

RAJAH SERFOJI GOVERNMENT COLLEGE
(AUTONOMOUS)
THANJAVUR-613 005



SYLLABUS
(With LOCF and CBCS)
FOR
BSc (Computer Science)
**(Applicable to the candidates admitted from the
academic year 2022-2023 onwards)**

RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR 613 005

PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE
BOARD OF STUDIES MEETING

VENUE : COMPUTER SCIENCE DEPARTMENT
DATE : 18/08/2022
TIME : 10.30 PM

AGENDA

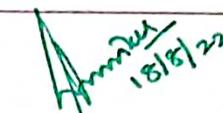
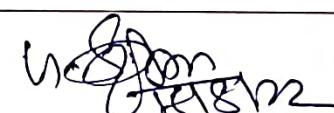
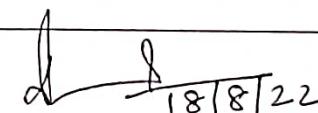
Approval of new syllabus for BSc(Computer Science), MSc(Computer Science) and MPhil(Computer Science) students who admitted in the academic year 2022-23 onwards.

MEMBERS IN BOARD OF STUDIES

NAME	ADDRESS
Dr. K. Mohan Kumar Chairman, Board of studies	HOD of Computer Science Rajah Serfoji Govt. College (Autonomous) Thanjavur
Dr. S. Kumaravel University Nominee	Associate Professor of Computer Science AVVM Sri Pushpam College Poondi, Thanjavur District.
Dr. A. Padmapriyaa Subject Expert-1	Professor of Computer Science Alagappa University Karaikudi 630003
Dr. P. Thiagarajan Subject Expert-2	Assistant Professor of Computer Science Central University Tiruvarur
Dr. Ravikumar Ramadoss Industrial Expert	Director PIXMonks Solutions Thanjavur
Mr. V. Srividhya Alumni	Programmer TUK Arts College, Karanthai Thanjavur
Dr. M. Chidambaram Member	Asst. Professor in Computer Science Rajah Serfoji Govt. College (Autonomous) Thanjavur
Dr. V.S. Suresh Kumar Member	Asst. Professor in Computer Science Rajah Serfoji Govt. College (Autonomous) Thanjavur
Mr. N. Suresh Babu Member	Asst. Professor in Computer Science Rajah Serfoji Govt. College (Autonomous) Thanjavur
Dr. D.J. Evanjaline	Asst. Professor in Computer Science Rajah Serfoji Govt. College (Autonomous) Thanjavur
Dr. J.Gnana Jayanthi	Asst. Professor in Computer Science Rajah Serfoji Govt. College (Autonomous) Thanjavur
Mr. C. Muruganandam	Asst. Professor in Computer Science Rajah Serfoji Govt. College (Autonomous) Thanjavur

Resolution Passed:

Resolved to approve the syllabus for BSc (Computer Science), MSc (Computer Science) and MPhil (Computer Science) from the academic year 2022-23 onwards

NAME	SIGNATURE
Dr. K. Mohan Kumar Chairman, Board of studies	
Dr. S. Kumaravel University Nominee	 18/8/22
Dr. A. Padmapriyaa Subject Expert-1	
Dr. P. Thiyagarajan Subject Expert-2	
Dr. Ravikumar Ramadoss Industrial Expert	
Mrs. B. Srividhya Alumni	 18/8/22
Dr. M. Chidambaram Member	 18/8/22
Dr. V.S. Suresh Kumar Member	 18/8/22
Mr. N. Suresh Babu Member	
Dr. D.J. Evanjaline Member	 18/8/22
Dr. J.Gnana Jayanthi Member	
Mr. C. Muruganandam Member	

VISION

Creation of globally capable, committed, empathetic and holistic persons promoting the society.

MISSION

1. Nurturing effective learning environment to the students of diverse background, developing their inherent skills and competencies through reflection and creation of knowledge and service.
2. Cultivating comprehensive learning and best practices through innovative and value driven pedagogy.
3. Contributing significantly to Higher Education through Teaching, Learning, and Research and Extension activities.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

1. Graduates will be able to accomplish professional standards in the global environment.
2. Graduates will be able to uphold integrity and human values.
3. Graduates will be able to appreciate and promote pluralism and multiculturalism in working environment.

BSc- COMPUTER SCIENCE PROGRAMME OUTCOMES (POs)

Upon completion of the BSc Computer Science degree Programme, students will be able to

1. Be capable of demonstrating comprehensive knowledge and understanding of the discipline that forms a part of an undergraduate program of study and applying the knowledge in real-life situations through critical thinking and analytical reasoning.
2. Become employable, entrepreneurs, or pursue higher education with scientific reasoning, problem-solving capacity, communication, and other generic skills and global competencies like digital literacy, and the ability to work in cooperation as a team.
3. Be a good citizen with multicultural competence, moral and ethical awareness, reflective thinking, and leadership qualities to make progressive efforts to sustain the environment, socio-cultural and economic fabric, and human values at the national and global level.
4. Proceed with a sense of inquiry and demonstrate capability for asking relevant/appropriate questions, problematizing, synthesizing, and articulating; and able to recognize cause-and-effect relationships, define problems, analyze, interpret and draw conclusions from data, predict cause-and-effect relationships, and to demonstrate an ability to plan, execute and report the results of an experiment or investigation.
5. Become a lifelong learner through self-paced and self-directed learning aimed at intellectual development, meeting economic, social, and cultural objectives, and adapting to changing trades and demands of the workplace through knowledge/skill development/reskilling.

BSc- COMPUTER SCIENCE PROGRAMME SPECIFIC OUTCOMES (PSOs)

On completion of the **B.Sc.(Computer Science)** Programme under graduates will be able to:

- Analyze the areas where computing skills are needed and present comprehensive software tools for business and other applications individually or through team.
- Compare existing tools and provide new software tools based on the new trends in society which eliminates the drawbacks of existing tools available at present.
- Assess ethical values to appreciate and promote social harmony and environmental sustainability through holistic skills obtained.

RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS), THANJAVUR-613005
B.Sc. COMPUTER SCIENCE COURSE STRUCTURE
(For the Candidates admitted from the academic year 2022 -2023 onwards)

Semester	Part	Course	Subject Code	Title of the Paper	Inst. Hrs.	Credit	Exam. Hrs.	Marks		Total
								Int.	Ext.	
I	I	LT	A1T1	PART I Tamil – I	6	3	3	25	75	100
	II	LE	A1E1	PART-II English –I	6	3	3	25	75	100
	III	CC1	A1CS1	Programming in C	6	5	3	25	75	100
	III	CC2	A1CSP1	Practical: C Programming	3	4	3	40	60	100
	III	Allied 1	A1ACSMA1	Allied Mathematics I	4	4	3	25	75	100
	III	Allied 2	A2ACSMA2	Allied Mathematics II	3	-	-	-	-	-
	IV	VE	A1VE	Value Education	2	2	3	25	75	100
					Total	30	21			600
II	I	LT	A2T2	PART I Tamil – II	6	3	3	25	75	100
	II	LE	A2E2	PART II English - II	6	3	3	25	75	100
	III	CC3	A2CS2	Data Structures and Algorithms	6	5	3	25	75	100
	III	CC4	A2CSP2	Practical: Data Structure using C	3	4	3	40	60	100
	III	Allied 2	A2ACSMA2	Allied Mathematics II	3	4	3	25	75	100
	III	Allied 3	A2ACSMA3	Allied Mathematics III	4	4	3	25	75	100
	IV	ES	A2ES	Environmental Studies	2	2	3	25	75	100
					Total	30	25			700

III	I	LT	A3T3	PART I Tamil – III	6	3	3	25	75	100
	II	LE	A3E3	PART-II English –III	6	3	3	25	75	100
	III	CC5	A3CS3	Programming in Java	6	5	3	25	75	100
	III	CC6	A3CSP3	Practical: Programming in Java	3	4	3	40	60	100
	III	Allied 4	A3ACSPH1	Applied Physics I	4	4	3	25	75	100
	III	Allied 5	A4ACSPHP	Practical: Applied Physics	3	-	-	-	-	-
	IV	SEC1	A3SB1	Office Automation Tools	2	2	3	25	75	100
					Total	30	21			600
IV	I	LT	A4T4	PART I Tamil – IV	6	3	3	25	75	100
	II	LE	A4E4	PART II English - IV	6	3	3	25	75	100
	III	CC7	A4CS4	Programming in Python	6	5	3	25	75	100
	III	CC8	A4CSP4	Practical: Python Programming	3	4	3	40	60	100
	III	Allied 5	A4ACSPHP	Practical: Applied Physics	3	4	3	40	60	100
	III	Allied 6	A4ACSPH2	Applied Physics II	4	4	3	25	75	100
	IV	SEC2	A4SB2	System Administration and Maintenance	2	2	3	25	75	100
					Total	30	25			700

V	III	CC9	A5CS5	Relational Database Management Systems	6	5	3	25	75	100
	III	CC10	A5CSP5	Practical: SQL and PLSQL	6	4	3	40	60	100
	III	DSE1	A5CSEL1A	Digital computer fundamentals & architecture	6	4	3	25	75	100
			A5CSEL1B	System Software						
			A5CSEL1C	Computer Graphics						
	III	DSE2	A5CSEL2A	Operating Systems		6	4	3	25	75
			A5CSEL2B	Open Source Technology						
			A5CSEL2C	Data Mining and Warehousing						
	IV	GEC1		Statistics	4	3	3	25	75	100
	IV	SSD	A5SSD	Soft Skill Development	1	2	3	25	75	100
	IV	SEC3	A5SB3	Android Programming	1	2	3	25	75	100
	IV	ECC1	A5CSEC1	Internet Programming	-	4	3	-	100	100
					Total	30	24			700
VI	III	CC11	A6CS6	Computer Networks	6	5	3	25	75	100
	III	CC12	A6CS7	Web Technology	6	5	3	25	75	100
	III	CC13	A6CSP6	Practical: Web Technology Lab	6	5	3	40	60	100
	III	DSE3	A6CSEL3A	Software Engineering	6	4	3	25	75	100
			A6CSEL3B	Microprocessor & Assembly Language Programming						
			A6CSEL3C	Software Testing						
	IV	GEC2		Commerce	4	3	3	25	75	100
	IV	GS	A6GS	Gender Studies	2	1	3	25	75	100
	IV	ECC2	A5CSEC2	Network Security	-	4	3	-	100	100
	V	Extra Activities		NCC/NSS/SPORTS/RCC/YRC/CCC	-	1	-	-	-	-
					Total	30	24			600
Grand Total							140			3900

PART	SUBJECT	PAPERS	TOTAL CREDIT
PART – I	TAMIL	4X3	12
PART – II	ENGLISH	4X3	12
PART – III	CORE	8X5=40, 5X4=20	60
	ELECTIVES	3X4	12
	ALLIED	6X4	24
PART – IV	NON-MAJOR ELECTIVE	2X3	6
	Extra credit course	2x4	8*
	ES,VE	2X2	4
	SKILL BASED	3X2	6
	SSD	1X2	2
	GS	1X1	1
PART - V	EXT, ACTIVITIES		1
TOTAL PAPERS		39 TOTAL CREDIT	140

*Not considered for CGPA

Separate passing minimum is prescribed for Internal and External

- a) The passing minimum for CIA shall be 40% out of 25 Marks(ie. 10 Marks)
- b) The passing minimum for Autonomous Examinations shall be 40% out of 75 Marks (ie. 30 Marks)
- c) The passing minimum is not less than 40 in the aggregate

Source of the content of each title:

SEMESTER	TITLE	CONTENT FROM
I	Programming in C	tnsche.tn.gov.in
	Practical: C Programming	tnsche.tn.gov.in
II	Data Structures and Algorithms	tnsche.tn.gov.in
	Practical: Data Structure using C	tnsche.tn.gov.in
III	Programming in Java	tnsche.tn.gov.in
	Practical: Java Programming	tnsche.tn.gov.in
	Office automation tools	2019-21 Syllabus
IV	Programming in Python	tnsche.tn.gov.in
	Practical: Python Programming	tnsche.tn.gov.in
	System Administration and Maintenance	tnsche.tn.gov.in
V	Relational Database Management Systems	Prepared by us.
	Practical: SQL and PLSQL	Prepared by us.
	Digital computer fundamentals & architecture	2015-18 syllabus
	System Software	tnsche.tn.gov.in.
	Computer Graphics	tnsche.tn.gov.in.
	Operating Systems	2019-21 Syllabus
	Open Source Technology	tnsche.tn.gov.in
	Data Mining and Warehousing	tnsche.tn.gov.in
	Android Programming	tnsche.tn.gov.in
	Internet Programming(Extra Credit Course1)	tnsche.tn.gov.in
VI	Computer Networks	tnsche.tn.gov.in
	Web Technology	Prepared by us
	Practical: Web Technology Lab	Prepared by us
	Software Engineering	2019-21 Syllabus
	Microprocessor & Assembly Language Programming	tnsche.tn.gov.in
	Software Testing	tnsche.tn.gov.in
	Network Security(Extra Credit Course 2)	tnsche.tn.gov.in
For Other Departments		
Internet & Web Design		tnsche.tn.gov.in
Fundamental of Information Technology		tnsche.tn.gov.in

Change of percentage of content: $70+15 = 85\%$

SYLLABUS FROM	NO OF COURSES TAKEN	TOTAL NUMBER OF COURSES	%
Tamil Nadu Govt.	21	29	72
Current/Existing Syllabus	4	29	14
New preparation by us	4	29	14

CONTENT

B.Sc(Computer Science)- COURSE

SEMESTER	COURSE CODE	TITLE	PAGE NO.
1	A1CS1	Programming in C	UG-1
	A1CSP1	Practical: C Programming	UG-4
2	A2CS2	Data Structures and Algorithms	UG-6
	A2CSP2	Practical: Data Structure using C	UG-8
3	A3CS3	Programming in Java	UG-10
	A3CSP3	Practical: Programming in Java	UG-13
	A3SB1	Office Automation Tools	UG-15
4	A4CS4	Programming in Python	UG-17
	A4CSP4	Practical: Python Programming	UG-19
	A4SB2	System Administration and Maintenance	UG-21
5	A5CS5	Relational Database Management Systems	UG-24
	A5CSP5	Practical: SQL and PLSQL	UG-27
	A5CSEL1A	Digital Computer Fundamentals & Architecture	UG-30
	A5CSEL1B	System Software	UG-33
	A5CSEL1C	Computer Graphics	UG-36
	A5CSEL2A	Operating Systems	UG-39
	A5CSEL2B	Open Source Technology	UG-42
	A5CSEL2C	Data Mining and Warehousing	UG-45
	A5SB3	Android Programming	UG-48
	A5CSEC1	Internet Programming (Extra Credit Course)	UG-50
6	A6CS6	Computer Networks	UG-53
	A6CS7	Web Technology	UG-56
	A6CSP6	Practical: Web Technology Lab	UG-59
	A6CSEL3A	Software Engineering	UG-61
	A6CSEL3B	Microprocessor & Assembly Language Programming	UG-64
	A6CSEL3C	Software Testing	UG-67
	A5CSEC2	Network Security	UG-69

FOR OTHER DEPARTMENTS

SEMESTER	COURSE CODE	TITLE	PAGE NO
5	A5CSEL01	Internet & Web Design	UG-72
6	A5CSEL02	Fundamental of Information Technology	UG-75

Credits : 4

Hours/Week : 6

Medium of instruction: English

Code: A1CS1

B.Sc(Computer Science) - Semester: 1
(For students admitted from 2022-2023 onwards)

PROGRAMMING IN C

COURSE OBJECTIVES:

- To develop programming skills using the fundamentals and basics of C language
- Understand the concept of a variable holding a value, how a variable is declared and how it can change
- To develop programs using the basic elements like control statements, Arrays and Strings
- To make the student learn a programming language.
- Be able to break a large problem into smaller parts, writing each part as a module or function

COURSE OUTCOMES:

CO's	CO–Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO–1	Learn about the concept of variable, data types, operators and Expressions.	K1
CO–2	Know the concepts of control structures and Looping statements.	K2
CO–3	Acquire knowledge about arrays and strings.	K3
CO–4	Learn how to create functions and passing arguments, structures and unions	K4
CO–5	Gain the knowledge to use pointers and handling files in C	K5

UNIT - I

History of C – Importance of C – Basic Structure of C Programs – Constants, Variables and Data Types – Operators and Expressions – Managing Input and Output Operations – Library functions.

UNIT - II

Decision Making and Branching – Decision Making with IF Statement – Simple IF Statement – The IF ... ELSE Statement – Nesting of IF ... ELSE Statements – The ELSE IF Ladder – The Switch Statement – The ?: Operator – The GOTO Statement – Decision Making and Looping – The WHILE Statement – The DO Statement – The FOR Statement.

UNIT - III

Arrays – One-Dimensional Arrays – Two-Dimensional Arrays – Multi-dimensional Arrays – Character Arrays and Strings – Declaring and Initializing String Variables – Reading and Writing Strings – Arithmetic Operations on Characters – Comparison of Two Strings – String-handling Functions.

UNIT - IV

User-Defined Functions – Function Declaration – Category of Functions – Nesting of Functions – Recursion – Storage Classes – Structures and Union – Arrays of Structures – Arrays within Structures – Structures within Structures – Structures and Functions – Unions.

UNIT - V

Pointers - Declarations - Passing pointers to Functions - Operation in Pointers - Pointer and Arrays - Arrays of Pointers - Structures and Pointers - File Management – Defining and Opening a File – Closing a File – Input / Output Operations on Files – Error Handling During I/O operations – Random Access to Files – Command Line Arguments.

BOOK FOR STUDY:

E.Balagurusamy, “Programming in ANSI C”, Fifth Edition, Tata McGraw Hill.

BOOKS FOR REFERENCE:

- B.W. Kernighan and D M.Ritchie, “The C Programming Language”, 2nd Edition, PHI, 1988.
- H. Schildt, “C: The Complete Reference”, 4th Edition. TMH Edition, 2000.
- Gottfried B.S, “Programming with C”, Second Edition, TMH Pub. Co. Ltd., New Delhi 1996.
- Kanetkar Y., “Let us C”, BPB Pub., New Delhi, 1999.

Relationship matrix for Course outcomes, Programme outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	2	3	3	2	3	2	3	1	2	2.88
CO2	3	2	3	3	1	2	3	1	2	3	2.88
CO3	3	2	3	2	2	3	2	1	3	3	3.00
CO4	2	2	2	2	3	1	2	3	2	2	2.63
CO5	1	2	3	2	3	3	2	1	3	1	2.63
Mean Overall Score (High Level Relationship between COs and POs)											2.80

Semester Question paper Pattern: Maximum Marks: 75 Exam 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

துறைத்தலைவா
கணினி அறிவியல் துறை
மன்றார் சபோரிடருக்கள்ளார்
(துண்டாட்சி)
தஞ்சாவூர் - 613 005.

COE

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

Credits : 4

Code: A1CSP1

Hours/Week : 3

Medium of instruction: English

B.Sc(Computer Science) - Semester: 1
 (For students admitted from 2022-2023 onwards)

PRACTICAL: C PROGRAMMING

COURSE OBJECTIVES:

- It aims to train the student to the basic concepts of the C-programming language
- To improve the programming skills through C language
- Read, understand and trace the execution of programs written in C language.

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
<i>On successful completion of this course, students will be able to</i>		
CO-1	Write the basic programming with decision making statements	K1
CO-2	Write programs with arrays and string functions	K2
CO-3	Develop their own functions to perform task	K3
CO-4	Create programs using pointers.	K4
CO-5	Gain skills to create and update files in C.	K5

LIST OF EXERCISES:

1. Convert temperature from Centigrade to Fahrenheit.
2. Swap the values of two variables without using third variable.
3. Find whether the given number is prime or not.
4. Display Monday to Sunday using switch statement.
5. Find the largest element in an array.
6. Display first Ten Natural Numbers and their sum.
7. Reverse a string and check for palindrome.
8. Find addition and subtraction of Two Matrices using functions.
9. Find factorial of a number using Recursion.
10. Write a program to add two numbers using pointer.
11. Create a file containing Student Details.
12. Update the details of student's information using various file modes.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	2	1	2	2	3	2	3	1	2	2.50
CO2	3	2	2	1	1	2	1	1	2	3	2.25
CO3	3	2	3	2	2	3	2	1	3	1	2.75
CO4	2	2	2	1	3	1	2	3	2	2	2.50
CO5	1	2	3	2	3	3	1	1	3	1	2.50
Mean Overall Score (High Level Relationship between COs and POs)											2.50

Semester Question paper Pattern: Maximum Marks: 60

Exam Duration: Three Hours

One question from the list of exercises.

25

Another question not in the list but relevant to the list of exercises.

35

For correct Program: 60% Typing the program: 20% Execution 20%

Signature of the HOD

துயற்றலைவர்,
கணினி அறிவியல் துறை
மாண்புமரபாளி அரசுக் கல்லூ
(தங்களாட்சி)
தஞ்சாவூர் - 613 005.

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

Credits : 4

Code: A2CS2

Hours/Week : 6

Medium of instruction: English

B.Sc(Computer Science) - Semester: 2
 (For students admitted from 2022-2023 onwards)

DATA STRUCTURES AND ALGORITHMS

COURSE OBJECTIVES:

- To introduce the various data structures and their implementations
- To evaluate algorithms and data structures in terms of time and memory complexity of basic operations.
- To understand the memory representation in linked list.
- To know important graph algorithms and their data structures.
- To know the basic algorithms and data structures for searching and sorting.

COURSE OUTCOMES:

CO's	CO–Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO–1	Learn about elementary data organization, mathematical notations and about arrays.	K1
CO–2	Know the concepts of stacks and queues.	K2
CO–3	Understand about the linked list representation and its operations.	K3
CO–4	Recognize the tree structures, binary tree traversal, and also graph theory.	K4
CO–5	Gain the knowledge in searching and sorting techniques	K5

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.

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THANJAVUR -613005

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.

BOOK FOR STUDY:

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

BOOKS FOR REFERENCE:

Ashok N. Kamthane, *Introduction to Data Structures in C*, Pearson Edition, 2007.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	2	3	3	2	3	2	1	1	2	2.63
CO2	3	2	2	2	1	2	3	1	2	3	2.63
CO3	3	2	2	2	2	1	2	2	3	3	2.75
CO4	2	2	2	2	3	1	2	3	2	2	2.63
CO5	1	2	1	2	3	2	2	1	3	2	2.38
Mean Overall Score (High Level Relationship between COs and POs)											2.60

Semester Question paper Pattern: Maximum Marks: 75 Exam 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
UG - 7 | Page
கணினி அறிவியல் துறை
மன்ற காபோசி அரசுக் கல்லூரி
(தங்னாட்சி)
தஞ்சாவூர் - 613 005.


COE
CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)

Credits : 4

Code: A2CSP2

Hours/Week : 3

Medium of instruction: English

B.Sc(Computer Science) - Semester: 2
 (For students admitted from 2022-2023 onwards)

PRACTICAL: DATA STRUCTURES USING C

COURSE OBJECTIVES:

- It aims to train the student to the basic concepts of the data structure using C-programming language
- To improve the logical thinking in C programming

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Write programs with basic mathematical notations	K1
CO-2	Improve the programming knowledge in searching techniques.	K2
CO-3	Increase the programming knowledge in sorting techniques.	K3
CO-4	Write the menu driven programs for stack and queue operations	K4
CO-5	Develop programs to perform the operations on singly linked list.	K5

LIST OF EXERCISES:

1. Merging two arrays into a single array.
2. To find the following in a matrix:
 - i. Row Sum
 - ii. Column Sum
 - iii. Trace Sum (Sum of Diagonal Elements)
 - iv. Sum of all the elements
3. Matrix addition and multiplication operations
4. Find an element using sequential search.
5. Find an element using binary search.
6. Perform sorting using bubble sort.
7. Perform sorting using insertion sort.

8. Perform sorting using selection sort.
9. Find the factorial of a number using recursion
10. PUSH and POP an element from STACK
11. Insert and delete an element from QUEUE.
12. Insert and delete a node in a linked list

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	2	3	2	2	3	2	3	1	2	2.75
CO2	3	2	2	1	2	2	1	1	2	2	2.25
CO3	3	2	3	2	2	3	2	1	3	1	2.75
CO4	2	2	2	1	3	1	2	3	2	2	2.50
CO5	1	2	2	2	3	3	1	1	2	1	2.25
Mean Overall Score (High Level Relationship between COs and POs)											2.50

Semester Question paper Pattern: Maximum Marks: 60

Exam Duration: Three Hours

One question from the list of exercises.

25

Another question not in the list but relevant to the list of exercises.

35

For correct Program: 60% Typing the program: 20% Execution 20%

[Signature]
Signature of the HOD
கல்லூரி அறிவியல் துறை
மன்றாங்கிபாரி அரசுக்கல்லூரி
(தாண்டி)
தஞ்சாவூர் - 613 005.

[Signature]
COE
CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR - 613 005.

Credits : 4

Code: A3CS3

Hours/Week : 6

Medium of instruction: English

B.Sc(Computer Science) - Semester: 3
(For students admitted from 2022-2023 onwards)

PROGRAMMING IN JAVA

COURSE OBJECTIVES:

- To understand the basic programming constructs of Java Language.
- To use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.

COURSE OUTCOMES:

CO's	CO–Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO–1	Use the syntax and semantics of java programming language and basic concepts of OOP.	K1
CO–2	Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages	K2
CO–3	Achieve Knowledge of multi-threading and to comprehend the event-handling techniques	K3
CO–4	Recognize about exceptions and input/output operations in files	K4
CO–5	Design simple GUI interfaces to interact with users, using Applets	K5

UNIT - I

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

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

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

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

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

BOOK FOR STUDY:

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

BOOKS FOR REFERENCE:

1. Herbert Schildt, *The Complete Reference Java*, Tata McGraw Hill, 4th Edition.
2. Sachin Malhotra & Saurabh Choudhary, “Programming in JAVA”, 2nd Ed, Oxford Press
3. Sagayaraj, Denis, Karthik and Gajalakshmi, “JAVA Programming for Core and Advanced Learners”, 2018

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	2	3	3	2	3	2	1	1	2	2.63
CO2	3	2	2	2	1	2	3	1	2	3	2.63
CO3	3	2	2	2	2	1	2	2	3	3	2.75
CO4	2	2	2	2	3	1	2	3	2	2	2.63
CO5	1	2	1	2	3	2	2	1	3	2	2.38
Mean Overall Score (High Level Relationship between COs and POs)											2.60

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Semester Question paper Pattern: Maximum Marks: 75 Exam 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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(தங்னாட்சி)
தஞ்சாவூர் - 613 005.

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

Credits : 4

Code: A3CSP3

Hours/Week : 3

Medium of instruction: English

B.Sc(Computer Science) - Semester: 3
 (For students admitted from 2022-2023 onwards)

PRACTICAL: JAVA PROGRAMMING

COURSE OBJECTIVES:

- To be knowledgeable enough about basic Java language syntax and semantics to be able to successfully read and write Java computer programs.
- To implement interfaces, inheritance, and polymorphism as programming techniques and apply exceptions handling.

COURSE OUTCOMES:

CO's	CO–Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Learn about how to create class and objects.	K1
CO-2	Achieve the Knowledge of developing simple java programs	K2
CO-3	Develop computer programs to solve real world problems	K3
CO-4	Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes	K4
CO-5	Design event driven GUI and web related applications which mimic the real word scenarios.	K5

LIST OF PROGRAMS:

1. Define a class called Student with the attributes name, reg_number and marks obtained in four subjects(m1,m2,m3,m4).Write a suitable constructor and methods to find the total mark obtained by the student and display the details of the student.
2. Write a Java program to find the area of a square, rectangle and triangle by
 - (i) Overloading Constructor
 - (ii) Overloading Method.
3. Write a java program to add two complex numbers. [Use passing object as argument and return object].
4. Define a class called Student_super with data members name, roll number and age. Write a suitable constructor and a method output () to display the details.

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5. Derive another class Student from Student_super with data members height and weight. Write a constructor and a method output () to display the details which overrides the super class method output(). [Apply method Overriding concept].
6. Write a java program to create an interface called Demo, which contains a double type constant, and a method called area () with one double type argument. Implement the interface to find the area of a circle.
7. Write a java program to create a thread using Thread class.
8. Demonstrate Java inheritance using extends keyword.
9. Create an applet with four Checkboxes with labels MARUTI-800, ZEN, ALTO and ESTEEM and a Text area object. The program must display the details of the car while clicking a particular Checkbox.
10. Write a Java program to throw the following exception,
 - 1) Negative Array Size
 - 2) Array Index out of Bounds
11. Write a java program to create a file menu with option New, Save and Close, Edit menu with option cut, copy, and paste.
12. Write a java programming to illustrate Mouse Event Handling

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	2	3	2	2	3	2	3	1	2	2.75
CO2	3	2	2	1	2	2	1	1	2	2	2.25
CO3	3	2	3	2	2	3	2	1	3	1	2.75
CO4	2	2	2	1	3	1	2	3	2	1	2.38
CO5	1	2	2	2	3	3	1	1	2	1	2.25
Mean Overall Score (High Level Relationship between COs and POs)											2.48

Semester Question paper Pattern: Maximum Marks: 60

Exam Duration: Three Hours

One question from the list of exercises.

25

Another question not in the list but relevant to the list of exercises.

35

For correct Program: 60% Typing the program: 20% Execution 20%

Signature of the HOD

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COE

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

Credits : 2

Code: A3SB1

Hours/Week : 2

Medium of instruction: English

B.Sc(Computer Science) - Semester: 5
(For students admitted from 2022 -2023 onwards)

OFFICE AUTOMATION TOOLS

COURSE OBJECTIVES:

- To understand the components of computers system
- To teach the usage of MS-Word
- To inculcate how to use the MS- Excel
- To teach the preparation of power point
- To know the various office appliances

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	<i>Explain the components of computers system</i>	K1
CO-2	<i>Prepare the document using MS-Word</i>	K2
CO-3	<i>Do calculations using MS- Excel</i>	K3
CO-4	<i>Give demonstration using power point</i>	K4
CO-5	<i>Understand the various office appliances</i>	K5

UNIT I

Computer Fundamentals: Computer and Operating system Fundamentals – Components of a computer system –Input and Output devices – Memory Handling –Storage Device s

UNIT II

MS -Word : Introduction to MS-Word and User Utilities – Exploring Template and Formation of Documents – Table handling –Mail Merge and Print Process

UNIT III

MS – Excel : Spreadsheet –workbook window –Formatting Cells / Worksheet – Working with Formula, Function and Charts – Filtering data and Printing a Presentation

UNIT IV

MS – Power Point : Introduction to MS –Power Point –Creating Templates – Font and color editing – Adding – Multimedia effects – Consolidating using MS-Power Point

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UNIT V

Officer Appliances : Accounting machine – Addressing machine – Envelope Sealing machine – Franking machine & other modern office gadgets

Text Books:

1. Dr.S.V.Srinivasa Vallabhan "Computer Application in Business" –, Sultan Chand and Sons, New Delhi
2. Alexis Leon – "MS-Office and Internet"
3. K.Mohan Kumar, Dr.S.Rajkumar "Computer Application in Business" –Vijay Nicole imprints Private Limited–Chennai
4. V.Rajaraman "Computer Basics" — PHI.
5. R.S.N.Pillai & Bagavathi – S.Chand "Office Management"

Relationship matrix for Course outcomes, Programme outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	2	3	2	2	3	2	3	3	2	3.00
CO2	2	2	2	1	2	2	1	2	2	2	2.25
CO3	3	2	3	3	2	3	2	1	3	3	3.13
CO4	2	2	2	1	3	3	2	3	2	2	2.75
CO5	3	2	2	2	3	3	1	2	3	3	3.00
Mean Overall Score (High Level Relationship between COs and POs)											2.83

Semester Question paper Pattern: Maximum Marks: 75 Exam 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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 RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
 THANJAVUR - 613 005

Credits : 4

Code: A4CS4

Hours/Week : 6

Medium of instruction: English

B.Sc(Computer Science) - Semester: 4
(For students admitted from 2022-2023 onwards)

PROGRAMMING IN PYTHON

COURSE OBJECTIVES:

- To gain knowledge on programming and problem solving using Python.
- To know how to work with lists, tuples and data dictionaries
- To acquire Object Oriented Skills in Python.

COURSE OUTCOMES:

CO's	CO–Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO–1	Learn basic algorithmic problem-solving techniques (decision structures, loops, functions).	K1
CO–2	Gain knowledge about functions (built-in, user-defined, recursion)	K2
CO–3	To know the concepts of files and exceptions.	K3
CO–4	Familiar with strings, lists and dictionaries.	K4
CO–5	Understand and use object-based software concepts	K5

UNIT - I

Introduction to Python: Introduction – Python Overview – Getting started with python – Comments – Python Identifiers – Reserved Keywords – Variables – Standard Data Types – Operators – Standard and Expressions – String Operations – Boolean Expressions – Control Statements – Iteration – Input from Keyboard.

UNIT - II

Functions: Introduction – Built-in Functions – Composition of Functions – User Defined Functions – Parameters and Arguments – Function Calls – The return statement – Python Recursive functions – The anonymous functions – Writing python scripts

UNIT - III

Strings and Lists: Strings – Compound Data type – len Function – String Slices – Strings are Immutable – String Traversal – Escape Characters – String Formatting Operator – String Formatting Functions - Lists – Values and accessing elements – Lists are Mutable – Traverse – Deleting elements from list – Built-in list operators – Built-in List methods - Tuples and Dictionaries: Tuples – Creating Tuples – Accessing values in Tuples – Basic Tuple Operations – Built-in Tuple Functions - Dictionaries.

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UNIT - IV

Files and Exceptions: Text Files – Opening a File – Closing a File – File Object Attributes – Reading from a file – Writing to a file – Renaming a file – Deleting a file – File related methods. - Directories – Exceptions – Built-in Exceptions – Handling Exceptions - Exception with arguments – User defined Exceptions

UNIT - V

Classes and Objects: Overview of OOP – Class Definition – Creating Objects – Objects as Arguments – Objects as Return values – Built-in class attributes – Inheritance – Method Overriding – Data Encapsulation – Data Hiding.

BOOK FOR STUDY:

1. Balagurusamy E, "Introduction to Computing and Problem Solving Using Python", 1st Edition, McGraw Hill Education(India) Private Limited, 2017.

BOOKS FOR REFERENCE:

1. Reema Thareja, "Python Programming using Problem Solving Approach", Oxford University Press, 2017.
2. Ashok NamdevKamthane and Amit Ashok Kamthane, "Programming and Problem Solving with Python", McGrawHill Education, November 2017.
3. Mark Lutz, "Learning Python", O'Reilly, Shroff Publishers &Dist

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of CO's
CO1	2	2	3	2	2	3	2	3	3	2	3.00
CO2	2	2	2	1	2	2	1	1	2	2	2.13
CO3	3	2	3	3	2	3	2	1	3	3	3.13
CO4	2	2	2	1	3	1	2	3	2	2	2.50
CO5	1	2	2	2	1	3	1	2	2	3	2.38
Mean Overall Score (High Level Relationship between COs and POs)											2.63

Semester Question paper Pattern: Maximum Marks: 75 Exam 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
துறைத்தலைவர்
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மன்ற சபோசி அரசுக் கல்லூரி
(தங்னாட்டி)
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CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
THANJAVUR - 613 005.

COE

Credits : 4

Code: A4CSP4

Hours/Week : 3

Medium of instruction: English

B.Sc(Computer Science) - Semester: 4
 (For students admitted from 2022-2023 onwards)

PRACTICAL: PYTHON PROGRAMMING

COURSE OBJECTIVE:

- To enrich programming and problem-solving skills with python programming.
- To understand the efficacy of python program with functions, recursion, list and dictionaries
- To understand the objective programming concepts of python

COURSE OUTCOMES:

CO's	CO–Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO–1	Acquire basic algorithmic problem-solving programs.	K1
CO–2	Gain knowledge about functions and recursion	K2
CO–3	Know how to work with lists and dictionaries.	K3
CO–4	Identify and repair coding errors in a program.	K4
CO–5	Develop the object-oriented programs.	K5

LIST OF PROGRAMS:

1. Write a program to reverse a four digit number.
2. Write a program to calculate the area of different shapes (Triangle, Rectangle, circle and sphere).
3. Write a Program to find maximum of a list of numbers
4. Write a program to find the factorial of a number using recursion
5. Write a program to find the Fibonacci series using recursion
6. Write a program to return prime numbers from a list.
7. Write a program to remove the vowels in a string.
8. Write a program to check common letters in two input strings.
9. Write a program to search an element in a list.

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10. Write a program to implement sort the elements in a list.
11. Write a program to map two lists into dictionary
12. Write a program to copy the contents of one file into another
13. Write a program to create a class which performs basic calculator operations.
14. Write a program to override display() method in Multiple Inheritance.

Relationship matrix for Course outcomes, Programme outcomes / Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	2	3	2	2	3	2	3	3	2	3.00
CO2	2	2	2	1	2	2	1	2	2	2	2.25
CO3	3	2	3	3	2	3	2	1	3	3	3.13
CO4	2	2	2	1	3	3	2	3	2	2	2.75
CO5	3	2	2	2	3	3	1	2	3	3	3.00
Mean Overall Score (High Level Relationship between COs and POs)											2.83

Semester Question paper Pattern: Maximum Marks: 60

Exam Duration: Three Hours

One question from the list of exercises.

25

Another question not in the list but relevant to the list of exercises.

35

For correct Program: 60% Typing the program: 20% Execution 20%

Signature of the HOD

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

Credits : 2

Code: A4SB2

Hours/Week : 2

Medium of instruction: English

B.Sc(Computer Science) - Semester: 4
(For students admitted from 2022-2023 onwards)

SYSTEM ADMINISTRATION AND MAINTENANCE

COURSE OBJECTIVES

- To study the basic concepts of computer system and operating system
- To configure the system installation, maintenance and trouble shooting
- To understand the basic concepts laptop, portable device and preventive maintenance techniques

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Understand the functional parts of general-purpose computer.	K1
CO-2	Perform configuration, management, and troubleshooting of folders, files, and printing resources.	K2
CO-3	Perform user accounts management and implement security groups.	K3
CO-4	Describe the elements of an effective troubleshooting methodology and use a variety of software and hardware tools to diagnose problems.	K4
CO-5	Demonstrate an understanding of the major approaches to computer management in the network environment.	K5

UNIT – I

Introduction to Personal Computer: Computer System – Purposes & Characteristics of Cases - Power Supplies - Internal Components - Ports - Cables - Input devices - Output devices. Safe Lab Procedures and Tool Use: Safe Working Conditions and Procedures - Tools and Software used with PC components.

UNIT - II

Computer Assembly: Open Case - Install Power Supply - Attach Components to Motherboard - Installation: Motherboard - Internal Drives - Drives in External Bayes -Adapter Cards. Internal cables connections -Reattach side panels - Connection of external cables - Boot the Computer. Preventive Maintenance and Troubleshooting: Purpose of Preventing Maintenance - Steps of Troubleshooting Process.

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UNIT - III

Fundamental Operating System: Purposes - Characteristics of Modern Operating Systems – Concepts Comparisons, Limitations, and Compatibilities - Determination of Operating System based on Customer Needs - Installation of Operating System -Navigate a GUI (Windows) - Common Preventive Maintenance Techniques- Troubleshoot.

UNIT - IV

Fundamental Laptops and Portable Devices: Common Uses - Components of Laptop - Comparison of the components of Desktop and Laptops - Configure Laptops - Mobile Phone Standards - Preventive Maintenance Techniques - Troubleshoot Laptop and Portable Devices. Fundamental Printers and Scanners: Types of Printers and Scanners - Installation and Configuration Process of Printers and Scanners - Preventive Maintenance Techniques- Troubleshoot.

UNIT - V

Fundamental Networks: Principles - Types - Concepts and Technologies - Physical Components - LAN Topologies and Architectures- Standard Organizations - Ethernet Standards - OSI and TCP/IP Models - Configuration of NIC and Modem - Establishing Connectivity - Preventive Maintenance Techniques - Troubleshoot. Fundamental Security: Security Threats - Security Procedures - Preventive Maintenance Techniques - Troubleshoot Security.

BOOK FOR STUDY:

David Anfinson& Ken Quamme, "IT Essentials: PC Hardware and Software Companion Guide", 3rd Edition, Pearson Publications, 2008.

BOOK FOR REFERENCE:

Quentin Docter, Emmett Dulaneyand Toby Skandier, "CompTIA A+ Complete Review Guide: Exam 220-901, Exam 220 - 902", 3rd Edition, Wiley Publications, 2015.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	3	3	2	2	3	2	3	3	2	3.13
CO2	2	2	2	1	2	2	1	2	2	1	2.13
CO3	3	2	3	3	2	3	3	1	3	3	3.25
CO4	2	2	2	1	3	3	2	3	3	1	2.75
CO5	3	2	2	2	3	3	1	2	3	3	3.00
Mean Overall Score (High Level Relationship between COs and POs)											2.85

RAJAHSERFOJIGOVT.COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Semester Question paper Pattern: Maximum Marks: 75 Exam Duration: Three Hours

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

Signature of the HOD

துறைத்தலைவர்,
“வளினி அறிவியல் துறை,
மண்ணர் சபோரி அரசுக் கல்லூரி...
(தன்னாட்சி)
தஞ்சாவூர் - 613 005.

COE

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

Credits : 5

Code: A5CS5

Hours/Week : 6

Medium of instruction: English

B.Sc(Computer Science) - Semester: 5
(For students admitted from 2022-2023 onwards)

RELATIONAL DATABASE MANAGEMENT SYSTEMS

COURSE OBJECTIVES:

- To discuss and realize the importance of Database Architecture Design notations, ER Modeling, Mapping and Schema design.
- To understand and use data manipulation language to query, update, and manage a database.
- To gain the knowledge Relational algebra and learn the use of SQL and PL/SQL.
- To describe a sound introduction to the discipline of database management systems.
- To give a good formal foundation on the relational model of data and study the SQL in detail.

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Learn about the use RDBMS compare with file system, structure of relational database and operations in relational algebra.	K1
CO-2	Know the basic structure of SQL commands, views, embedded and dynamic SQL.	K2
CO-3	Understand about security and integrity constraints, encryption and authentication in databases.	K3
CO-4	Emphasize the importance of normalization in databases.	K4
CO-5	Familiarize the issues of transaction like concurrency control, recovery and security.	K5

UNIT I

Introduction: Definition for Database and Database system - Database system Applications- Purpose of Database Systems - View of Data - Database Languages - Database Users and Administrators - History of Database Systems.

Relational databases: Structure of Relational Databases -Database Schema - Keys – Schema Diagrams - Relational Query Languages- Relational Algebra

UNIT II

Introduction to 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 Sub queries - Modification of the Database

Intermediate SQL: Join Expressions - Views - Transactions - Integrity Constraints - SQL Data Types and Schemas – Authorization

UNIT III

Database Design: Overview of the Design Process - The Entity- Relationship Model - Constraints - Removing redundant attributes in entity sets-Entity Relationship diagrams- Reduction to Relational Schemas - Entity-Relationship Design Issues - Extended E-R Features - Alternative Notations for Modeling Data - Other Aspects of Database Design

UNIT IV

Normalization: Definition - Purpose of normalization - 1NF,2NF, 3NF and BCNF with examples

Data storage: Overview of physical storage media-Magnetic disk and flash storage -File organization -Organization of records and files-data dictionary storage

Query processing: Overview-Selection operation-Sorting-Join operation-Other operations

UNIT V

Transaction Management: Transaction concept-A Simple Transaction model-Concurrency control: Definition- Deadlock- **Recovery system:** Failure classification-Recovery algorithms

Database system Architecture: Centralized and client server architecture-Server system architecture- Parallel system-Distributed systems

BOOK FOR STUDY:

A Silberschatz, H Korth, S Sudarshan, "Database System and Concepts", 5th Edition McGraw-Hill, 2005.

BOOKS FOR REFERENCE:

1. Alexix Leon & Mathews Leon, "Essential of DBMS", 2nd reprint, Vijay Nicole Publications, 2009.
2. Alexix Leon & Mathews Leon, "Fundamentals of DBMS", 2nd Edition, Vijay Nicole Publications, 2014.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	3	2	2	2	1	2	3	3	2	2.75
CO2	2	2	1	1	2	2	1	2	2	3	2.25
CO3	3	2	3	3	2	1	3	1	3	3	3.00
CO4	2	2	2	1	3	2	2	3	3	2	2.75
CO5	3	2	1	1	3	3	1	2	3	3	2.75
Mean Overall Score (High Level Relationship between COs and POs)											2.70

Semester Question paper Pattern: Maximum Marks: 75 Exam 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 Head of the Department
கணினி அறிவியல் துறை
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Semester Question paper Pattern: Maximum Marks: 60	Exam Duration: Three Hours
One question from the list of exercises.	25
Another question not in the list but relevant to the list of exercises.	35

For correct Program: 60% Typing the program: 20% Execution 20%

Signature of the HOD

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THANJAVUR - 613 005.

RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Credits : 5

Hours/Week : 6

Medium of instruction: English

Code: A5CSEL1A

B.Sc(Computer Science) - Semester: 5
(For students admitted from 2022-2023 onwards)

DIGITAL COMPUTER FUNDAMENTALS & ARCHITECTURE

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Understand the fundamentals of various number systems, complements, codes and perform conversions.	K1
CO-2	Understand the logic gates and the laws of Boolean algebra, remember and solve K-maps	K2
CO-3	Understand basics of arithmetic and sequential circuits, apply the logics for designing circuit diagrams.	K3
CO-4	Know and realize the important of central processing unit, instruction formats and various instructions.	K4
CO-5	Understand the usage of I/O, data-transfer, I/O processor and analyze various strategies of interrupts	K5

UNIT - I

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

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UNIT -II

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

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 – Decoder– Encoder. (Self-Study:Half Subtractor,D and T (Flip-flop)

UNIT -IV

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

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 DMAController, DMA Transfer. Input-Output Processor: IOP Communication. (Self-Study: Handshaking)

BOOK FOR STUDY:

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

BOOKS FOR REFERENCE:

- V.Vijayendran, "Digital Fundamentals", S. Viswanathan Publishers Pvt Ltd, 2009.
- Donald P Leach, Albert Paul Malvino, Goutam Saha, "Digital Principles and Applications", 7th Edition, McGraw Hill, 2011.
- David A.Patterson, John L. Hennessy, "Computer Organization and Design", Fourth Edition, Morgan Kauffmann Publishers, 2011.
- William Stallings, "Computer Organization and Architecture", Tenth Edition, Pearson Education, 2015.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	3	3	2	2	2	1	2	3	3	3	3.00
CO2	2	2	1	3	2	2	1	2	2	3	2.50
CO3	3	3	2	2	2	1	3	1	2	2	2.63
CO4	2	2	2	3	2	2	2	3	1	2	2.63
CO5	3	2	1	3	3	3	1	2	3	1	2.75
Mean Overall Score (High Level Relationship between COs and POs)											2.70

Semester Question paper Pattern: Maximum Marks: 75 Exam 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.

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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: A5CSEL1B

B.Sc(Computer Science) - Semester: 5
(For students admitted from 2022-2023 onwards)

SYSTEM SOFTWARE

COURSE OBJECTIVES:

- To view and understand the major tasks of the system software of a computer system
- To focus on internal working of the hardware
- To know about loader, macro processor and editing process

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.	K1
CO-2	Describe the various concepts of assemblers and macroprocessors.	K2
CO-3	Understand the various phases of compiler and compare its working with assembler.	K3
CO-4	Understand how linker and loader create an executable program from an object module created by assembler and compiler.	K4
CO-5	To know various editors and debugging techniques.	K5

UNIT - I

The Simplified Instructional Computer (SIC) - Machine architecture - Data and instruction formats - addressing modes - instruction sets - I/O and programming.

UNIT - II

A simple SIC assembler – Assembler algorithm and data structures - Machine dependent assembler features - Instruction formats and addressing modes – Program relocation - Machine independent assembler features - Literals – Symbol-defining statements – Expressions - One pass assemblers and Multi pass assemblers - Implementation example - MASM assembler.

UNIT - III

Design of an Absolute Loader – A Simple Bootstrap Loader - Machine dependent loader features - Relocation – Program Linking – Algorithm and Data Structures for Linking Loader -

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Machine-independent loader features - Automatic Library Search – Loader Options - Loader design options - Linkage Editors – Dynamic Linking – Bootstrap Loaders - Implementation example - MSDOS linker

UNIT - IV

Macro Definition and Expansion – Macro Processor Algorithm and data structures - Machine-independent macro processor features - Concatenation of Macro Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters-Macro within Macro-Implementation example - MASM Macro Processor – ANSI C Macro language.

UNIT - V

Overview of the Editing Process - User Interface – Editor Structure - Interactive debugging systems - Debugging functions and capabilities – Relationship with other parts of the system – User-Interface Criteria.

BOOK FOR STUDY:

- Leland L. Beck, “System Software – An Introduction to Systems Programming”, 4 th Edition, Pearson Education Asia, 2010.

BOOKS FOR REFERENCE:

- D. M. Dhamdhere, “Systems Programming and Operating Systems”, Second Revised Edition, Tata McGraw-Hill, 2009.
- John J. Donovan, “Systems Programming”, Tata McGraw-Hill Edition, 2009.
- John R. Levine, Linkers & Loaders – Harcourt India Pvt. Ltd., Morgan Kaufmann Publishers, 2009.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	3	2	2	2	3	2	1	2	3	2.75
CO2	2	2	3	3	2	2	1	2	3	3	2.88
CO3	3	3	2	3	2	1	3	2	1	1	2.63
CO4	2	2	3	3	2	1	2	3	2	2	2.75
CO5	3	2	1	3	3	3	1	2	3	2	2.88
Mean Overall Score (High Level Relationship between COs and POs)											2.78

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Semester Question paper Pattern:Maximum Marks: 75 Exam Duration: Three Hours

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

Signature of the HOD

துறைத்தலைவா
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மன்னர் சபோசி அரசுக் கல்லூரி
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THANJAVUR - 613 005.

RAJAHSERFOJIGOVT.COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Credits : 5

Code: A5CSEL1C

Hours/Week : 6

Medium of instruction: English

B.Sc(Computer Science) - Semester: 5
(For students admitted from 2022-2023 onwards)

COMPUTER GRAPHICS

COURSE OBJECTIVES:

- To understand the basic concepts of Computer Graphics
- To know two-dimensional system, mapping, and drawing algorithm
- To apply geometric transformations, viewing and clipping on graphical objects
- To understand visible surface detection techniques and illumination models
- To learn the swags of 3-D graphics.

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
<i>On successful completion of this course, students will be able to</i>		
CO-1	Understand the basics of computer graphics, different graphics systems and applications of computer graphics.	K1
CO-2	Discuss various algorithms for scan conversion and filling of basic objects	K2
CO-3	Extract scene with different clipping methods and its transformation	K3
CO-4	Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.	K4
CO-5	Render projected objects to naturalize the scene in 2D view and use of illumination models for this.	K5

UNIT - I

Overview of graphics Systems: Video Display Device - Refresh Cathode-Ray tubes Raster - Scan Displays Random - Scan Displays - Color CRT Monitors - Direct view Storage tubes Flat - Panel Displays Three - Dimensional Viewing Devices, Stereoscopic and Virtual - Reality Systems.

UNIT - II

Raster - Scan Systems Video Controller - Random - Scan Systems Video Controller - Random-Scan Systems - Input device – Keyboard- Mouse - Trackball - Space ball and Joysticks - Data Glove – Digitizers Image Scanners - Touch Panels - Light pens. Voice Systems - Hard-Copy Devices - Line Drawing Algorithms-DDA Algorithms - Circle generating Algorithm Properties of Ellipses.

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UNIT - III

Two Dimensional Geometric Transformation: Basic Transformations - Translation - Rotation - Scaling - Matrix Representations and Homogeneous Coordinates - Other Transformations
Reflections Two Dimensional Viewing : Windows to view point coordinate Transformations - Clipping Operations - Point Clipping - Line Clipping - Curve Clipping - Text Clipping - Exterior Clipping.

UNIT - IV

Three Dimensional Concepts: Three Dimensional Display method - Parallel projection - Depth cueing visible line and surface - Three Dimensional Geometric and modelling Transformations: Translation - Rotation - Scaling - Composite Transformations. Three Dimensional Viewing: Viewing pipeline - Viewing Coordinates - Projections - Parallel Projections - Perspective Projections.

UNIT - V

Visible Surface Detection Methods : Classification Visible Surface Detection Algorithms - Back Face Detection - Depth - Buffer Method - A-Buffer Method - Scan line method - Depth sorting method - BSP tree method - Area Subdivision Method.

BOOK FOR STUDY:

Donald Hearn and M. Pauline Baker , "Computer Graphics", 2nd Edition, 1996

BOOK FOR REFERENCE:

John f. Hughes, Andries Van Dam, Morgan McGuire, David F. Sklar, James D. Foley, Steven K. Feiner, Kurt Akeley, "Computer Graphics Principles and Practice" 3rd Edition, Pearson Education, 2014.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	3	1	3	3	3	2	1	2	3	2.88
CO2	2	2	3	3	2	2	3	2	3	3	3.13
CO3	3	3	2	1	2	1	3	2	3	2	2.75
CO4	2	2	3	3	1	1	2	1	2	3	2.50
CO5	3	2	1	3	3	2	1	2	3	3	2.88
Mean Overall Score (High Level Relationship between COs and POs)											2.83

RAJAH SERFOJI GOVT.COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Semester Question paper Pattern: Maximum Marks: 75 Exam Duration: Three Hours

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

Signature of the HOD

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தஞ்சாவூர் - 613 005.

பாக்டி -
COE

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

Credits : 5

Code: A5CSEL2A

Hours/Week : 6

Medium of instruction: English

B.Sc(Computer Science) - Semester: 5

(For students admitted from 2022-2023 onwards)

OPERATING SYSTEM

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

CO's	CO–Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Grasping the basic concepts of operating systems together with the modules needed to manage the different computer resources.	K1
CO-2	Use system calls for managing processes, memory and the file system.	K2
CO-3	Know about the different approaches to memory management.	K3
CO-4	Understand what a process is and how processes are synchronized and scheduled.	K4
CO-5	Understand the structure and organization of the file system.	K5

UNIT -I

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

UNIT - II

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

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

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UNIT - IV

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

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

BOOK FOR STUDY:

- Stuart .E. Madnick and John J. Donavan “*OperatingSystem*”, Tata McGraw Hill book company limited.

Unit I; Chapter 1.1, 1.2, 1.3, 1.4, 2.3

Unit II: Chapter 3.1, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8

Unit III: Chapter 4.1, 4.2, 4.3, 4.5

Unit IV: Chapter 5.1, 5.2, 5.5, 5.6

Unit V : Chapter 6.1, 6.2, 6.3, 6.7, 6.8

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	3	1	3	2	1	2	1	2	3	2.50
CO2	2	2	3	2	2	2	3	2	3	1	2.75
CO3	2	1	2	1	2	1	3	2	3	2	2.38
CO4	2	3	3	3	1	1	2	2	2	3	2.75
CO5	3	2	1	3	2	2	1	2	3	2	2.63
Mean Overall Score (High Level Relationship between COs and POs)											2.60

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THANJAVUR -613005

Semester Question paper Pattern:Maximum Marks: 75 Exam 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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THANJAVUR -613005

Credits : 5

Hours/Week : 6

Medium of instruction: English

Code: A5CSEL2B

B.Sc(Computer Science) - Semester: 5

(For students admitted from 2022-2023 onwards)

OPEN SOURCE TECHNOLOGY

COURSE OBJECTIVES:

- To study common open source software licenses, open source project structure.
- To understand the role and future of open source software in the industry.
- To understand the economic and technical background of the Free / Open Source Software movement (FOSS)
- To gain experience using open source tools, languages and frameworks to prepare for careers in software development.
- To work on an open source project and will be expected to make a significant contribution.

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Gain knowledge about common open source licenses and the impact of choosing a license	K1
CO-2	Know open source project structure and how to successfully setup a project	K2
CO-3	Understand concepts, and methodologies related to open source software development.	K3
CO-4	Familiar with open source software products and development tools currently available on the market.	K4
CO-5	Utilize open source software for developing a variety of software applications, particularly web applications.	K5

UNIT - I

Introduction: Open Source, Free Software, Free Software vs. Open Source software, Public Domain Software, FOSS does not mean no cost. History: BSD, The Free Software Foundation and the GNU Project.

UNIT - II

Open Source History, Initiatives, Principle and methodologies. Philosophy: Software Freedom, Open Source Development Model Licences and Patents: What Is A License, Important

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FOSS Licenses (Apache,BSD/GPL, LGPL), copyrights and copyleft, Patents Economics of FOSS : Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization

UNIT - III

Community Building: Importance of Communities in Open Source Movement-JBoss Community- Starting and Maintaining an Open Source Project - Open Source Hardware

UNIT - IV

Apache HTTP Server and its flavors- WAMP server (Windows, Apache, MySQL, PHP)- Apache, MySQL, PHP, JAVA as development platform.

UNIT - V

Open source vs. closed source Open source government, Open source ethics. Social and Financial impacts of open source technology, Shared software, Shared source.

BOOKS FOR STUDY:

- Sumitabha Das “Unix Concepts and Applications, Tata McGraw Hill Education 006
- The Official Ubuntu Book, 8th Edition
- Kailash Vedera, Bhavyesh Gandhi, “Open Source Technology”, University Science press, ker

BOOKS FOR REFERENCE:

- Paul Kavanagh, “Open Source Software: Implementation and Management”, Elsevier Digital Press
- The Linux Documentation Project : <http://www.tldp.org>
- Docker Project Home : <http://www.docker.com>

Relationship matrix for Course outcomes, Programme outcomes /Programme

Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	3	1	3	2	1	3	1	2	3	2.63
CO2	2	2	3	2	2	2	2	2	3	1	2.63
CO3	2	1	2	1	2	1	3	2	1	2	2.13
CO4	2	3	3	3	1	3	2	2	2	3	3.00
CO5	3	2	1	3	2	2	1	1	3	2	2.50
Mean Overall Score (High Level Relationship between COs and POs)											2.58

RAJAH SERFOJI GOVT.COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Semester Question paper Pattern:Maximum Marks: 75 Exam Duration: Three Hours

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

Signature of the HOD

துயர்தத்தலைவா
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(தங்களாட்சி)
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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: A5CSEL2C

B.Sc(Computer Science) - Semester: 5
(For students admitted from 2022-2023 onwards)

DATA MINING AND WAREHOUSING

COURSE OBJECTIVES:

- Be familiar with mathematical foundations of data mining tools.
- To understand and implement classical models and algorithms in data warehouses and data mining
- To characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.
- To acquire data mining techniques in various applications like social, scientific and environmental context.
- To develop skill in selecting the appropriate data mining algorithm for solving practical problems.

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Enlist functionalities of data mining and data preprocessing Techniques.	K1
CO-2	Understand data mining system architecture and generalization of data.	K2
CO-3	Demonstrate the knowledge single, multilevel association rules for data warehousing.	K3
CO-4	Describe the underlying concepts of data mining algorithms	K4
CO-5	Find the effectiveness of clustering methods used for datamining.	K5

UNIT -I

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

UNIT -II

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

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UNIT -III

Mining Association Rules: Basic Concepts – Single Dimensional Boolean Association Rules From Transaction Databases, Multilevel Association Rules from transaction databases – Multi dimension Association Rules from Relational Database and Data Warehouses.

UNIT - IV

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

UNIT - V

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

BOOK FOR STUDY:

- J.Han and M. Kamber, “Data Mining Concepts and Techniques”, 2001, Harcourt India Pvt. Ltd, New Delhi.

BOOKS FOR REFERENCE:

- K.P. Soman ,Shyam Diwakar, V.Ajay “Insight into Data Mining Theory and Practice “, Prentice Hall of India Pvt. Ltd, New Delhi\

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	3	1	3	2	3	3	1	2	3	2.88
CO2	2	2	3	2	1	2	3	2	3	1	2.63
CO3	2	1	2	1	2	2	3	2	2	2	2.38
CO4	2	3	3	3	1	3	2	1	1	3	2.75
CO5	3	2	1	3	2	2	2	1	2	2	2.50
Mean Overall Score (High Level Relationship between COs and POs)											2.63

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Semester Question paper Pattern:Maximum Marks: 75 Exam 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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சென்றீர் -

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RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS),
THANJAVUR - 613 005.

Credits : 2

Code: A5SB3

Hours/Week : 1

Medium of instruction: English

B.Sc(Computer Science) - Semester: 5
(For students admitted from 2022-2023 onwards)

ANDROID PROGRAMMING

COURSE OBJECTIVES:

- To covers the fundamentals of Android programming
- To create robust mobile applications and learn how to integrate them with other services
- To develop intuitive, reliable mobile apps using the android services and components
- To create a seamless user interface that works with different mobile screens
- To learn by building sophisticated and meaningful mobile applications for Android

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Understand the fundamentals of Android operating systems	K1
CO-2	Gain their skills of using Android software development tools.	K2
CO-3	Develop software with reasonable complexity on mobile platform.	K3
CO-4	Deploy software for mobile devices using SQLite database	K4
CO-5	Debug programs running on mobile devices through testing activities	K5

UNIT - I

Introduction - History about Android operating system - Android program structure - User interface - Building blocks of User interface - Android Layout types - Layout attributes - Toasts - Activity.

UNIT - II

Dialogs - Intent - types of intent - Explicit and Implicit intent - Intent data transfer from one activity to another - Android switch button.

UNIT - III

Android life cycle: Android Activity life cycle - menus - menu Activity - Synchronous Task - Recycler view - Broadcast receiver and Notification.

UNIT - IV

Shared preferences - SQLite Database - Alarm manager - alarm Types - Android services.

UNIT - V

Testing Activity - Publishing App - steps of Publishing App.

BOOK FOR STUDY:

- "Android For Beginners" Pratiyash Guleria, BPB publications.

BOOKS FOR REFERENCE:

- "Android programming for Beginners" - By John Horton, Packt
- "Android system programming" By Roger Ye, Packt

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	2	1	3	2	3	3	3	2	3	3.00
CO2	2	2	3	2	1	2	3	2	3	2	2.75
CO3	2	1	2	1	2	3	3	2	2	2	2.50
CO4	2	3	3	3	2	3	2	1	1	3	2.88
CO5	3	2	1	3	2	2	2	1	2	3	2.63
Mean Overall Score (High Level Relationship between COs and POs)											2.75

Semester Question paper Pattern: Maximum Marks: 75 Exam 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
 துவக்குமியலாவா
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 தஞ்சாவூர் - 613 005.
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 THANJAVUR - 613 005.

RAJAH SERFOJI GOVT.COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Credits : 4

Code: A5CSEC1

Hours/Week :

Medium of instruction: English

B.Sc(Computer Science) - Semester: 5
(For students admitted from 2022-2023 onwards)

INTERNET PROGRAMMING

COURSE OBJECTIVES:

- To know the client-server model of Internet programming works.
- To learn java-specific web services architecture
- To gain knowledge to develop a dynamic webpage by the use of java script and DHTML.
- To make to write a well formed / valid XML document.
- Be familiar with client server architecture and able to develop a web application using java technologies.

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Analyze a web page and identify its elements and attributes.	K1
CO-2	Create web pages using XHTML and Cascading Style Sheets.	K2
CO-3	Build dynamic web pages using JavaScript (Client side programming).	K3
CO-4	Create XML documents and Schemas.	K4
CO-5	Build interactive web applications using AJAX.	K5

UNIT - I

Web Essentials: Clients, Servers and Communication – The Internet – Basic Internet protocols – World wide web – HTTP Request Message – HTTP Response Message – Web Clients – Web Servers – HTML5 – Tables – Lists – Image – HTML5 control elements – Semantic elements – Drag and Drop – Audio – Video controls – CSS3 – Inline, embedded and external style sheets – Rule cascading – Inheritance – Backgrounds – Border Images – Colors – Shadows – Text – Transformations – Transitions – Animations.

UNIT - II

Java Script: An introduction to JavaScript–JavaScript DOM Model–Date and Objects,- Regular Expressions- Exception Handling–Validation–Built-in objects–Event Handling- DHTML with JavaScript- JSON introduction – Syntax – Function Files – Http Request – SQL.

UNIT - III

Servlets: Java Servlet Architecture- Servlet Life Cycle- Form GET and POST actions- Session Handling- Understanding Cookies- Installing and Configuring Apache Tomcat Web Server-

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DATABASE CONNECTIVITY: JDBC perspectives, JDBC program example – JSP: Understanding Java Server Pages-JSP Standard Tag Library (JSTL)-Creating HTML forms by embedding JSP code.

UNIT - IV

An introduction to PHP: PHP- Using PHP- Variables- Program control- Built-in functions- Form Validation- Regular Expressions – File handling – Cookies – Connecting to Database. XML: Basic XML- Document Type Definition- XML Schema DOM and Presenting XML, XML Parsers and Validation, XSL and XSLT Transformation, News Feed (RSS and ATOM).

UNIT - V

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods; Web Services: Introduction- Java web services Basics – Creating, Publishing, Testing and Describing a Web services (WSDL)-Consuming a web service, Database Driven web service from an application –SOAP.

BOOK FOR STUDY:

- Deitel and Deitel and Nieto, Internet and World Wide Web – How to Program, Prentice Hall, 5th Edition, 2011.

BOOKS FOR REFERENCE:

- Stephen Wynkoop and John Burke —Running a Perfect Website, QUE, 2nd Edition, 1999.
- Chris Bates, Web Programming – Building Intranet Applications, 3rd Edition, Wiley Publications, 2009.
- Jeffrey C and Jackson, —Web Technologies A Computer Science Perspective, Pearson Education, 2011.
- Gopalan N.P. and Akilandeswari J., —Web Technology, Prentice Hall of India, 2011.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	2	1	3	2	1	2	3	2	3	2.63
CO2	2	2	3	2	1	2	1	2	3	2	2.50
CO3	2	1	2	1	2	3	3	2	2	3	2.63
CO4	2	3	2	2	2	3	2	1	1	3	2.63
CO5	3	2	1	3	1	2	2	1	2	2	2.38
Mean Overall Score (High Level Relationship between COs and POs)											2.55

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THANJAVUR -613005

Semester Question paper Pattern:Maximum Marks: 75 Exam Duration: Three Hours

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

Signature of the HOD

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(தங்களாட்சி)
தஞ்சாவூர் - 613 005.

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THANJAVUR - 613 005,

RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Credits : 5

Code: A6CS6

Hours/Week : 6

Medium of instruction: English

B.Sc(Computer Science) - Semester: 6
(For students admitted from 2022-2023 onwards)

COMPUTER NETWORKS

COURSE OBJECTIVES:

- To identify the key issues for the realization of the LAN/WAN/MAN network architectures
- To learn the 7-layer OSI network model and understand the TCP/IP suite of protocols.
- To acquire the knowledge of the basic protocols involved in wired/wireless communication process.
- To recognize the data link design issues and various data link protocols used for data transmission.
- Understand different routing algorithms used for data transmission.

COURSE OUTCOMES:

CO's	CO–Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO–1	Suggest appropriate network model for data communication.	K1
CO–2	Know how reliable data communication is achieved through data link layer.	K2
CO–3	Propose appropriate routing algorithm for data routing.	K3
CO–4	Connect internet to the system and knowledge of trouble shooting	K4
CO–5	Know how internet address are installed and how internet protocols are used in connecting internet.	K5

UNIT -I

Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP Models – Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer – Theoretical Basis for Data Communication - Guided Transmission Media

UNIT -II

Wireless Transmission - Communication Satellites – Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues – Error Detection and Correction.

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UNIT - III

Elementary Data Link Protocols - Sliding Window Protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols – Bluetooth.

UNIT - IV

Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms – IP Protocol – IP Addresses – Internet Control Protocols.

UNIT - V

Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection – Simple Transport Protocol – Internet Transport Protocols (ITP) - Network Security: Cryptography.

BOOK FOR STUDY:

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

BOOKS FOR REFERENCE:

- B. A. Forouzan, “Data Communications and Networking”, Tata McGraw Hill, 4th Edition, 2007.
- F. Halsall, “Data Communications, Computer Networks and Open Systems”, Pearson Education, 2008.
- D. Bertsekas and R. Gallagher, “Data Networks”, 2nd Edition, PHI, 2008.
- Lamarca, “Communication Networks”, Tata McGraw- Hill, 2002

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	3	2	1	3	2	1	2	3	2	3	2.75
CO2	2	3	3	2	1	2	1	2	3	2	2.63
CO3	2	1	2	1	2	3	3	2	2	3	2.63
CO4	2	2	2	2	2	3	2	1	3	3	2.75
CO5	3	2	1	3	1	2	3	1	2	3	2.63
Mean Overall Score (High Level Relationship between COs and POs)											2.68

RAJAH SERFOJI GOVT.COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Semester Question paper Pattern: Maximum Marks: 75 Exam 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.

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

Credits : 5

Code: A6CS7

Hours/Week : 6

Medium of instruction: English

B.Sc(Computer Science) - Semester: 6
(For students admitted from 2022-2023 onwards)

WEB TECHNOLOGY

COURSE OBJECTIVES:

- To teach the basics involved in publishing content on the World Wide Web.
- To facilitate the fundamental concepts of internet
- To familiarize with a variety of element types, including hyperlinks, images, lists, tables, and forms.
- To develop basic programming skills using Javascript
- To use Java script for dynamic effects and to validate form input entry

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Define the fundamentals of web designing and impart knowledge in HTML.	K1
CO-2	Design and develop valid standards-conformant HTML document.	K2
CO-3	Understand Java script functionalities to work with client side scripts	K3
CO-4	Develop a dynamic web page by the use of java script	K4
CO-5	Implement the web based applications using effective data base access with rich client interaction.	K5

UNIT - I

Introduction to the IIS: Client and server architecture. Introduction to HTML: Header Section: Title– Heading– Body Section– Anchor tag – Hyperlink –Paragraph – Colourful webpages.

UNIT - II

Fonttag – Formatting Characters – Images and Pictures–List: Ordered List–Unordered List – Table Handling- Frames: Frame set Definition– Frame Definition–Nested Frame Sets.

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UNIT – III

Forms – Form Elements Database Basics: Database Tables-Records and Fields- Creating a Table-Setting Field Properties-Setting the Key and saving the table- Modifying the table- Adding the field – Deleting the Field.

UNIT - IV

Overview of Java Script –Advantages of Java Script – Using SCRIPT tag- Syntax and Command Blocks-output-Dialogs and Prompts. Working with data and Information: Data Types- Variables – Expressions – Operators and Comparison Expressions. Functions and Objects: Defining Functions – Building objects in JavaScript.

UNIT - V

Events in JavaScript: Events-Event Handlers-this Keyword-Events and Forms-Common Form Events. Creating Interactive Forms: Form Object and its Properties – Form Elements- More Form Elements.

BOOKS FOR STUDY:

- “WorldWide Web Design with HTML”, C. Xavier, TMH, 2000. (For UNIT I & UNIT II)
- “Microsoft Access 2000 Programming” Paul Kimmel. (For UNIT III)
- “JavaScript Interactive Course”, Danesh, TechMedia (For UNIT IV & UNIT V)

BOOK FOR REFERENCE:

- Programming the World Wide Web – Robert W. Sebesta Fourth Edition Pearson

Relationship matrix for Course outcomes, Programme outcomes / Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	3	2	1	3	3	1	2	1	2	1	2.38
CO2	2	1	3	2	1	2	1	1	3	3	2.38
CO3	2	1	3	1	2	3	3	2	2	2	2.63
CO4	2	1	2	3	2	3	2	1	3	1	2.50
CO5	3	2	1	3	3	2	3	1	2	3	2.88
Mean Overall Score (High Level Relationship between COs and POs)											2.55

RAJAH SERFOJI GOVT.COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Semester Question paper Pattern:Maximum Marks: 75 Exam Duration: Three Hours

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


Signature of the HOD

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மன்னர் குபோதி அரசுக் கல்லூர்
(தங்னாட்சி)
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: A6CSP6

B.Sc(Computer Science) - Semester: 6
(For students admitted from 2022-2023 onwards)

PRACTICAL:WEB TECHNOLOGY LAB

COURSE OBJECTIVES:

- To know about the web pages and its designing
- To develop simple webpages just for sharing data
- To design interactive webpages using databases
- Understand the web technologies to create adaptive web pages for web application.

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Understand the structure of basic HTML tags	K1
CO-2	Identify the different uses of ordered and unordered list	K2
CO-3	Create WebPages using tables with its data.	K3
CO-4	Update the data interactively using database	K4
CO-5	Write simple web applications using Java Script.	K5

LIST OF PROGRAMS:

1. Simple HTML using basic tags.
2. Program using AnchorTag.
3. Program using Hyper Link
4. Program using Ordered List
5. Program using Unordered List.
6. Program for Table Creation.
7. Program using Frames.
8. Program using Forms.
9. Simple Table creation using MS-Access

10. Addition of two numbers using JavaScript.
11. SimpleProgram-1using JavaScript.
12. Java Script Program using Functions.
13. JavaScript Program using Events.
14. JavaScript Program using Form Elements.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	3	2	1	3	3	1	2	1	2	1	2.38
CO2	2	1	3	2	1	2	1	1	3	3	2.38
CO3	2	1	3	1	2	3	3	2	2	2	2.63
CO4	2	1	2	3	2	3	2	1	3	1	2.50
CO5	3	2	1	3	3	2	3	1	2	3	2.88
Mean Overall Score (High Level Relationship between COs and POs)											2.55

Semester Question paper Pattern: Maximum Marks: 60

Exam Duration: Three Hours

One question from the list of exercises.

25

Another question not in the list but relevant to the list of exercises.

35

For correct Program: 60% Typing the program: 20% Execution 20%

Signature of the HOD

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கல்வினி அறிவியல் துறை
மாண்பு காபோரி அரசுக்
(தன்னொட்டி)
தஞ்சாவூர் - 613 005.

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COE

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

Credits : 5

Code: A6CSEL3A

Hours/Week : 6

Medium of instruction: English

B.Sc(Computer Science) - Semester: 6
(For students admitted from 2022-2023 onwards)

SOFTWARE ENGINEERING

COURSE OBJECTIVES:

- To provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases.
- To understand the cost factors and estimation techniques.
- To study about software requirements and design notations and techniques.
- To gain knowledge about implementation, testing and maintenance
- Be employed in industry, government, or entrepreneurial endeavors to demonstrate professional advancement

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Decompose the given project in various phases of a lifecycle	K1
CO-2	Work in one or more significant application domains	K2
CO-3	Work as an individual and as part of a multidisciplinary team to develop and deliver quality software	K3
CO-4	Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle	K4
CO-5	Gain the ability to understand the testing techniques and maintenance concepts necessary for effective software project.	K5

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.

RAJAH SERFOJI GOVT.COLLEGE (AUTONOMOUS)

THANJAVUR -613005

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.

BOOK FOR STUDY:

- Richard Fairley “*Software Engineering Concepts*” –, 1997, Tata McGraw Hill.

Unit I: Chapter 1.1, 1.2, 1.3, 2.3, 2.4

Unit II: Chapter 3.1, 3.2, 3.3, 3.4

Unit III: Chapter 4.1, 4.2, 5.1, 5.2

Unit IV: Chapter 5.3, 5.4, 6.1, 6.2, 6.3, 6.4

Unit V: Chapter 8.1, 8.2, 8.5, 8.6, 9.1, 9.2, 9.3

BOOK FOR REFERENCE:

- Roger S. Pressman, “*Software Engineering*” –Tata McGraw Hill, 5th Edition

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	3	2	1	3	3	1	2	1	2	2	2.50
CO2	3	1	3	2	1	2	1	1	3	3	2.50
CO3	3	1	3	1	2	3	3	2	2	2	2.75
CO4	2	1	2	3	2	3	2	1	3	2	2.63
CO5	3	2	1	3	3	2	3	1	2	3	2.88
Mean Overall Score (High Level Relationship between COs and POs)											2.65

RAJAH SERFOJI GOVT.COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Semester Question paper Pattern: Maximum Marks: 75 Exam 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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(தந்னாட்சி)
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THANJAVUR -613005

Credits : 5

Hours/Week : 6

Medium of instruction: English

Code: A6CSEL3B

B.Sc(Computer Science) - Semester: 6
(For students admitted from 2022-2023 onwards)

MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

COURSE OBJECTIVES:

- To study the basic architecture of 8085 processor
- To achieve knowledge about the instruction set
- To learn about the data transfer schemes and its applications
- To develop skill in simple program writing for INTEL 8085
- To know about interfacing peripherals and DMA controller

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Assess and solve basic binary math operations using the microprocessor	K1
CO-2	Apply knowledge and demonstrate programming proficiency using addressing modes	K2
CO-3	Analyze assembly language programs; select appropriate assemble into machine a cross assembler utility of a microprocessor and microcontroller	K3
CO-4	Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices	K4
CO-5	Evaluate assembly language programs and download the machine code that will provide solutions real-world control problems	K5

UNIT - I

Architecture and Operation: Introduction to 8085, Microprocessor organization/ architecture & its operation Microprocessor based system, memory interfacing, basic interfacing concepts, and interfacing I/O devices

UNIT - II

Programming the 8085: Programming model, instruction classification, Instruction format, addressing modes, writing assembly level programs-overview of instruction set, timing diagrams data transfer, Arithmetic, Logic branch operations.

UNIT - III

Programming techniques- Looping Counting and Indexing, 16 bit arithmetic operations logic operations Compare and rotate operations. Counters and Time delays, Generation of pulse wave forms. Stacks and subroutines- conditional CALL and RETURN instructions. Advanced subroutine

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concepts- BCD to Binary and Binary to BCD conversions, BCD to 7 segment conversion , Binary to ASCII and ASCII to Binary code conversion, BCD addition and subtraction , multiplication and division.

UNIT -IV

Memory Interface: Memory and I/O mapping and interfacing concepts. Interrupts: 8085 vectored interrupts, Restart as Software instructions, additional I/O concepts and processes.

UNIT -V

Interfacing of peripherals (I/Os) and applications: Interfacing Keyboard (linear and matrix) and 7 segment display including multiplexes, 8279 programmable keyboard /display interface, 8255 PPI , 8259 PIC , DMA and 8257 DMA controller , Serial communication using 8251, D to A converters and interfacing, RS323 serial Page 31 of 38 communication standards.

BOOK FOR STUDY:

- R.S.Gaonkar – Microprocessor Architecture , Programming and Application with 8085. Penram Int., 3rd Edn.

BOOKS FOR REFERENCE:

- Kenneth L.Short - Microprocessor and Programmed Logic “ , PHI , 2nd Edn.
- Aditya P. Mathur- Introduction to Microprocessors, 3RD Edn. TMH
- Douglas V.Hall- Microprocessors and digital systems, McGraw Hill
- Antonakos: Introduction to Intel family of Microproscessors Pearson Education

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	3	2	1	3	3	1	2	2	2	2	2.63
CO2	3	1	3	2	1	2	1	2	3	3	2.63
CO3	3	1	3	1	2	3	3	2	2	2	2.75
CO4	2	1	2	3	2	3	1	1	3	2	2.50
CO5	3	2	1	3	3	2	1	1	2	3	2.63
Mean Overall Score (High Level Relationship between COs and POs)											2.63

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(கல்லொட்டி)
தந்தையார் - 613 005.

RAJAH SERFOJI GOVT.COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Semester Question paper Pattern:Maximum Marks: 75 Exam Duration: Three Hours

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

Signature of the HOD

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

Credits : 5

Code: A6CSEL3C

Hours/Week : 6

Medium of instruction: English

B.Sc(Computer Science) - Semester: 6
(For students admitted from 2022-2023 onwards)

SOFTWARE TESTING

COURSE OBJECTIVES:

- To study fundamental concepts in software testing
- To find what may get created by the programmer while developing the software.
- Gaining confidence in and providing information about the level of quality.
- To make sure that the end result meets the business and user requirements.
- To gain the confidence of the customers by providing them a quality product.

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	List a range of different software testing techniques and strategies and be able to apply specific(automated) unit testing method to the projects.	K1
CO-2	Distinguish characteristics of structural testing methods.	K2
CO-3	Demonstrate the integration testing which aims to uncover interaction and compatibility problems as early as possible.	K3
CO-4	Discuss about the functional and system testing methods.	K4
CO-5	Demonstrate various issues for object oriented testing.	K5

UNIT - I

Introduction: Purpose – Productivity and Quality in Software – Testing Vs Debugging – Model for Testing – Bugs – Types of Bugs – Testing and Design Style.

UNIT - II

Flow / Graphs and Path Testing – Achievable paths – Path instrumentation – Application – Transaction Flow Testing Techniques.

UNIT - III

Data Flow Testing Strategies - Domain Testing: Domains and Paths – Domains and Interface Testing.

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UNIT - IV

Linguistic –Metrics – Structural Metric – Path Products and Path Expressions. Syntax Testing – Formats – Test Cases.

UNIT – V

Logic Based Testing – Decision Tables – Transition Testing – States, State Graph, State Testing.

BOOKS FOR STUDY:

- B. Beizer, "Software Testing Techniques", II Edn., DreamTech India, New Delhi, 2003.
- K.V.K. Prasad , "Software Testing Tools", DreamTech. India, New Delhi, 2005.

BOOKS FOR REFERENCE:

- Burnstein, 2003, "Practical Software Testing", Springer International Edn.
- E. Kit, 1995, "Software Testing in the Real World: Improving the Process", Pearson Education, Delhi.
- R.Rajani, and P.P.Oak, 2004, "Software Testing", Tata Mcgraw Hill, New Delhi.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	3	2	1	3	1	1	2	2	2	2	2.38
CO2	3	1	3	2	1	2	1	2	1	3	2.38
CO3	3	1	3	1	2	3	3	2	2	2	2.75
CO4	2	1	2	3	2	1	1	1	3	2	2.25
CO5	3	2	1	3	3	2	1	2	2	3	2.75
Mean Overall Score (High Level Relationship between COs and POs)											2.50

Semester Question paper Pattern:Maximum Marks: 75 Exam 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 Head
 மாணிக்கி அறிவியல் துறை
 மாணவர் காபோரி அரசுக்கால்வாசி
 (குமாரங்காரி)
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RAJAH SERFOJI GOVT.COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Credits : 4

Code: A6CSEC2

Hours/Week :

Medium of instruction: English

B.Sc(Computer Science) - Semester: 6
(For students admitted from 2022-2023 onwards)

NETWORK SECURITY

COURSE OBJECTIVES:

- To study the number theory used for network security
- To understand the design concept of cryptography and authentication
- To develop experiments on algorithm used for security
- To know how to make different encryption techniques
- To use various protocols for network security and system security

COURSE OUTCOMES:

CO's	CO–Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Analyze and design classical encryption techniques and block ciphers.	K1
CO-2	Understand and analyze public-key cryptography, RSA and other public-key cryptosystems.	K2
CO-3	Analyze and design hash and MAC algorithms, and digital signatures.	K3
CO-4	Understand key management and distribution schemes and design User Authentication.	K4
CO-5	Know about Intruders and Intruder Detection mechanisms, Types of Malicious software.	K5

UNIT - I

Model of network security – Security attacks, services and attacks – OSI security architecture – Classical encryption techniques – SDES – Block cipher PrinciplesDES – Strength of DES – Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – RC4 - Differential and linear cryptanalysis – Placement of encryption function – traffic confidentiality.

UNIT - II

Number Theory – Prime number – Modular arithmetic – Euclid's algorithm - Fermat's and Euler's theorem – Primality – Chinese remainder theorem – Discrete logarithm – Public key cryptography and RSA – Key distribution – Key management – Diffie Hellman key exchange – Elliptic curve cryptography.

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UNIT - III

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS.

UNIT - IV

Authentication applications – Kerberos – X.509 Authentication services - E-mail security – IP security - Web security

UNIT - V

Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security

BOOK FOR STUDY:

- William Stallings, “Cryptography & Network Security”, Pearson Education, Fourth Edition 2010

BOOKS FOR REFERENCE:

- Charlie Kaufman, Radia Perlman, Mike Speciner, “Network Security, Private communication in public world”, PHI Second Edition, 2002.
- Bruce Schneier, Neils Ferguson, “Practical Cryptography”, Wiley Dreamtech India Pvt Ltd, First Edition, 2003.
- Douglas R Simson “Cryptography – Theory and practice”, CRC Press, First Edition, 1995.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	3	2	1	3	1	1	2	3	2	2	2.50
CO2	3	1	3	2	1	2	1	3	1	3	2.50
CO3	3	1	3	1	2	3	3	2	3	2	2.88
CO4	2	1	2	3	2	1	1	1	2	2	2.13
CO5	3	2	1	3	3	2	1	2	3	3	2.88
Mean Overall Score (High Level Relationship between COs and POs)											2.58

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THANJAVUR -613005

Semester Question paper Pattern:Maximum Marks: 75 Exam 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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(தங்களாட்சி)
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THANJAVUR - 613 005.

NMEC1

Credits : 3

Code: **A5CSEL01**

Hours/Week : 3

Medium of instruction: English

Semester:5

(For students admitted from 2018 onwards)

INTERNET AND WEB DESIGN

COURSE OBJECTIVES:

- To understand the concepts of internet
- To learn about HTML tags for web page designing
- To know the various controls in web page designing

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Understand basic concepts of internet	K1
CO-2	Use HTML tags for the web pages	K2
CO-3	Apply tables in their web pages	K3
CO-4	Implement various kinds of list and other controls	K4
CO-5	Develop their own web pages for different applications	K5

UNIT I

Introduction to the Internet : Computer in Business – Networking – Internet – Email - Resource Sharing – Gopher – WWW – Usenet – Telnet – Bulleting board service - Wide Area Information Service. Internet Technologies : Modem – Internet addressing – Physical Connections – telephone lines. Internet Browsing : Internet Explorer – Netscape Navigator.

UNIT II

Introduction to HTML : Designing a home page – History of HTML - HTML generations – HTML document – Anchor tag – Hyper links – Sample HTML Documents. Head and Body sections: Head Section – Title – Prologue – Links – Colorful web page – Comment lines.

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UNIT III

Design the body Section: Heading printing – aligning the heading – Horizontal rule – Paragraph – tab setting – Image and pictures – Embedding PNG format images Ordered and Unordered Lists : Lists - Unordered lists – Heading in all list – Ordered List – Nested lists. Table Handling : Table – Table creation in HTML – Width of the Table and Cells – Cells spanning Multiple Rows/Columns – Coloring cells – Column specification.

UNIT IV

DHTML and Style sheets : Defining styles – Element of styles – Linking a style sheet a to and HTML document – In-line styles – External Style Sheets – Internal style sheets – Multiple styles.

UNIT V

Frames : Frameset defining – Frame definition – Nested Framesets – Web Page designing and forms.

BOOK FOR STUDY

C. Xavier, “*World Wide Web design with HTML*”, TMH,2000(All Chapters)

BOOK FOR REFERENCE:

Jennifer Niederst “*Web Design in a Nutshell*” – O Reily first edition – shroff publishers and distributors Pvt Ltd.

Relationship matrix for Course outcomes, Programme outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	2	3	3	2	3	2	3	1	2	2.88
CO2	3	2	3	3	1	2	3	1	2	3	2.88
CO3	3	2	3	2	2	3	2	1	3	3	3.00
CO4	2	2	2	2	3	1	2	3	2	2	2.63
CO5	1	2	3	2	3	3	2	1	3	1	2.63
Mean Overall Score (High Level Relationship between COs and POs)											2.80

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THANJAVUR -613005

Semester Question paper Pattern: Maximum Marks: 75 Exam 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]
Signature of the HOD
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(தங்களாட்சி)
தஞ்சாவூர் - 613 005.

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NMEC2

Credits : 3

Code: A6CSEL02

Hours/Week : 3

Medium of instruction: English

Semester:6

(For students admitted from 2018-2019 onwards)

FUNDAMENTALS OF INFORMATION TECHNOLOGY

COURSE OBJECTIVES:

- To understand the various parts of computer and its devices.
- To learn about hardware and software.
- To know the internet and applications of computers.

COURSE OUTCOMES:

CO's	CO-Statements	Cognitive Levels
	<i>On successful completion of this course, students will be able to</i>	
CO-1	Understand fundamental concepts of Computer.	K1
CO-2	Know various kinds of memory and the functions	K2
CO-3	Learn the different kinds of input, output devices and software used in computers	K3
CO-4	Understand the functions of internet and WWW.	K4
CO-5	Learn about the use of computers in education.	K5

UNIT I

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

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

Output devices: Introduction – monitor – printer- plotter – Introduction to computer software: Introduction- computer software- Hardware/software interaction- classification of software-

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operating system- utilities- compilers and interpreters- word processors – Spreadsheets- presentation software- image processors.

UNIT IV

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

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

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

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Mean Score of COs
CO1	2	2	3	3	2	3	2	1	1	2	2.63
CO2	3	2	2	2	1	2	3	1	2	3	2.63
CO3	3	2	2	2	2	1	2	2	3	3	2.75
CO4	2	2	2	2	3	1	2	3	2	2	2.63
CO5	1	2	1	2	3	2	2	1	3	2	2.38
Mean Overall Score (High Level Relationship between COs and POs)											2.60

Semester Question paper Pattern:Maximum Marks: 75 Exam 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

பெருமான்
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(கண்ணாட்சி)
தஞ்சாவூர் - 613 005.

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