNIT IV: **No. of hours: 12**

10. Program using Modules.

11. Program using Lists.

12. Program using Tuples.

UNIT V: **No. of hours: 12**

13. Program using Dictionaries.

14. Program for File Handling.

Total Hours: 60

Text Book

1. ReemaThareja, "Python Programming using problem solving approach", First Edition, 2017, Oxford University Press.
2. Dr. R. NageswaraRao, "Core Python Programming", First Edition, 2017, Dream tech Publishers.

Reference books

1. Vamsi Kurama, "Python Programming: A Modern Approach", Pearson Education.
2. Mark Lutz, "Learning Python", Orielly.
3. Adam Stewarts, "Python Programming", Online.
4. Fabio Nelli, "Python Data Analytics", APress.
5. Kenneth A. Lambert, "Fundamentals of Python – First Programs", CENGAGE Publication.

Web Resources

1. https://www.programiz.com/python-programming
2. https://www.guru99.com/python-tutorials.html
3. https://www.w3schools.com/python/python_intro.asp
4. https://www.geeksforgeeks.org/python-programming-language/
5. https://en.wikipedia.org/wiki/Python_(programming_language)

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	14

S-Strong-3 M-Medium-2 L-Low-1

Semester Question paper Pattern

Maximum Marks: 75Exam Duration: Three Hours

Section A-Answer All Questions (Two questions from each unit)	10x2=20
Section B- Answer All questions (Either or Type – Two questions from each unit)	5x5=25
Section C- Answer any THREE questions (One question from each unit)	3x10=30

Signature of the HOD

துறைததலைவர்
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(தன்னா[illegible]சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 1 **Code: T3CSSE4**
Hours/Week : 1
Medium of instruction: English

B.Sc (Computer Science) - Semester: III
(For students admitted from 2023-2024 onwards)

MULTIMEDIA SYSTEM

Learning objectives	
LO1	To learn about Introduction to multimedia.
LO2	To know about Multimedia computer components.
LO3	To learn about Text and Video.
LO4	To know about Digital Audio Representation and Processing.
LO5	To learn about File Standard For Internet and Problems.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Gain knowledge about multimedia hardware and software.	K1,K2
CO2	Familiarize about multimedia environments and components.	K2,K3
CO3	Get knowledge about text and video.	K3,K4
CO4	Know about the digital audio and video representation.	K5,K6
CO5	Acquire knowledge about file standard for Internet.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 6**
Multimedia definition - Multimedia hardware - Multimedia software - Multimedia networking.

UNIT II: **No. of hours: 6**
Multimedia application - Multimedia environment - Multimedia computer components - Multimedia standards - Multimedia pc.

UNIT III: **No. of hours: 6**
Text: Engineering text - Positioning text - Sizing text - Editing text - Fonts - Shadowing - Cloning - Building image and graphics - Backdrops and hanging pictures - Positioning, Capturing and converting graphics - Compressing bitmaps - Controlling pallets - Triggering - Hypertext - Hyper picture - Buttons - Editing links - Triggering in backdrops - Analog video - Digital video - Digital audio – Music.

UNIT IV: **No. of hours: 6**
Digital Audio Representation and Processing - Digital Representation of Sound - Translation of Sound - Digital Signal Processing Of Sound - Speech Recognition Synthesis - Waveform Audio Recording - Cd Audio Clip Making.

UNIT V: **No. of hours: 6**
File Standard For Internet - SGML, HTML, XML - MIME - Voice Mail - Video - Tele Conferencing - Problems: Bandwidth - Performance Measurement - Multimedia Presentation

- Authoring Design Paradigms - User Interfaces - Multimedia Applications With Case Studies.

Total Hours: 30

Text Book

1. "Mastering HTML5 and CSS3 Made Easy", TeachUComp Inc., 2014.
2. Thomas Michaud, "Foundations of Web Design: Introduction to HTML & CSS"

Reference books

1. World Wide Web Design with HTML",C.Xavier, McGraw Hill Education, 2017

Web Resources

1. https://www.teachucomp.com/samples/html/5/manuals/Mastering-HTML5-CSS3.pdf
2. https://www.w3schools.com/html/default.asp

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	2	3	3	3
CO 3	2	3	3	3	3	3
CO 4	3	3	3	3	3	3
CO 5	3	3	3	2	3	3
Weightage of course contributed to each PSO	14	15	14	14	15	15

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

தலைவர்
துறைத்தலைவர்
கணினி அறிவியல் துறை
மன்னர் சரபோசி அரசுக் கல்லூரி
(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 2 **Code: T3CSSE5**
Hours/Week : 2
Medium of instruction: English

B.Sc(Computer Science) - Semester: III
(For students admitted from 2023-2024 onwards)

WEB DESIGNING

	Learning objectives
LO1	To understand the basics of Internet and browser.
LO2	To study about the Page layout and Links.
LO3	To understand and apply the concepts List, Tables and Frames.
LO4	To understand the concept of Forms.
LO5	To identify and understand the goals and objectives of Style Sheets.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Gain knowledge about HTML tags.	K1,K2
CO2	Familiarize about Page layout and Links.	K2,K3
CO3	Get knowledge about List, Tables and Frames.	K3,K4
CO4	Know about the forms and multimedia helper applications.	K5,K6
CO5	Acquire knowledge about cascading style sheet.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 6**

Introduction: The Internet, the Web, and HTML. HTML Building Blocks - Writing HTML - HTML Tags - Nesting Tags Spacing - Special Symbols -File Names - URLsStarting Your Web Page –Creating a Title- Organizing the Page -Text Formatting - Creating Web Images - Getting Images - Making Images Smaller Exporting GIF Images from Photoshop - Using (Mostly) Browser Safe Colors - Converting to Browser Safe Colors Reducing the Number of Colors- Creating Transparency -Creating Fake Transparency - Interlacing GIF Images Creating Animated GIFs - Creating JPEG Images - Blurring Images to Aid JPEG Compression - Creating Low Resolution Images -Creating PNG Files.

UNIT II: **No. of hours: 6**

Page Layout: Using Background Color - Using Background Images - Centering Elements on a Page - Specifying the Margins - Creating a Line Break - Keeping Lines Together - Creating Discretionary Line Breaks - Specifying the Space Between Paragraphs - Creating Indents - Creating Indents (with Lists) - Creating Blocks of Space – Using Pixel Shims - Using Block Quotes - Quoting Short Passages of Text - Creating Columns - Using Preformatted Text - Positioning Elements with Layers.

Links: Creating a Link to Another Web Page - Creating Anchors - Linking to a Specific Anchor - Targeting Links to Specific Windows - Setting the Default Target - Creating Other Kinds of Links - Creating Keyboard - Shortcuts for Links - Setting the Tab Order for Links - Using Images to Label Links - Dividing an Image into Clickable Regions-Creating a Client-Side Image Map - Using a Server-Side Image Map-Changing the Color of Links.

UNIT III: **No. of hours: 6**

Lists: Creating Ordered Lists - Creating Unordered Lists -Creating Definition Lists - Creating Nested Lists.

Tables : Creating a Simple Table - Adding a Border - Wrapping Text around a Table - Adding Space around a Table- Spanning a Cell across Columns - Spanning a Cell across Rows - Aligning a Cell's Contents-Controlling Space in and Around Cells Dividing Your Table into Column Groups - Dividing the Table into Horizontal Sections.

Frames: Creating a Simple Frameset -Creating Frames in Rows and Columns - Combining Framesets - Creating an Inline Frame -Adjusting a Frame's Margins-Showing or Hiding Scroll Bars - Adjusting the Color of the Borders -Adjusting the Frame Borders - Targeting Links to Particular Frames - Targeting Links to Special Spots - Changing the Default Target - Nesting Framesets - Creating Alternatives to Frames.

UNIT IV: **No. of hours: 6**

Forms: Creating Text Boxes-Creating Password Boxes-Creating Larger Text Areas Creating Radio Buttons-Creating Checkboxes-Creating Menus - About Hidden Fields-Adding Hidden Fields to a Form-Creating the Submit Button. Resetting the Form -Organizing the Form Elements- Disabling Form Elements - Keeping Elements from Being Changed. Multimedia : Helper Applications and Plug-ins-Non-Supported Images - Sound - Getting Sound - Embedding Sound in a Page Adding a Link to a Sound - Adding Background Sound for Explorer . Video Adding External Video to Your Page -Adding Internal Video - Adding Internal Video for Explorer - Creating a Marquee.

UNIT V: **No. of hours: 6**

An Introduction to Cascading Style Sheets - The Advantages of Using Style Sheets - The Downside of Style Sheets -The Anatomy of a Style - Setting up Style Sheets - Creating an Internal Style Sheet -Creating an External Style Sheet - Using an External Style Sheet - Applying Styles Locally - Defining Styles for Classes - Identifying Particular Tags -Creating Custom HTML Tags - Creating Custom Block-Level HTML Tags Using Custom Block-Level HTML Tags - Creating Custom Inline HTML Tags - Using Custom Inline HTML Tags Defining Styles for Links -Formatting Text with Styles.

Total Hours: 30

Text Book

1. HTML 4 for the World Wide Web: Visual QuickStart Guide -Publisher: Peachpit Press.

Reference books

1. HTML Complete Reference : Powell ,TMH
2. Laura Lemay, RafeColburn , Jennifer Kyrnin, "Mastering HTML, CSS &Javascript Web Publishing", 2016.
3. DT Editorial Services (Author), "HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery)", Paperback 2016, 2nd Edition.

Web Resources

1. NPTEL & MOOC courses titled Web Design and Development.
2. https://www.geeksforgeeks.org

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	2	1	2
CO 2	3	3	2	2	3	3
CO 3	3	3	2	3	3	2
CO 4	3	2	3	2	2	3
CO 5	3	2	2	2	3	3
Weightage of course contributed to each PSO	14	15	14	14	15	13

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

துறைத்தலைவர்
கணினி அறிவியல் துறை
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(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 4
Hours/Week : 4
Medium of instruction: English

Code: T4CS7

B.Sc (Computer Science) - Semester: IV
(For students admitted from 2023-2024 onwards)

.NET PROGRAMMING

Course objectives	
LO1	To identify and understand the goals and objectives of the .NET framework and ASP.NET with C# language.
LO2	To develop ASP.NET Web application using standard controls.
LO3	To implement file handling operations.
LO4	To handles SQL Server Database using ADO.NET.
LO5	To understand the Grid view control and XML classes.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge about .NET framework.	K1,K2
CO2	Familiarize about ASP.NET and controls.	K2,K3
CO3	Know about rich controls file modes.	K3,K4
CO4	Understand ADO.NET database connections.	K5,K6
CO5	Acquire knowledge about Grid view control and XML classes.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 15**

Overview of .NET framework: Common Language Runtime (CLR), Framework Class Library- C# Fundamentals: Primitive types and Variables – Operators - Conditional statements -Looping statements – Creating and using Objects – Arrays – String operations.

UNIT II: **No. of hours: 15**

Introduction to ASP.NET - IDE-Languages supported Components -Working with Web Forms – Web form standard controls: Properties and its events – HTML controls -List Controls: Properties and its events.

UNIT III: **No. of hours: 15**

Rich Controls: Properties and its events – validation controls: Properties and its events– File Stream classes - File Modes – File Share – Reading and Writing to files – Creating, Moving, Copying and Deleting files – File uploading.

UNIT IV: **No. of hours: 15**

ADO.NET Overview – Database Connections – Commands – Data Reader - Data Adapter - Data Sets - Data Controls and its Properties – Data Binding.

UNIT V: **No. of hours: 15**

Grid View control: Deleting, editing, Sorting and Paging. XML classes – Web form to manipulate XML files - Website Security - Authentication - Authorization – Creating a Web application.

Total Hours: 75

Text Book

1. SvetlinNakov,VeselinKolev& Co, Fundamentals of Computer Programming with C#,Faber publication,2019.
2. Mathew, Mac Donald, The Complete Reference ASP.NET, Tata McGraw-Hill,2015.

Reference books

1. Herbert Schildt, The Complete Reference C#.NET, TataMcGraw-Hill,2017.
2. Kogent Learning Solutions, C# 2012 Programming Covers .NET 4.5 Black Book, Dreamtechpres,2013.
3. Anne Boehm, Joel Murach, Murach's C# 2015, Mike Murach& Associates Inc.2016.
4. DenielleOtey, Michael Otey, ADO.NET: The Complete reference, McGrawHill,2008.
5. Matthew MacDonald, Beginning ASP.NET 4 in C# 2010,APRESS,2010.

Web Resources

1. https://www.geeksforgeeks.org/introduction-to-net-framework/
2. https://www.javatpoint.com/net-framework

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	2	3
CO 2	3	2	2	3	3	3
CO 3	3	3	3	2	3	3
CO 4	2	2	1	3	3	2
CO 5	3	3	3	3	3	3
Weightage of course contributed to each PSO	14	13	12	14	14	14

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

துறைத்தலைவர்
கணினி அறிவியல் துறை
மன்னர் சரபோஜி அரசுக் கல்லூரி

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 3 **Code: T4CS8**
Hours/Week : 3
Medium of instruction: English

B.Sc (Computer Science) - Semester: IV
(For students admitted from 2024-2025 onwards)

.NET PROGRAMMING LAB

Learning objectives	
LO1	To know about web application tools, html and server controls.
LO2	To create web and list controls.
LO3	To implement data binding with data controls.
LO4	To implement database application using Data Controls.
LO5	To Implement Authentication – Authorization and ASP.NET controls.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge about web application tools, html and server controls.	K1,K2
CO2	Familiarize about web and list controls.	K2,K3
CO3	Know about data binding with data controls.	K3,K4
CO4	Understand about database application using Data Controls.	K5,K6
CO5	Implement Authentication – Authorization and ASP.NET controls.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 12**

1. Develop a program using control statements in c#.
2. Create a program using string operations like
    a. String length
    b. Uppercase
    c. Lowercase
    d. Sliced string
    e. Concatenated string in c# environment.

UNIT II: **No. of hours: 12**

3. Develop a program using web controls in ASP.NET environment.
4. Create a program using List controls in ASP.NET.

UNIT III: **No. of hours: 12**

5. Develop ASP.NET programs using rich controls like
    a. Calendar
    b. Wizard
6. Develop a program using validation controls in ASP.NET environment.

UNIT IV: **No. of hours: 12**

7. Create a ASP.NET application program using File concepts like
    a. Create
    b. Read
    c. Write
    d. Move
    e. Copy
    f. Delete
8. Creating a database connectivity program in ADO.NET environment.

UNIT V: **No. of hours: 12**

9. Develop a program using grid view controls in ASP.NET windows application.
10. Creating a Web Application program in ASP.NET environment.

Text Book

1. Svetlin Nakov, Veselin Kolev& Co, Fundamentals of Computer Programming with C#, Faber publication,2019.
2. Mathew, Mac Donald, The Complete Reference ASP.NET, Tata McGraw-Hill,2015.

Reference books

1. Herbert Schildt, The Complete Reference C#.NET, TataMcGraw-Hill,2017.
2. Kogent Learning Solutions, C# 2012 Programming Covers .NET 4.5 Black Book, Dreamtech pres,2013.
3. Anne Boehm, Joel Murach, Murach's C# 2015, Mike Murach& Associates Inc.2016.
4. DenielleOtey, Michael Otey, ADO.NET: The Complete reference, McGrawHill,2008.
5. Matthew MacDonald, Beginning ASP.NET 4 in C# 2010, APRESS,2010.

Web Resources

1. https://www.geeksforgeeks.org/introduction-to-net-framework/
2. https://www.javatpoint.com/net-framework

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	2	1	2
CO 2	3	3	2	2	3	3
CO 3	3	3	2	3	3	2
CO 4	3	2	3	2	2	3
CO 5	3	2	2	2	3	3
Weightage of course contributed to each PSO	15	12	10	11	12	13

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

துறைத்தலைவர்
கணினி அறிவியல் துறை
மன்னர் சரபோசி அரசுக் கல்லூரி
(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 2
Hours/Week : 2
Medium of instruction: English

Code: T4CSEC6

B.Sc (Computer Science) - Semester: IV
(For students admitted from 2023-2024 onwards)

CYBERCRIME AND ITS SECURITY

Learning objectives	
LO1	To get knowledge of Cyber crime
LO2	To familiarize about Cyber security.
LO3	To know about hacking and its types.
LO4	To understand about computer security, anti-virus and back- ups.
LO5	To understand about cyber law

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge of Cyber crime.	K1,K2
CO2	Familiarize about Cyber security.	K2,K3
CO3	Know about hacking and its types.	K3,K4
CO4	Understand about computer security, anti-virus and back- ups.	K5,K6
CO5	Understand about cyber law.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

Unit I: **No. of hours: 6**

Cyber crime: definition-Types -History of cybercrime-Reasons for cyber crime-Effects of cybercrime against individual, business, society, & Nation.

Unit II: **No. of hours: 6**

Cyber security – Security goals – Types of cyber-attacks – Types of cyber attackers – Cyber security tools – Cyber security challenges -Advantages of cyber security.

Unit III: **No. of hours: 6**

Hacking-Definition-Types of hacking- Advantages and disadvantages of hacking -Purpose of hacking -Types of hackers – Ethical hacking – Ethical hacking tools.

Unit IV: **No. of hours: 6**

Computer Security – overview – Security Terminologies – Securing through operating system – Security through Antivirus – Managing malware – Securing through backup: Backup devices - Types of back-ups.

Unit V: **No. of hours: 6**

Cyber law – Meaning of cyber law – Advantages of cyber law – objective of cyber law - Areas of cyber law - IT act 2000 – Offences and penalties.

Total Hours: 30

References:

1. Over view of cyber crime and security by Akash Mishra
2. https://u-next.com/blogs/cyber-security/history-of-cybercrime/
3. https://www.javatpoint.com/cyber-security-tutorial
4. https://www.tutorialspoint.com/computer_security/index.htm
5. https://www.javatpoint.com/ethical-hacking
6. https://www.tutorialspoint.com/ethical_hacking/index.htm
7. https://www.tutorialspoint.com/information_security_cyber_law/index.htm
8. https://www.javatpoint.com/what-is-cyber-law

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	3	2	2	3
CO 2	3	2	2	2	1	2
CO 3	3	3	3	2	3	2
CO 4	3	3	3	2	2	2
CO 5	2	2	3	3	2	2
Weightage of course contributed to each PSO	14	12	14	11	10	11

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

துறைத்தலைவர்
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மன்னர் சரபோசி அரசுக் கல்லூரி
(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 2 **Code: T4CSSE7**
Hours/Week : 2
Medium of instruction: English

B.Sc (Computer Science) - Semester: IV
(For students admitted from 2023-2024 onwards)

SOFT SKILL DEVELOPMENT

Learning objectives	
LO1	To get knowledge about Verbal and Non - Verbal communication skills.
LO2	To familiarize about emotional skills, self awareness and regulations.
LO3	To know about functional skills.
LO4	To understand about Interpersonal Skills, social skills and Time Management.
LO5	To gain knowledge about Personality Skills, Leadership skills.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge about Verbal and Non - Verbal communication skills.	K1,K2
CO2	Familiarize about emotional skills, self awareness and regulations.	K2,K3
CO3	Know about functional skills.	K3,K4
CO4	Understand about Interpersonal Skills, social skills and Time Management.	K5,K6
CO5	Gain knowledge about Personality Skills, Leadership skills.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

Unit I: **No. of hours: 6**

Communication Skills: Verbal and Non - Verbal communication - The active vocabulary - Conversational Etiquette - KOPPACT syndrome.

Unit II: **No. of hours: 6**

Emotional Skills: Emotional Intelligence - The five steps to Emotional Quotient - Self Awareness and Regulation - Empathy - Social Intelligence - stress management - coping with failures.

Unit III:

No. of hours: 6

Functional Skills: Using the tools of communicatory and emotional skills - Resume writing - Preparation of Curriculum Vitae - interview skills - Acing the interview - Group dynamics - Mock interviews and Group discussions.

Unit IV:

No. of hours: 6

Interpersonal Skills: Synergising relationships - SWOT analysis - SOAR analysis - The social skills - Time Management - Decision making - problem solving - prioritising and Implementation.

Unit V:

No. of hours: 6

Personality Skills: Leadership skills - Attributes and Attitudes - Social leader vs The Boss - critical and creative thinking.

Total Hours: 30

Books for Reference:

1. Social intelligence: The new science of human relationships - Daniel Goleman; 2006.
2. Body Language in the workplace - Allan and Barbara Pease; 2011.
3. Student's Hand Book: Skill Genie - Higher education department, Government of Andhra Pradesh.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	3	2	2	3
CO 2	2	2	2	2	1	2
CO 3	3	3	3	2	3	2
CO 4	3	3	3	2	2	2
CO 5	3	3	3	2	2	1
Weightage of course contributed to each PSO	14	13	14	10	10	10

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

தலைவர்/தலைவா
கணினி அறிவியல் துறை
மன்னர் சரபோசி அரசுக் கல்லூரி
(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 4 **Code: T5CS9**
Hours/Week : 6
Medium of instruction: English

B.Sc (Computer Science) - Semester: V
(For students admitted from 2023-2024 onwards)

SOFTWARE ENGINEERING

Learning objectives	
LO1	To understand the concepts of Introduction to Software Engineering
LO2	To learn about concepts of Software Cost Estimation
LO3	To learn about Software Requirements
LO4	To learn about Design Notations
LO5	To understand about Verification and Validation Techniques

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Understand the concepts of Introduction to Software Engineering	K1,K2
CO2	Learn concepts of Software Cost Estimation	K2,K3
CO3	Know about Software Requirements	K3,K4
CO4	Gain knowledge about Design Notations	K5,K6
CO5	Understand about Verification and Validation Techniques	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I

Introduction to Software Engineering: Definitions – Size factors- Quality and productivity Factors- Planning a software project: Planning the development Process – Planning an Organizational Structure.

UNIT II

Software Cost Estimation: Software Cost factors – Software Cost Estimation Techniques – Staffing-Level Estimation – Estimating Software Estimation Costs.

UNIT III

Software Requirements Definition: The Software Requirements Specification – Formal Specification Techniques. Software Design: Fundamental Design Concepts – Modules and Modularization Criteria.

UNIT IV

Design Notations – Design Techniques. Implementation issues: Structured Coding Techniques – Coding Style – Standards and Guidelines – Documentation Guidelines.

UNIT V

Verification and Validation Techniques: Quality Assurance – Walkthroughs and Inspections – Unit Testing and Debugging – System Testing. Software Maintenance: Enhancing Maintainability during Development – Managerial Aspects of Software Maintenance - Configuration Management.

TextBook:

Richard Fairley *"Software Engineering Concepts"* –, 1997, Tata McGraw Hill.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	3	2	2	3
CO 2	3	2	2	2	1	2
CO 3	3	3	3	2	3	2
CO 4	3	3	3	2	2	2
CO 5	3	3	3	2	2	2
Weightage of course contributed to each PSO	15	13	14	10	10	11

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

துறைத்தலைவர்
கணினி அறிவியல் துறை
மன்னர் சரபோசி அரசுக் கல்லூரி
(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 4 **Code: T5CS10**
Hours/Week : 6
Medium of instruction: English

B.Sc (Computer Science) - Semester: V
(For students admitted from 2023-2024 onwards)

DATABASE MANAGEMENT SYSTEM

Learning objectives	
LO1	To acquire knowledge about database system and design.
LO2	To understood the concepts of data base management system, design simple Database relational models.
LO3	To learn and understand to write queries using SQL, PL/SQL.
LO4	To enable the students to learn the designing of data base systems, foundation on the relational model of data.
LO5	To gain knowledge about Relational Database Design and normal forms.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Acquire knowledge about database system and design.	K1,K2
CO2	Familiarize about data base relational model.	K2,K3
CO3	Know about queries in SQL, PL/SQL.	K3,K4
CO4	Understand about relational languages and models.	K5,K6
CO5	Gain knowledge about Relational Database Design and normal forms.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I **No. of hours: 15**

Introduction: Database-System Applications- Purpose of Database Systems - View of Data - Database Languages - Relational Databases - Database Design -Data Storage and Querying Transaction Management -Data Mining and Analysis - Database Architecture - Database Users and Administrators - History of Database Systems.

UNIT II **No. of hours: 15**

Relational Model: Structure of Relational Databases -Database Schema - Keys – Schema Diagrams - Relational Query Languages - Relational Operations. Fundamental Relational-Algebra Operations Additional Relational-Algebra Operations- Extended Relational-Algebra Operations.

UNIT III

No. of hours: 15

SQL: Overview of the SQL Query - Language - SQL Data Definition - Basic Structure of SQL Queries - Additional Basic Operations - Set Operations - Null Values - Aggregate Functions - Nested Subqueries - Modification of the Database -Join Expressions - Views - Transactions - Integrity Constraints - SQL Data Types and Schemas – Authorization.

UNIT IV

No. of hours: 15

Relational Languages: The Tuple Relational Calculus - The Domain Relational Calculus. Database Design and the E-R Model: Overview of the Design Process - The Entity-Relationship Model - Reduction to Relational Schemas - Entity-Relationship Design Issues - Extended E-R Features - Alternative Notations for Modeling Data - Other Aspects of Database Design.

UNIT V

No. of hours: 15

Relational Database Design: Features of Good Relational Designs - Atomic Domains and First Normal Form - Decomposition Using Functional Dependencies - Functional-Dependency Theory - Decomposition Using Functional Dependencies - Decomposition Using Multivalued Dependencies-More Normal Forms - Database-Design Process.

Total Hours: 75

Text Book:

Abraham Silberschatz, Henry F. Korth, S.Sudarshan " *Database System Concepts"*, Sixth edition, McGraw-Hill-2010.

Unit I- Chapter 1.1 – 1.9, 1.12, 1.13
Unit II – Chapter 2, 2.1-2.6, 6.1
Unit III – Chapter 3.1 - 3.9, 4.1 – 4.6
Unit IV – Chapter 7.1, 7.2, 7.6 – 7.10
Unit V – Chapter 8.1 – 8.8

Reference Book:

Ramez Elmasri, *Database Systems: Models, Languages, Design and Application*, Pearson

Education 2014

Web Resources

1. Web resources from NDL Library, E-content from open-source libraries

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	2	1	2
CO 2	3	3	2	2	3	3
CO 3	3	3	2	3	3	2
CO 4	3	2	3	2	2	3
CO 5	3	2	2	2	3	3
Weightage of course contributed to each PSO	15	12	10	11	12	13

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

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(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 4 **Code: T5CS11**
Hours/Week : 5
Medium of instruction: English

B.Sc (Computer Science) - Semester: V
(For students admitted from 2023-2024 onwards)
DATA STRUCTURE AND ALGORITHMS

Learning objectives	
LO1	To understand the concepts of Introduction and Preliminaries
LO2	To learn linear data structures-lists, stacks, queues
LO3	To learn Linked List
LO4	To learn about Trees and Graphs structures and application of graphs
LO5	To understand various sorting and searching

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Understand the concepts of Introduction and Preliminaries	K1,K2
CO2	Learn linear data structures-lists, stacks, queues	K2,K3
CO3	Know about Linked List	K3,K4
CO4	Gain knowledge about Trees and Graphs structures and application of graphs	K5,K6
CO5	Understand various sorting and searching methods	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I
Introduction and Preliminaries: Basic Terminology, Elementary Data Organization, Data Structures – Data Structure Operations, Algorithms – Mathematical Notations and Functions – Control Structures
Arrays – Introduction – Linear Array, Representation of Linear Array in Memory, Traversing Linear Arrays, Inserting and Deleting, Multidimensional Arrays

UNIT II
Stacks – Array Representation of Stack, Arithmetic Expressions: Polish Notation – Recursion. Queues and Linked Lists : Queues – Deques – Array Representation Queues – Insertion and Deletion

UNIT III
Linked List, Representation of Linked Lists in Memory, Traversing a Linked List, Insertion into a Linked List, Deletion from a Linked List, Two-Way Linked Lists.

UNIT IV
Trees and Graphs : Binary Trees, Representing Binary Trees in Memory, Traversing Binary Tree – Threads, Binary Search Tree, Searching and Inserting in Binary Search Tree, Deleting in Binary Search tree – Graph Theory – Terminology, Sequential Representation of Graph: Adjacency Matrix, Path Matrix.

UNIT V

Sorting and Searching: Sorting – Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Quick sort, Heap Sort – Searching: Liner Search, Binary Search.

Text Book:

Seymour Lipschutz and G.A. Vijayalakshmi Pai (Schaum's Series), *Data Structures*, Tata McGraw Hill Publishing Company Ltd., New Delhi, Indian Adopted Edition, 2006.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	3	3
CO 3	3	3	3	2	3	2
CO 4	3	2	3	2	3	3
CO 5	3	3	3	3	3	3
Weightage of course contributed to each PSO	15	14	13	13	15	14

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

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COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 3
Hours/Week : 3
Medium of instruction: English

Code: T5CS12

B.Sc (Computer Science) - Semester: V
(For students admitted from 2023-2024 onwards)

DATABASE MANAGEMENT SYSTEM LAB

Learning objectives	
LO1	To know about simple queries.
LO2	To familiarize about insertion, deletion queries
LO3	To learn and understand about primary and foreign keys
LO4	To understand about string operations in MySQL
LO5	To gain knowledge about view and functions.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Know about simple queries.	K1,K2
CO2	Familiarize about insertion, deletion queries.	K2,K3
CO3	Know about how to create table with primary key and foreign key.	K3,K4
CO4	Understand about string operations in MySQL.	K5,K6
CO5	Gain knowledge about view and functions.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

1. Write a MySQL statement to create a Simple Table Countries including Columns Country_ID, Country_Name and Region_ID.
2. Write a MySQL statement to change Salary Employee to 8000 Who's ID is 105, if the Existing Salary is less than 5000
   Write a MySQL statement to Rename Table Countries to Country_New and to add a Column Region_ID to the Table.
4. Create the above tables by properly specifying the primary keys and the foreign keys
5. Develop MySQL queries to implement String operations using % , '_' and Sort the element using asc,desc
6. Write a MySQL statement to Joining Tables.
7. Implement the views using create view, drop view statements
8. Write a MySQL statement to Aggregate Functions.
9. Write a MySQL statement to Built in Function.
10. Write a MySQL statement to differentiate the Drop and Delete Table.
11. Create database for a store and Enter at least five tuples for each relation
12. Create a table containing phone number, user name, address of the phone user. Write a Function to search the address using phone number.

Total Hours: 60

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	3	3	3	2
CO 2	3	3	1	2	2	2
CO 3	2	2	3	3	3	3
CO 4	2	2	3	3	3	1
CO 5	2	3	3	3	3	3
Weightage of course contributed to each PSO	12	12	13	14	14	11

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

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(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 5
Hours/Week : 6
Medium of instruction: English

Code: T6CS13

B.Sc (Computer Science) - Semester: VI
(For students admitted from 2023-2024 onwards)

COMPUTER NETWORKS

	Learning objectives
LO1	To learn the basic concepts of Data communication and Computer network
LO2	To learn about data link layer.
LO3	To learn about network layer.
LO4	To study about transport layer.
LO5	To learn the concept of application layer.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Acquire knowledge about network, hardware, software and reference model.	K1,K2
CO2	Familiarize about data link layer, error correction and detection.	K2,K3
CO3	Know about network layer design issues and routing algorithms.	K3,K4
CO4	Understand about transport layer service and elements.	K5,K6
CO5	Gain knowledge about domain name system and network security.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I **No. of hours: 15**

Introduction: The use of Computer Networks – Networks Hardware – Network Software – The Reference Model. The Physical Layer: Guided Transmission media – Wireless Transmission.

UNIT II **No. of hours: 15**

The Data Link Layer: Data link layer design Issues – Error Detection and Correction – Elementary Data Link Protocols. The Medium Access control Sub Layer: The Channel Allocation Problem – Multiple Access Protocols.

UNIT III **No. of hours: 15**

The Network Layer: Network Layer Design issues – Routing algorithms – Congestion control algorithms – Internetworking – The Network Layer in the internet.

UNIT IV

No. of hours: 15

The Transport Layer: The Transport Service – Elements of Transport protocols – A Simple Transport Protocol – The Internet Transport Protocols (UDP & TCP).

UNIT V

No. of hours: 15

The Application Layer: DNS – The Domain Name System – Electronic Mail – The World Wide Web – Network Security : Cryptography – E-Mail security – Web security.

Total Hours: 75

Text Book

1. A. S. Tanenbaum, "Computer Networks", 4th Edition, Prentice-Hall of India, 2008.

Reference books

1. B. A. Forouzan, "Data Communications and Networking", Tata McGraw Hill, 4th Edition, 2017
2. F. Halsall, "Data Communications, Computer Networks and Open Systems", Pearson Education, 2008
3. D. Bertsekas and R. Gallagher, "Data Networks", 2nd Edition, PHI, 2008.
4. Lamarca, "Communication Networks", Tata McGraw- Hill, 2002.

Web Resources

1. https://en.wikipedia.org/wiki/Computer_network
2. https://citationsy.com/styles/computer-networks

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	3	2	3
CO 2	3	2	2	2	2	2
CO 3	3	2	3	3	2	3
CO 4	3	2	2	2	2	2
CO 5	3	2	2	2	2	3
Weightage of course contributed to each PSO	15	11	11	12	10	13

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

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மன்னர் சரபோசி அரசுக் கல்லூரி
(தன்னாட்சி)
தஞ்சாவூர்-613 005

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CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 5
Hours/Week : 6
Medium of instruction: English

Code: T6CS14

B.Sc (Computer Science) - Semester: VI
(For students admitted from 2023-2024 onwards)

MICROPROCESSOR AND MICRO CONTROLLER

	Learning objectives
LO1	To introduce the internal organization of Intel 8085 Microprocessor.
LO2	To know about various instruction sets and classifications.
LO3	To enable the students to write assembly language programs using 8085.
LO4	To learn about Peripheral Devices and their Interfacing.
LO5	To formularise about Microprocessor Applications.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Gain knowledge about evaluation of microprocessor and types of memory.	K1,K2
CO2	Familiarize about instruction set of 8085.	K2,K3
CO3	Know about assembly language programs.	K3,K4
CO4	Understand about peripheral devices and their interfacing.	K5,K6
CO5	Gain knowledge about applications of microprocessors.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 15**

Evaluation of Microprocessor – Single Chip Microcomputer – CPU. Memory: Semiconductor Memory – Magnetic Memory – Optical Disk – Cache Memory. Buses – Microprocessor Application – Microprocessor Architecture and pin description of 8085.

UNIT II: **No. of hours: 15**

Instruction Set of Intel 8085: Addressing modes – Status Flags – Symbols and Abbreviations – Intel 8085 Instructions.

UNIT III: **No. of hours: 15**

Examples of Assembly Language Programs – Addition - Subtraction – Multiplication – Division - Finding the Largest and Smallest Numbers in an Array – Arranging a Series of Numbers in Ascending and Descending Order – Sum of a Series of Numbers — Block Move.

UNIT IV: **No. of hours: 15**

Peripheral Devices and their Interfacing: Addressing Space Partitioning – Memory and I/O Interfacing – Data Transfer Schemes – Interrupts of Intel 8085 – Interfacing Devices and I/O Devices – I/O Ports: Programmable Peripheral Interface – Programmable Counter / Interval Timer – A/D Converter and D/A Converter.

UNIT V: **No. of hours: 15**

Microprocessor Applications – Delay Subroutine – 7 Segment LED Displays – Frequency Measurement – Temperature Measurement and Control – Water Level Indicator – Microprocessor based Traffic Control.

Total Hours: 75

Text Book:

1. Badri Ram "*Fundamentals of Microprocessor and Microcomputers*" – 7th Editions - Dhanpat Rai and Sons -2010.

Reference books

1. Mathur- "Introduction to Microprocessor"- 3rd Edition- Tata McGraw-Hill -1993.
2. Raj Kamal - "Microcontrollers: Architecture, Programming, Interfacing and System Design", Pearson Education, 2005
3. Krishna Kant, "Microprocessors and Microcontrollers – Architectures, Programming and System Design 8085, 8086, 8051, 8096", PHI, 2008

Web Resources

1. E-content from open-source libraries
2. https://www.bing.com/
3. _https://theopennotes.in/

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	2
CO 2	3	3	3	2	3	2
CO 3	3	3	3	3	3	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	2	3	2
Weightage of course contributed to each PSO	15	15	14	12	14	10

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

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COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 4 **Code: T6CS15**
Hours/Week : 4
Medium of instruction: English

B.Sc (Computer Science) - Semester: VI
(For students admitted from 2023-2024 onwards)
MICRO PROCESSOR LAB

	Learning objectives
LO1	To become familiar with the instruction set of Intel 8085 microprocessor
LO2	To expose students to the operation of typical 8085 microprocessor trainer kit
LO3	To provide practical hands-on experience with assembly language programming
LO4	To develop and test assembly language programs
LO5	To gain knowledge about array and shifting programs.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Develop programs in assembly languages.	K1,K2
CO2	Familiarize to write programs addition, subtraction.	K2,K3
CO3	Gain knowledge to use looping in assembly language programs.	K3,K4
CO4	Understand the concepts of arrays in programs.	K5,K6
CO5	Gain knowledge about shifting programs.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

1. Addition – 8 bit using 8085

2. Subtraction – 8 bit using 8085

3. Multiplication – 16 bit using 8085

4. Division - 16 bit using 8085

5. Find the Smallest Number in a Data Array.

6. Find the Biggest Number in a given list.

7. To Arrange an Array of Data in Ascending order

8. To Arrange an Array of Data in Descending order.

9. Sum of series.

10. Search a given number an Array of Data.

11. To Finding Two's complement of a number.

12. To shift the data

Total Hours: 60

Text Book

1. R. S. Gaonkar- "Microprocessor Architecture- Programming and Applications with 8085"- 5th Edition- Penram International Publications,2009. [For unit I to unit IV]
2. Soumitra Kumar Mandal -"Microprocessors and Microcontrollers – Architectures, Programming and Interfacing using 8085, 8086, 8051", Tata McGraw Hill Education Private Limited. [for unit V].

Reference books

1. Mathur- "Introduction to Microprocessor"- 3rd Edition- Tata McGraw-Hill -1993.
2. Raj Kamal - "Microcontrollers: Architecture, Programming, Interfacing and System Design", Pearson Education, 2005.
3. Krishna Kant, "Microprocessors and Microcontrollers – Architectures, Programming and System Design 8085, 8086, 8051, 8096", PHI, 2008

Web Resources

1. E-content from open source libraries
2. https://www.bing.com/

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	3	3	2
CO 2	3	3	2	3	3	2
CO 3	3	3	3	3	3	2
CO 4	3	3	2	3	3	2
CO 5	3	3	2	3	3	2
Weightage of course contributed to each PSO	**15**	**14**	**11**	**15**	**15**	**10**

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

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முன்னர் சரபோசி அரசுக் கல்லூரி
(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits: 2 **Code: T6GS**
Hours/Week : **2**
Medium of instruction: English / Tamil

B.Sc (Computer Science) - Semester: VI
(For students admitted from 2023-2024 onwards)

பாலின சமத்துவம் (GENDER STUDIES)

Course Objectives

1. To make boys and girls aware of each other strengths and Weakness.
2. To develop sensitivity towards both genders in order to lead an ethically enriched life.
3. To promote attitudinal change towards a gender balanced ambience and women empowerment.

அலகு -1

பாலினம் தொடர்பான கோட்பாடுகள்: பாலினம் தொடர்பான கோட்பாடுகள்: பாலியல் - பாலினம் - உடற்கூறுரீதியாக நிர்ணயித்தல் - ஆணாதிக்கம் - பெண்ணியம் - பாலின பாகுபாடு - பாலின வேலைப்பாகுபாடு - பாலின ஒருபடித்தானவைகள் - பாலின உணர்வூட்டல் - பாலின சமவாய்ப்பு - பாலின சமத்துவம் - பாலின மையநீரோட்டமாக்கல் - அதிகாரப்படுத்துதல்.

அலகு - 2

மகளிரியல் **Vs** பாலின சமத்துவக்கல்வி: பாலின சமத்துவக்கல்வி - பல்கலைக்கழக மானியக்குழுவின் வழிகாட்டுதல்கள் - ஏழாவது ஐந்தாண்டுத் திட்டம் முதல் பதினோராவது ஐந்தாண்டுத் திட்டம் - பாலின சமத்துவக்கல்வி: பெய்ஜிங் மாநாடு மற்றும் பெண்களுக்கு எதிரான அனைத்து வன்முறைகளையும் ஒழிப்பதற்கான சர்வதேச உடன்படிக்கை - இணைத்தல் ஃ உட்படுத்துதல் - ஒதுக்கல்.

அலகு - 3

பாலியல் பாகுபாட்டிற்கான தளங்கள்: குடும்பம் - பாலின விகிதாச்சாரம் - கல்வி - ஆரோக்கியம் - ஆளுமை - மதம் - வேலை ஏள வேலை வாய்ப்பு - சந்தை - ஊடகங்கள் - அரசியல் - சட்டம் - குடும்ப வன்முறை - பாலியல் துன்புறுத்தல் - அரசு கொள்கைகள் மற்றும் திட்டங்கள்.

அலகு – 4

பெண்கள் மேம்பாடு மற்றும் பாலின சமத்துவ மேம்பாடு: முயற்சிகள் - சர்வதேச பெண்களுக்கான தசாப்தம் - சர்வதேச பெண்கள் ஆண்டு - பெண்களின் மேம்பாட்டிற்கான தேசிய கொள்கை - பெண்கள் அதிகார ஆண்டு 2001 - சர்வதேச கொள்கைகளை மைய நீரோட்டமாக்கல்.

அலகு -5

பெண்கள் இயக்கங்கள் மற்றும் பாதுகாப்பு நிறுவன ஏற்பாடுகள்: தேசிய மற்றும் மாநில மகளிர் ஆணையம் - அனைத்து மகளிர் காவல் நிலையங்கள் - குடும்ப நீதி மன்றங்கள் - குடும்ப வன்முறையிலிருந்து பெண்களைப் பாதுகாக்கும் சட்டம் 2005 - பணியிடங்களில் பெண்கள் மீதான பாலியல் துன்புறுத்தல்களை தடுப்பதற்கான உச்சநீதிமன்ற வழிகாட்டுதல்கள் - தாய்சேய் சேமநலச் சட்டம் பெண்சிசுவை கருவிலேயே கண்டறியும் தொழில் நுட்பம் (முறைப்படுத்துதல் மற்றும் தவறாக பயன்படுத்துதலை தடை செய்திடும்) சட்டம் - சுய உதவிக் குழுக்கள் - பஞ்சாயத்து அமைப்புகளுக்கான 73வது மற்றும் 74வது சட்டத்திருத்தம்.

REFERENCE BOOKS

1. Saha Chandana, Gender Equity and Gender Equality: Study of Girl Child in Rajasthan, Jaipur: Rawat Publication, 2003
2. Misra Geetanjali, Chandiramani Radhika (ed.,) Sexuality, Gender and Rights: Exploring Theory and Practice in South and Southeast Asia, New Delhi : Sage Publication, 2005
3. Krishna Sumi, (ed.,), Livelihood and Gender: Equity in Community Resource Management, New Delhi : Sage Publication, 2004
4. Sexual Harassment at the Workplace – A Guide , New Delhi ;Sakshi,1999.

Course Outcomes At the end of the course, the students will be able to		**Cognitive level**
CO-1	Understand the problems of gender bias in the society	Understanding
CO-2	Know and Recollect the legal safety measures available to protect from the gender discrimination	Remembering
CO-3	Analyse the ways in which social institutions and power structures impact the material realities of women's lives	Remembering
CO-4	Demonstrate an openness to learn the views from the view of a women	Applying
CO-5	Develop equitable and just thinking towards women	Applying

Question Paper Pattern

Maximum Marks : 75
Applying Exam Duration : 3 Hours
Part A - 5 x 6 = 30 (5 Out of 7 atleast 1 Question from each Unit)
Part B - 3 x 15 = 45 (3 Out of 5 - 1 Question from each Unit)

Credits: 2
Hours/Week : 2
Medium of instruction: English

Code: TCSECD

B.Sc (Computer Science) - Semester: VI
(For students admitted from 2023-2024 onwards)

PHP PROGRAMMING

Learning objectives	
LO1	To provide the necessary knowledge on basics of PHP.
LO2	To design and develop dynamic, database-driven web applications using PHP version.
LO3	To get an experience on various web application development techniques.
LO4	To learn the necessary concepts for working with the files using PHP.
LO5	To acquires knowledge about sessions and cookies.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Understand the basic concepts of PHP.	K1,K2
CO2	Familiarize about PHP in HTML.	K2,K3
CO3	Gain knowledge about switch, arrays and functions in PHP.	K3,K4
CO4	Understand the concepts of reading and writing files.	K5,K6
CO5	Acquires knowledge about sessions and cookies.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 6**

Introduction to PHP -Basic Knowledge of websites -Introduction of Dynamic Website -Introduction to PHP -Scope of PHP -XAMPP and WAMP Installation

UNIT II: **No. of hours: 6**

PHP Programming Basics - Syntax of PHP - Embedding PHP in HTML - Embedding HTML in PHP.

Introduction to PHP Variable -Understanding Data Types -Using Operators -Using Conditional Statements -If(), else if() and else if condition Statement.

UNIT III: **No. of hours: 6**

Switch () Statements -Using the while() Loop -Using the for() Loop PHP Functions.PHP Functions - Creating an Array -Modifying Array Elements -Processing Arrays with Loops - Grouping Form Selections with Arrays -Using Array Functions.

UNIT IV: **No. of hours: 6**

PHP Advanced Concepts -Reading and Writing Files -Reading Data from a File.

UNIT V: **No. of hours: 6**

Managing Sessions and Using Session Variables -Destroying a Session -Storing Data in Cookies - Setting Cookies.

Total Hours: 30

Text Book

1. Head First PHP & MySQL: A Brain-Friendly Guide- 2009-Lynn Mighley and Michael Morrison.
2. The Joy of PHP: A Beginner's Guide to Programming Interactive Web Applications with PHP and MySQL- Alan Forbes.

Reference books

1. PHP: The Complete Reference-Steven Holzner.
2. DT Editorial Services (Author), "*HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery)*", Paperback 2016, 2nd Edition.

Web Resources

1. Opensource digital libraries: PHP Programming
2. https://www.w3schools.com/php/default.asp

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	2	1	2
CO 2	3	3	2	2	3	3
CO 3	3	3	2	3	3	2
CO 4	3	2	3	2	2	3
CO 5	3	2	2	2	3	3
Weightage of course contributed to each PSO	15	12	10	11	12	13

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

துறைத்தலைவர்
கணினி அறிவியல் துறை
முன்னர் சரபோசி அரசுக் கல்லூரி
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Credits 2

Course Code: T6PCS

Instruction Hours - 2
Medium: English and Tamil

PROFESSIONAL COMPETENCY SKILL

Course Objectives

To develop the personality development and to improve the skills needed for the employment opportunities

Unit – I

KNOW YOURSELF:

Knowing yourself – Positive thinking – Physical fitness – Emotional Intelligence – Skills to develop emotional intelligence.

Unit – II

RESUME WRITING:

Resume writing - purpose of a resume – How long should my resume job? – Types of Resume – Chronological Resume, Functional Resume, Combination Resume, Infographic Resume, Resume with profile, Targeted Resume, mini Resume, Non-traditional resume – Things to do – Formats of Resume – Job Application or covering letter.

Unit – III

GROUP DISCUSSION:

Introduction – Types of Group discussions – Difference between group discussion and panel discussion debate – personality traits – Advantages of Group discussion – Dos and Don'ts.

Unit – IV

INTERVIEW SKILLS:

Introduction – Types of interviews – Preparatory steps for job interview– Interview skills – punctuality – Think before you speak – clarity – being confident – Listening – Expressing optimism – Body language – Showing interest – Communication skills – Expressing gratitude.

Unit – V

PROFESSIONAL SKILLS:

Creativity at work place – Ethical values – Capacity building, Developing interpersonal relationship -Leadership and team building – Decision making – Stress and Time management

Unit – VI

PROFESSIONAL COMPONENTS:
Expert Lectures, Online Seminars - Webinars on Industrial Interactions/Visits, Competitive Examinations, Employable and Communication Skill Enhancement, Social Accountability and Patriotism.

Text Books

1) ICTACT – Soft skills and Industry awareness – Tamil Nadu state council for Higher Education, Department of Higher Education – ICT Academy of Tamil Nadu, Chennai.
2) Soft Skills: An integrated approach to maximize personality, Gajendra S.Chauhan, Sangeetha Sharma, Wiley India.

COURSE OUTCOMES:

At the end of the course, the student will be able to:

CO1 Acquire the knowledge about the personality development. K2
CO2 Gain the knowledge about various types of resumes and resume writing. **K2**
CO3 Able to face the first step of interview on gaining the group discussion skills **K3**
CO4 Acquire interview skills and understand about body language. **K4**
CO5 Gain the professional skills for employability and leadership. **K3**
K1 - Remember; K2 – Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate;

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO 1	2	2	2	2	2	3	3	3	3	2
CO 2	2	3	2	2	3	3	2	3	2	2
CO 3	3	2	3	3	3	2	3	2	3	2
CO 4	3	2	3	3	2	3	3	3	3	2
CO 5	2	2	2	2	3	3	2	2	2	2

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO 1	3	2	3	3	2	3	3	3	3	2
CO 2	3	2	3	3	3	2	3	2	3	2
CO 3	2	2	2	2	2	3	3	3	3	2
CO 4	2	3	2	2	3	3	2	3	2	2
CO 5	2	2	2	2	3	3	2	2	2	2

Question Paper Pattern

Maximum Marks: 75 **Marks Exam Duration: 3 Hrs**

Part-A 5x6=30 Marks Answer ALL Questions (Either or Type-Two questions from each unit)
Part-B 3x15=45 Marks Answer Any Three Questions (Three out of Five-one question from each unit)

HOD
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THANJAVUR-613 005.

LIST OF ELECTIVE COURSES

Credits : 3
Hours/Week : 4/6
Medium of instruction: English

Code: TCSECA

B.Sc (Computer Science) - Elective
(For students admitted from 2023-2024 onwards)

OPERATING SYSTEM

Learning Objectives	
LO1	To understand the services provided by and the design of an operating system.
LO2	To understand the structure and organization of the file system.
LO3	To understand what a process is and how processes are synchronized and scheduled.
LO4	To understand different approaches to memory management.
LO5	To use system calls for managing processes, memory and the file system.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Understand the basic concepts of operating system.	K1,K2
CO2	Familiarize about memory management system.	K2,K3
CO3	Gain knowledge about processor management and scheduling.	K3,K4
CO4	Understand the concepts of device management and traffic controller.	K5,K6
CO5	Acquires knowledge information management system.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 15**

Importance of operating system – Basic concepts and terminology – an operating system resource manager – OS process viewpoint - I/O programming.

UNIT II: **No. of hours: 15**

Memory Management: Single contiguous allocation – partitioned allocation – relocatable partitioned memory management – paged memory management - demand paged memory management – segmented memory management – segmented and demand paged memory management.

UNIT III: **No. of hours: 15**

Processor Management: State model - Job scheduling – process scheduling – Process synchronization.

UNIT IV:

No. of hours: 15

Device Management: Techniques for device management – device characteristics-hardware considerations – I/O traffic controller, I/O scheduler, I/O device handlers – Virtual devices.

UNIT V:

No. of hours: 15

Information Management: Introduction - A Simple file system - general model of a file system – logical file system - physical file systems.

Total Hours: 75

Text Book

1. Stuart .E. Madnick and John J. Donavan "*Operating System*", Tata McGraw Hill book company limited.

Reference books

1. Stallings (2006), Operating System, Internals and Design Principles, 5th edition, Pearson Education, India.
2. Andrew S. Tanenbaum (2007), Modern Operating System, 2nd edition, Prentice Hall of India.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	2	3	1	3	2	1
CO 2	2	2	3	2	2	2
CO 3	2	1	2	1	2	1
CO 4	2	3	3	3	1	1
CO 5	3	2	1	3	2	2
Weightage of course contributed to each PSO	11	11	10	12	9	7

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

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Credits : 3

Code: TCSECB

Hours/Week : 4/6
Medium of instruction: English

B.Sc (Computer Science) - Elective
(For students admitted from 2023-2024 onwards)

DIGITAL COMPUTER FUNDAMENTALS & ARCHITECTURE

	Learning Objectives
LO1	To know the concepts of representation and conversion of number systems.
LO2	To understand and gain knowledge about the logic circuits and design different kinds of circuits for Boolean algebra and K-maps.
LO3	To recognize and design combinational and sequential circuits.
LO4	To acquire the knowledge about the internal workflow of CPU, micro-operations and program control
LO5	To learn about I/O, data-transfer techniques, and interrupts.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Know the concepts of representation and conversion of number systems	K1,K2
CO2	Familiarize about logic circuits and design different kinds of circuits for Boolean algebra and K-maps..	K2,K3
CO3	Gain knowledge about combinational and sequential circuits.	K3,K4
CO4	Understand the concepts CPU organization.	K5,K6
CO5	Acquires knowledge about input output organization.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 15**

Number System: Decimal, Binary, Octal, Hexadecimal – Binary addition, Multiplication, Division– Floating point representation, Complements, BCD, Excess3, Gray codes – Convention between Number Systems. (Self-study: Graycodes)

UNIT II: **No. of hours: 15**

Digital Logic: The basic Gates – NOR, NAND, XOR Gates – COMBINATIONAL LOGIC CIRCUITS: Boolean algebra, simplification of Boolean functions – Karnaugh map – Canonical form – Don't care condition –Product of sum, Sum of products, K-map Computational circuits.

UNIT III: **No. of hours: 15**

Arithmetic Circuits: Half Adder, Full Adder, Parallel Binary Adder, BCD Adder, Half subtractor, Full subtractor, Parallel binary subtractor. Sequential Circuits - FLIP-FLOP: RS, JK, D, and T. Multiplexers – Demultiplexers – Decode r– Encoder. (Self-Study: Half

Subtractor, D and T (Flip-flop)

UNIT IV: **No. of hours: 15**

Central Processing Unit: General Register Organization – Control word–Examples of Micro operations – Stack organization –Instruction formats–Addressing modes–Data Transfer and manipulation program control.

UNIT V: **No. of hours: 15**

Input–Output Organization: Input – Output Interface – I/O Interface –I/O Bus Versus Memory Bus – Isolate Versus Memory I/O- Example of I/O interface. Asynchronous Data: Strobe Control and Handshaking – Priority Interrupt: Chaining Priority, Parallel priority Interrupt, Direct Memory DMA Controller, DMA Transfer. Input-Output Processor: IOP Communication. (Self-Study: Handshaking)

Total Hours: 75

Text Book

1. M.Morris Mano, "Computer System Architecture", Third Edition –Tenth impression, PrenticeHall of India,2013.(UNIT- I toV).

Reference books

1. V.Vijayendran, "Digital Fundamentals", S. ViswanathanPublishersPvtLtd,2009.
2. Donald P Leach, Albert Paul Malvino, Goutam Saha, "Digital Principles and Applications", 7thEdition, McGraw Hill, 2011.
3. David A.Patterson, JohnL.Hennessy, "Computer Organization and Design", Fourth Edition, MorganKauffmann Publishers, 2011.
4. WilliamStallings,"ComputerOrganizationandArchitecture",TenthEdition,Pears onEducation,2015.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	1
CO 2	2	2	1	3	2	2
CO 3	3	3	2	2	2	1
CO 4	2	2	2	3	2	2
CO 5	3	2	1	3	3	3
Weightage of course contributed to each PSO	13	12	8	13	11	9

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

தலைமைத்துணைவர்
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Credits : 3
Hours/Week : 4/6
Medium of instruction: English

Code: TCSECC

B.Sc (Computer Science) - Semester: VI
(For students admitted from 2023-2024 onwards)

IOT AND ITS APPLICATIONS

	Learning objectives
LO1	To provide the necessary knowledge on Fundamentals of IoT.
LO2	To design and develop Physical design of IoT.
LO3	To get an experience on various Communication Model.
LO4	To learn the necessary concepts for IoT network protocol stack.
LO5	To get a knowledge on Security and Privacy of IoT.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Know the concepts of Fundamentals of IoT	K1,K2
CO2	Familiarize about the physical design of IoT	K2,K3
CO3	Gain knowledge about Communication Models, IoT architecture and protocols.	K3,K4
CO4	Understand the concepts IoT network protocol stack.	K5,K6
CO5	Acquires knowledge about Security and Privacy and challenges of IoT.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 12**

Fundamentals of the Internet of things: Introduction – How does it work? – Consumer IoT – Rachio lawn-watering system. **Characteristics of IoT:** Interconnectivity – Intelligence – Dynamic – Sensing – Expressing – Extensive Scale - Heterogeneity – Endpoint management – Security.

UNIT II: **No. of hours: 12**

The physical design of IoT: IoT architecture and components – Wireless sensors and actuators – things – Gateway – Cloud Gateway – Streaming-data Processor – Data Lake – Big data warehouse – Data analytics – Machine learning and the models that ML generates – Control applications. **Logical design of IoT:** Devices – Communication – Services – Management – Security – Application.

UNIT III: **No. of hours: 12**

Communication Models: Request And Response Model – Publisher-Subscriber model - Push Pull Model – Exclusive pair model. **IoT architecture and Protocols:** Introduction – Taxonomy – Three-layer and Five layer of IoT – Fog based architecture – Advantages of Fog Computing – Representative architecture.

UNIT IV: **No. of hours: 12**

IoT network protocol stack: IoT Technology stack – Device Hardware – Device Software – Communication – Cloud Platform – Cloud applications. Bluetooth – ZigBee – 6LowPAN. **Program Framework for IoT:** Interpretability in IoT – Proamming paradigm – Assembly – Procedural functional object oriented programming – multi paradigm programming.

UNIT V: **No. of hours: 12**

Security, Privacy and Challenges in IoT: Design Challenges – Development challenges – Security Challenges – Privacy Challenges. IoT. **IoT Applications:** The Smart Home – Health Care – Agriculture – Military – Politics – Smart home Features and Functions.

Total Hours: 60

Text Book

2. Dr. Kamalesh Lakhwani, Dr. Hemant Kumar Gianey, et, al, "IoT Internet of Things Principles Paradigms and Applications of IoT", BPB Publications, 2020.

Reference books

1. Michael Miller, "The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World", kindle version.
2. Francis da Costa, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", Apress Publications 2013, 1st Edition,.
3. Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice" .
4. 4..CunoPfister, "Getting Started with the Internet of Things", O"Reilly Media 2011

Web Resources

1. https://www.simplilearn.com
2. https://www.javatpoint.com
3. https://www.w3schools.com

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	3	3	3
CO 2	3	2	2	3	3	3
CO 3	3	2	3	3	3	3
CO 4	3	3	2	3	3	3
CO 5	3	3	2	3	3	2
Weightage of course contributed to each PSO	15	12	11	15	15	14

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

துறைத்தலைவர்
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மன்னர் சரபோசி அரசுக் கல்லூரி
(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits: 3 **Code: TCSECE**
Hours/Week : 4/6
Medium of instruction: English

B.Sc (Computer Science) - Elective
(For students admitted from 2023-2024 onwards)

NATURAL LANGUAGE PROCESSING

Learning objectives	
LO1	To teach students the leading trends and systems in NLP.
LO2	To know the concept about lexical level in NLP.
LO3	To gain the knowledge about parsing in syntactic level.
LO4	To learn the concept of semantic level.
LO5	To enable the student to be capable to describe pragmatic processing.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Know about the applications of NLP techniques and key issues	K1,K2
CO2	Familiarize about lexical level in NLP.	K2,K3
CO3	Gain knowledge about parsing in syntactic level.	K3,K4
CO4	Understand the concepts semantic level.	K5,K6
CO5	Acquires knowledge about pragmatic level.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 15**

Introduction: application of NLP techniques and key issues- MT grammar checkers- dictation – document generation- NL interfaces- Natural language processing key issues- the different analysis level used for NLP: morpho – lexical – syntactic – semantic – pragmatic - markup(TEI,UNICODE)-finitestateautomata-Recursiveandaugmentedtransitionnetworks.

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UNIT II: **No. of hours: 15**

Lexical level: Error tolerant lexical processing (spelling error correction)-transducers for the design of morphologic analyzers features-towards syntax: part-of-speech tagging (BRILL, HMM)- efficient representations for linguistic sources (lexica, grammars,….) tries and finite state automata..

UNIT III: **No. of hours: 15**

Syntactic level: grammars (eg. formal /Chomsky hierarchy, DCSGs, systematic case, unification, stochastic)- parsing (top-down, bottom up, char(early algorithm),CYK algorithm)-

automated estimation of probabilistic model parameters(inside-outside algorithm)- data oriented parsing- grammar formalisms and tree banks-efficient parsing for context-free grammars (CFGs).

UNIT IV: **No. of hours: 15**

Semantic level: logical forms - ambiguity resolution - semantic network and parsers-procedural semantics - montague semantics- vector space approaches - distributional semantics-lexical semantics and word sense disambiguation-compositional semantics semantic role labelling and sematic parsing

UNIT V: **No. of hours: 15**

Pragmatic Level Pragmatic level: knowledge representation- reasoning- plan/goal recognition –speech acts/intentions – belief models- discourse- reference. Natural language generation: content determination – sentence planning- surface realization, subjectivity and sentiment analysis: information extraction – automatic summarization- information retrieval and question answering– named entity recognition and relation extraction.

Total Hours: 75

Text Book

1. Danie lJ and JamesH. Martin, An Introduction to natural language processing, computation a linguistics and speech recognition prenticehall,2009.

Reference books

1. 1.LanH Written and Elbef, Mark A. Hall, datamining: practical machine learning tools and techiniques, Morgan Kaufmann, 2013.

2. Mohamed ZakariaKurdi, Natural Language Processing and Computational Linguistics 1, speech, Morphology, and syntax, wiley, ISTE Ltd, 2016.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	2	3	3
CO 3	2	3	2	3	3	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	2
Weightage of course contributed to each PSO	14	15	14	14	15	13

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

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(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits: 3
Hours/Week : 4/6
Medium of instruction: English

Code: TCSECF

B.Sc (Computer Science) - Elective
(For students admitted from 2023-2024 onwards)

CRYPTOGRAPHY

Learning objectives	
LO1	To understand basics of Cryptography and Network Security
LO2	To be able to secure a message over insecure channel by various means
LO3	To learn about how to maintain the Confidentiality, Integrity and Availability of a data.
LO4	To understand various protocols for network security to protect against the threats in the networks.
LO5	To research in the emerging areas of cryptography and network security.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Know about the concepts of security attacks.	K1,K2
CO2	Familiarize about confidentiality using conventional encryption	K2,K3
CO3	Gain knowledge about principles of public key crypto systems.	K3,K4
CO4	Understand the concepts of MD5 message digest algorithm	K5,K6
CO5	Acquires knowledge about IP security.	K6
K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create		

UNIT I: **No. of hours: 15**

Introduction to security attacks - services and mechanism - introduction to cryptography - Conventional Encryption: Conventional encryption model - classical encryption techniques - substitution ciphers and transposition ciphers – cryptanalysis – steganography - stream and block ciphers - Modern Block Ciphers: Block ciphers principals - Shannon's theory of confusion and diffusion – fiestal structure - data encryption standard(DES) - strength of DES - differential and linear crypt analysis of DES - block cipher modes of operations - triple DES – AES.

UNIT II: **No. of hours: 15**

Confidentiality using conventional encryption - traffic confidentiality - key distribution - random number generation - Introduction to graph - ring and field - prime and relative prime numbers - modular arithmetic - Fermat's and Euler's theorem - primality testing - Euclid's Algorithm - Chinese Remainder theorem - discrete algorithms.

UNIT III: **No. of hours: 15**

Principles of public key crypto systems - RSA algorithm - security of RSA - key management – Diffle-Hellman key exchange algorithm - introductory idea of Elliptic curve cryptography – Elgamel encryption - Message Authentication and Hash Function: Authentication requirements - authentication functions - message authentication code - hash functions - birthday attacks – security of hash functions and MACS.

UNIT IV: **No. of hours: 15**

MD5 message digest algorithm - Secure hash algorithm (SHA) Digital Signatures: Digital Signatures - authentication protocols - digital signature standards (DSS) - proof of digital signature algorithm - Authentication Applications: Kerberos and X.509 - directory authentication service - electronic mail security-pretty good privacy (PGP) - S/MIME.

UNIT V: **No. of hours: 15**

IP Security: Architecture - Authentication header - Encapsulating security payloads - combining security associations - key management Web Security: Secure socket layer and transport layer security - secure electronic transaction (SET) - System Security: Intruders - Viruses and related threads - firewall design principals – trusted systems.

Total Hours: 75

Text Book

1. William Stallings, "Crpyptography and Network security Principles and Practices", Pearson / PHI.

2. Wade Trappe, Lawrence C Washington, " Introduction to Cryptography with coding theory", Pearson.

Reference books

1. W. Mao, "Modern Cryptography – Theory and Practice", Pearson Education.

2. Charles P. Pfleeger, Shari Lawrence Pfleeger – Security in computing – Prentice Hall of India.

RESOURCES:

Video Lectures

1. http://nptel.ac.in/courses/106105031/**lecture by** Dr. Debdeep MukhopadhyayIIT Kharagpur
2. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-033-computer-system-engineering-spring-2009/video-lectures/ **lecture by** Prof. Robert Morris and Prof. Samuel Madden MIT.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
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CO 5	3	3	3	3	3	2
Weightage of course contributed to each PSO	14	15	14	14	15	13

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
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COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 3 **Code: TCSECG**
Hours/Week : 4/6
Medium of instruction: English

B.Sc (Computer Science) - Elective
(For students admitted from 2023-2024 onwards)

BIG DATA ANALYTICS

Learning objectives	
LO1	To Understand the Big Data Platform and its use cases.
LO2	To Provide an overview of Apache Hadoop .
LO3	To Provide HDFS Concepts and Interfacing with HDFS.
LO4	To Understand Map Reduce Jobs.
LO5	To Provide hands on Hadoop Eco System.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge about Big Data and Hadoop.	K1,K2
CO2	Familiarize about HDFS, Hadoop I/O.	K2,K3
CO3	Gain knowledge about Map reduce, types and formats.	K3,K4
CO4	Understand the concepts Pig, and HBase	K5,K6
CO5	Acquires knowledge Machine learning.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 15**

Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, IBM Big Data Strategy, Introduction to Infosphere Big In sights and Big Sheets.

UNIT II: **No. of hours: 15**

The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.

UNIT III: **No. of hours: 15**

Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.

UNIT IV: **No. of hours: 15**

Pig: Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators. Hive : Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. Hbase : HBasics, Concepts, Clients, Example, Hbase Versus RDBMS. Big SQL : Introduction

UNIT V: **No. of hours: 15**

Machine Learning : Introduction, Supervised Learning, Unsupervised Learning, Collaborative Filtering. Big Data Analytics with BigR.

Total Hours: 75

Text Books:

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)

References:

1. Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press.

2. Anand Rajaraman and Jef rey David Ulman, "Mining of Massive Datasets", Cambridge University Press, 2012.

3. Tom White " Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.

4. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

Mapping with Programme Outcomes:

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CO 1	3	3	3	3	3	3
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S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

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CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 3 **Code: TCSECH**

Hours/Week : 4/6
Medium of instruction: English

B.Sc (Computer Science) - Elective
(For students admitted from 2023-2024 onwards)

SOFTWARE PROJECT MANAGEMENT

Learning objectives	
LO1	To learn about how to manage the software project.
LO2	To know about the project and product life cycle.
LO3	To familiarize the project monitoring and controls.
LO4	To gain knowledge about software testing.
LO5	To learn about Project Management Tools

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge about how to manage the software project..	K1,K2
CO2	Familiarize about the project and product life cycle	K2,K3
CO3	Gain knowledge about the project monitoring and controls.	K3,K4
CO4	Understand the concepts software testing.	K5,K6
CO5	Acquires knowledge about Project Management Tools	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 15**

Introduction and Software Project Planning: Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.

UNIT II: **No. of hours: 15**

Project Organization and Scheduling Project Elements: Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts. (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Desk checks, Walkthroughs, Code Reviews, Pair Programming.

UNIT III: **No. of hours: 15**

Project Monitoring and Control: Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming.

UNIT IV: **No. of hours: 15**

Software Quality Assurance and Testing Objectives: Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Cleanroom process.

UNIT V: **No. of hours: 15**

Project Management and Project Management Tools Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.

Total Hours: 75

Text Books:

1. M. Cotterell, Software Project Management, Tata McGraw-Hill Publication.
2. Royce, Software Project Management, Pearson Education

References:

3. Kieron Conway, Software Project Management, Dreamtech Press
4. S. A. Kelkar, Software Project Management, PHI Publication.
5. Harold R. Kerzner, Project Mangment "A Systems Approach to Planning, Scheduling, and Controlling" Wiley.
4. Mohapatra, Software Project Management, Cengage Learning.
5. P.K. Agarwal, SAM R., Software Project Management, Khanna Publishing House

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
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CO 5	3	3	3	3	3	2
Weightage of course contributed to each PSO	14	15	14	14	15	13

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
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தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits: 3 **Code: TCSECI**

Hours/Week : 4/6
Medium of instruction: English

B.Sc (Computer Science) - Elective
(For students admitted from 2023-2024 onwards)

HUMAN COMPUTER INTERACTION

Learning objectives	
LO1	To get knowledge about overview of Human-Computer Interaction (HCI), with an understanding of user interface design
LO2	To familiarize about the Design process.
LO3	To gain knowledge about the Windows and Multimedia
LO4	To understand the concepts HCI in the software process
LO5	To acquires knowledge about Cognitive models Goal and task hierarchies Design Focus

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge about overview of Human-Computer Interaction (HCI), with an understanding of user interface design	K1,K2
CO2	Familiarize about the Design process.	K2,K3
CO3	Gain knowledge about the Windows and Multimedia	K3,K4
CO4	Understand the concepts HCI in the software process	K5,K6
CO5	Acquires knowledge about Cognitive models Goal and task hierarchies Design Focus	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 15**

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design. The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics Principles of user interface.

UNIT II: **No.ofhours:15**

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, and understanding business junctions. Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT III:

No. of hours: 15

Windows – New and Navigation schemes selection of window, selection of devices based and screen- based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT IV:

No. of hours: 15

HCI in the software process, The software life cycle Usability engineering Iterative design and prototyping Design Focus: Prototyping in practice Design rationale Design rules Principles to support usability Standards Golden rules and heuristics HCI patterns Evaluation techniques, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method. Universal design, Universal design principles Multi-modal interaction.

UNIT V:

No. of hours: 15

Cognitive models Goal and task hierarchies Design Focus: GOMS saves money Linguistic models The challenge of display-based systems Physical and device models Cognitive architectures Ubiquitous computing and augmented realities Ubiquitous computing applications research Design Focus: Ambient Wood – augmenting the physical Virtual and augmented reality Design Focus: Shared experience Design Focus: Applications of augmented reality Information and data visualization Design Focus: Getting the size right.

Total Hours: 75

Text Book

1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dream Tech. Units 1, 2, 3 2. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education Units 4,5

Reference books

1. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia. 2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech. 3. User Interface Design, Soren Lauesen , Pearson Education. 4. Human –Computer Interaction, D. R. Olsen, Cengage Learning. 5. Human –Computer Interaction, Smith - Atakan, Cengage Learning.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
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S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

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தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits: 3
Hours/Week : 4/6
Medium of instruction: English

Code: TCSECJ

B.Sc (Computer Science) - Elective
(For students admitted from 2023-2024 onwards)

ARTIFICIAL INTELLIGENCE

	Learning objectives
LO1	To understand the basics of agents.
LO2	To know about problem solving methods.
LO3	To learn about predicate logic and ontological engineering.
LO4	To investigate applications of AI techniques in intelligent agent.
LO5	To experience AI applications.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge about the basics of agents.	K1,K2
CO2	Familiarize about problem solving methods.	K2,K3
CO3	Gain knowledge about predicate logic and ontological engineering.	K3,K4
CO4	Understand the concepts of AI techniques in intelligent agent	K5,K6
CO5	Acquires knowledge of AI applications.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 15**

Introduction–Definition – Future of Artificial Intelligence – Characteristics of Intelligent Agents–Typical Intelligent Agents – Problem Solving Approach to Typical AI problems.

.UNIT II: **No. of hours: 15**

Problem solving Methods – Search Strategies- Uninformed – Informed – Heuristics – Local Search Algorithms and Optimization Problems -Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search – Game Playing – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games

UNIT III: **No. of hours: 15**

Knowledge Representation First Order Predicate Logic – Prolog Programming – Unification – Forward Chaining-Backward Chaining – Resolution – Knowledge Representation – Ontological Engineering-Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories -Reasoning with Default Information

UNIT IV: **No. of hours: 15**

Software Agents Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent systems.

UNIT V: **No. of hours: 15**

Applications AI applications – Language Models – Information Retrieval- Information Extraction – Natural Language Processing – Machine Translation – Speech Recognition – Robot – Hardware –Perception – Planning – Moving.

Total Hours: 75

Text Book

1. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach, Prentice Hall, Third Edition, 2009.

2. Artificial Intelligence: A Modern Approach, 4th Edition, Stuart Russell, peter Norvig University of California at Berkeley, Pearson education, 2020.

3. I. Bratko, —Prolog: Programming for Artificial Intelligence, Fourth Edition, Addison-Wesley Educational Publishers Inc., 2011

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	2	3	3
CO 3	2	3	2	3	3	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	2
Weightage of course contributed to each PSO	14	15	14	14	15	13

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

Section A - Answer All Questions (Two questions from each unit)	10 x 2 = 20
Section B - Answer All questions (Either or Type – Two questions from each unit)	5 x 5 = 25
Section C - Answer any THREE questions (One question from each unit)	3 x 10 = 30

Signature of the HOD

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(தன்னாட்சி)
தஞ்சாவூர்-613 005

COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 3 **Code: TCSECK**

Hours/Week : 4/6
Medium of instruction: English

B.Sc (Computer Science) - Elective
(For students admitted from 2023-2024 onwards)

ROBOTICS AND ITS APPLICATIONS

Learning objectives	
LO1	To provide an introduction to robotics and automation.
LO2	To provide information on various types of end effectors, their design, interfacing and selection.
LO3	To provide the detail of operations for a variety of sensory devices.
LO4	To familiarize the basic concepts of transformation performed by robot.
LO5	To understand the robotic programming for automation.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge about robotics and automation.	K1,K2
CO2	Familiarize about various types of end effectors, their design, interfacing and selection.	K2,K3
CO3	Gain knowledge about operations for a variety of sensory devices.	K3,K4
CO4	Understand the concepts of transformation performed by robot.	K5,K6
CO5	Acquires knowledge of robotic programming for automation.	K6
K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create		

UNIT I: **No. of hours: 15**

History of robots, Classification of robots, Present status and future trends. Basic components of robotic system. Basic terminology- Accuracy, Repeatability, Resolution, Degree of freedom. Mechanisms and transmission, End effectors, Grippers-different methods of gripping, Mechanical grippers-Slider crank mechanism, Screw type Rotary actuators, Cam type gripper, Magnetic grippers, Vacuum grippers, Air operated grippers; Specifications of robot.

UNIT II: **No. of hours: 15**

Drive system- hydraulic, pneumatic and electric systems Sensors in robot – Touch sensors, Tactile sensor, Proximity and range sensors, Robotic vision sensor, Force sensor, Light sensors, Pressure sensors..

UNIT III: **No. of hours: 15**

2D, 3D Transformation, Scaling, Rotation, Translation, Homogeneous coordinates, multiple transform, Simple problems. Matrix representation, Forward and Reverse Kinematics Of Three

Degree of Freedom, Homogeneous Transformations, Inverse kinematics of Robot, Robot Arm dynamics, D-H representation of robots, Basics of Trajectory Planning.

UNIT IV: **No. of hours: 15**

Robot Control, Robot controls-Point to point control, Continuous path control, Intelligent robot, Control system for robot joint, Control actions, Feedback devices, Encoder, Resolver, LVDT, Motion interpolations, Adaptive control..

UNIT V: **No. of hours: 15**

Introduction to Robotic Programming, On-line and off - line programming, programming examples. Robot applications-Material handling, Machine loading and unloading, assembly, Inspection, Welding, Spray painting.

Total Hours: 75

Text Book

1. Mikell P Groover, Nicholas G Odrey, Mitchel Weiss, Roger N Nagel, Ashish Dutta, "IndustrialRobotics, Technology programming and Applications", McGraw Hill, 2012.
2. Craig. J. J. "Introduction to Robotics- mechanics and control", Addison- Wesley, 1999.

Reference books

1. Richard D. Klafter, Thomas .A, ChriElewski, Michael Negin, "Robotics Engineering an IntegratedApproach", PHI Learning., 2009.

2. Francis N. Nagy, Andras Siegler, "Engineering foundation of Robotics", Prentice Hall Inc., 1987.

3. P.A. Janaki Raman, "Robotics and Image Processing an Introduction", Tata McGraw Hill Publishingcompany Ltd., 1995.

4. Carl D. Crane and Joseph Duffy, "Kinematic Analysis of Robot manipulators", Cambridge University press, 2008.

5.Fu. K. S., Gonzalez. R. C. & Lee C.S.G., "Robotics control, sensing, vision and intelligence", McGraw Hill Book co, 1987

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	2	3	3
CO 3	2	3	2	3	3	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	2
Weightage of course contributed to each PSO	14	15	14	14	15	13

S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

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COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 3 **Code: TCSECL**

Hours/Week : 4/6
Medium of instruction: English

B.Sc (Computer Science) – Elective
(For students admitted from 2023-2024 onwards)

COMPUTER GRAPHICS

Learning objectives	
LO1	To learn about the graphics basics.
LO2	To understand drawing algorithms for line, circle, ellipse, fill.
LO3	To familiarize the 2D transformation and viewing.
LO4	To understand the concepts of 3D display methods and transformation.
LO5	To know about the 3D viewing techniques.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge about graphics basics.	K1,K2
CO2	Familiarize about output primitives and their attributes.	K2,K3
CO3	Gain knowledge about two dimensional transformation and viewing.	K3,K4
CO4	Understand the concepts 3D display methods and transformation.	K5,K6
CO5	Acquires knowledge of 3D viewing techniques.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 15**

Introduction to computer graphics: Brief Survey of Computer Graphics – Graphics Systems: Video Display Devices – Types –Raster-Scan Systems and Random-Scan Systems – Input Devices –Hard-Copy Devices – Graphics Software.

UNIT II: **No. of hours: 15**

Output primitives and their attributes Line-Drawing (DDA and Bresenham's) Algorithms – Circle-Generating (Midpoint) Algorithm –Ellipse-Generating (Midpoint) Algorithms- Area-Filling (Boundary – Fill and Flood-Fill) Algorithms - Line Attributes - Color and Gray scale Levels – Character Attributes .

UNIT III: **No. of hours: 15**

Two-dimensional transformations and viewing : Basic Transformations - Matrix Representations and Homogeneous Coordinates – Composite Transformations - Other Transformations –Window-to- Viewport Coordinate Transformation.

UNIT IV: **No. of hours: 15**

Three - dimensional concepts: Three-Dimensional Display Methods: Parallel and Perspective Projections – Depth Cueing - Visible Line and Surface Identification –Three-Dimensional Transformations: Translation- Rotation- Scaling - Other Transformations.

UNIT V: **No. of hours: 15**

Three-dimensional viewing: Viewing Pipeline and Coordinates –Transformation from World to Viewing Coordinates – Projections –Parallel Projection- Perspective Projection

Total Hours: 75

Text Book

1. S. Harrington,1987, Computer Graphics , 2nd Edition , Tata McGraw-Hill Book

Reference books

1. W.M. Newman and R.F. Sproull ,1997, Principles of Interactive Computer Graphics, 2nd Edition, Tata McGraw-Hill Publishing Co. Ltd.

2. D.P. Mukherjee, 1999, Fundamentals of Computer Graphics and Multimedia , 1st Edition, Prentice-Hall of India Pvt. Ltd.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	2	3	3
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CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	2
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S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

Maximum Marks: 75 Exam Duration: Three Hours

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CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 3 **Code: TCSECM**

Hours/Week : 4/6
Medium of instruction: English

B.Sc (Computer Science) – Elective
(For students admitted from 2023-2024 onwards)

CLOUD COMPUTING

	Learning objectives
LO1	To get acquainted with the term Cloud computing.
LO2	To understand various types of free and commercial clouds.
LO3	To understands various types of cloud services like SaaS, PaaS and IaaS.
LO4	To know how the Cloud Computing is changing software industry
LO5	To gain knowledge about Sales force Cloud Computing Services

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge about basics of networking.	K1,K2
CO2	Familiarize about client server computing.	K2,K3
CO3	Gain knowledge about Google Cloud, Google Apps, Google Compute Engine.	K3,K4
CO4	Understand the concepts red hat Cloud Computing with its PaaS.	K5,K6
CO5	Acquires knowledge about sales force Cloud Computing Services.	K6
K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create		

UNIT-I: **No. of hours: 15**

Computer Networks, basics of networking, Architectures of networking, topologies, types of Networks, LAN, WAN, MAN, Network Components, Protocols, Communication aspects, basics of internet.

UNIT-II: **No. of hours: 15**

Client-Server Computing, Cluster Computing, Grid Basics, Distributed Computing. Introduction to Cloud Computing, Introduction to Software as a Service (SaaS), Infrastructure as a Service (IaaS), and Platform as a Service (PaaS).

UNIT- III: **No. of hours: 15**

Understanding Google Cloud, Google Apps, Google Compute Engine (GCE), Google App Engine. Amazon Services, Amazon Web Services, Amazon EC2. IBM Cloud Computing with its PaaS, IBM as Saas and IBM as IaaS.

UNIT-IV: **No. of hours: 15**

Red hat Cloud Computing with its PaaS. Microsoft Azure Cloud Computing Service - Windows azure platform Services, Windows Azure storage, Windows Azure fabrics.

UNIT-V: **No. of hours: 15**

Sales force Cloud Computing Services Pass, SaaS and IaaS. Heroku and Force.com as PaaS.

Total Hours: 75

Text Book:

1. Cloud Computing , An Introduction by Subu Sangameswar.

Reference Book:

1. Mastering Cloud Computing Paperback by Buyya (Author), Vecchiola (Author), Selvi (Author)

2. Cloud Computing for Complete Beginners: Building and Scaling High-PerformanceWeb Servers on the Amazon Cloud **by IkramFatah.**

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
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S-Strong-3 M-Medium-2 L-Low-1

Semester Question Paper Pattern

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CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 3 **Code: TCSECN**

Hours/Week : 4/6
Medium of instruction: English

B.Sc (Computer Science) – Elective
(For students admitted from 2023-2024 onwards)

ARTIFICIAL NEURAL NETWORKS

Learning objectives	
LO1	To understand the biological neural network and to model equivalent neuron models.
LO2	To understand the architecture, learning algorithm and issues of various feed forward and feedback neural networks.
LO3	To perform the training of neural networks using various learning rules.
LO4	To Perform the testing of neural networks.
LO5	To perform analysis of these networks for various pattern recognition applications.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge about neural network and to model equivalent neuron models.	K1,K2
CO2	Familiarize about Single Layer Perceptrons.	K2,K3
CO3	Gain knowledge about Back Propagation.	K3,K4
CO4	Understand the concepts Self-Organization Maps.	K5,K6
CO5	Acquires knowledge about Neuro Dynamics.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I: **No. of hours: 15**

Introduction: A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks. Learning Process: Error Correction Learning, Memory Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process.

UNIT II: **No. of hours: 15**

Single Layer Perceptrons: Adaptive Filtering Problem, Unconstrained Organization Techniques, Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques, Perceptron –Convergence Theorem, Relation Between

Perceptron and Bayes Classifier for a Gaussian Environment. Multilayer Perceptron: Back Propagation Algorithm XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection.

UNIT III: **No. of hours: 15**

Back Propagation: Back Propagation and Differentiation, Hessian Matrix, Generalization, Cross Validation, Network Pruning Techniques, Virtues and Limitations of Back Propagation Learning, Accelerated Convergence, Supervised Learning.

UNIT IV: **No. of hours: 15**

Self-Organization Maps (SOM): Two Basic Feature Mapping Models, Self-Organization Map, SOM Algorithm, Properties of Feature Map, Computer Simulations, Learning Vector Quantization, Adaptive Patter Classification.

UNIT V: **No. of hours: 15**

Neuro Dynamics: Dynamical Systems, Stability of Equilibrium States, Attractors, Neuro Dynamical Models, Manipulation of Attractors as a Recurrent Network Paradigm Hopfield Models – Hopfield Models, Computer Experiment.

Total Hours: 75

Text Books:

1. Neural Networks a Comprehensive Foundations, Simon Haykin, PHI edition.

Reference Books

1. Artificial Neural Networks - B. Vegnanarayana Prentice Hall of India P Ltd 2005

2. Neural Networks in Computer Inteligance, Li Min Fu MC GRAW HILL EDUCATION 2003

3. Neural Networks -James A Freeman David M S Kapura Pearson Education 2004.

4. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
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Semester Question Paper Pattern

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COE

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits: 3

Code: TCSECO

Hours/Week : 4/6
Medium of instruction: English

B.Sc (Computer Science) – Elective
(For students admitted from 2023-2024 onwards)

VIRTUAL REALITY

	Learning objectives
LO1	To understand the Virtual reality systems
LO2	To familiarize the techniques of creation and presentation of virtual environments in virtual Reality
LO3	To evaluate VR systems in terms of 2D and 3D orientation.
LO4	To create content for augmented reality application.
LO5	To apply augmented reality to a problem and evaluate.

Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
CO1	Get knowledge about Virtual reality systems.	K1,K2
CO2	Familiarize about creation and presentation of virtual environments in virtual Reality.	K2,K3
CO3	Gain knowledge about VR systems in terms of 2D and 3D orientation	K3,K4
CO4	Understand the concepts augmented reality application	K5,K6
CO5	Acquires knowledge about augmented reality components.	K6
K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create		

UNIT I:

No. of hours: 15

Virtual Reality - Introduction to Virtual Reality - What is virtual reality – Modern VR experiences - Virtual reality systems - Hardware and Software - Geometry of virtual Worlds - Geometric models - Changing position and Orientation - Axis - Angle Representations - Transformations.

UNIT II:

No. of hours: 15

Virtual Reality Evolution - Light and Optics - behavior of light - Optical Aberrations - cameras and displays - The physiology of human vision - Implications of VR - Visual Perception - Perception of Depth -Motion and Color.

UNIT III:

No. of hours: 15

Evaluating VR Systems - Tracking 2D and 3D orientation - Interaction- Locomotion - Interaction Mechanisms -Auditory Perception and Rendering.

UNIT IV:

No. of hours: 15

Augmented Reality - What Is Augmented Reality - The Relationship between Augmented Reality and Other Technologies - How Does Augmented Reality Work - Ingredients of an Augmented Reality Experience.

UNIT V:

No. of hours: 15

Components of Augmented Reality - Augmented Reality Hardware and Software – Interaction - Mobile Augmented Reality - Reality Applications - Trends in Augmented Reality.

Total Hours: 75

Text Books:

1. Alan B Craig, William R Sherman and Jeffrey D Will, "Developing Virtual Reality Applications:
2. Foundations of Effective Design", First Edition, Morgan Kaufmann, Elsevier, 2009.
3. Alan B Craig, "Understanding Augmented Reality - Concepts and Applications", Morgan Kaufmann, Elsevier, First Edition, 2013.

Reference Books

1. Jason Jerald, "The VR Book: Human-Centered Design for Virtual Reality", First Edition, ACM Publications, 2015.
2. Dieter Schmalstieg, Tobias Höllerer, "Augmented Reality: Principles and Practice", First Edition, Addison-Wesley, 2016.

Mapping with Programme Outcomes:

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S-Strong-3 M-Medium-2 L-Low-1

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Maximum Marks: 75 Exam Duration: Three Hours

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