SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE – SYLLABUS
(Under CBCS based on OBE) (For those admitted during 2024 – 2025 and after)

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ABOUT THE DEPARTMENT

The Department of Computer Science was established during the year 1987–88 with B.Sc. Computer Science Programme. Since then, the Department has been functioning successfully producing young Computer Science graduates every year, with well trained and experienced faculty members and supporting staff. So far, the Department has produced more than 1000 (33 batches) Computer Science graduates and they are all well placed in India & Abroad. The Department has been producing excellent results over a period of 35 years. The Department has adequate infrastructure with a well–equipped Computer Laboratory, a well stacked Department Library, well–furnished class rooms, a separate room for power point presentation with a LCD Projector.

VISION

- Apply a broad understanding of the fundamental theories, concepts, and applications of Computer Science in their career.
- Analyze a multifaceted computing problem and to apply principles of computing and other relevant disciplines to identify solutions and compare alternative solutions to computing problems.
- Apply Computer Science theory and software development fundamentals to produce computing–based solutions.
- To attain an ability to use current techniques, skills, and tools necessary for computing practice.
- To affiance in a wide range of careers and/or graduate studies in computer science or related fields with a zeal for lifelong learning.
- To communicate effectively, both orally and in writing and engaged in collaborative teamwork.
- Recognize the social and ethical errands of a professional working in the discipline.

MISSION

The Mission of the Department is to impart computer education to the students in the rural area of Madurai district, so that they become enlightened and intelligent, and to improve the standards of their life, as well as to produce graduates who excel in research and service. We also aim to inculcate the attitudes and values that will motivate them towards the continuous process of learning and leadership. We strive to educate ground–breaking skills and technology for the benefit of learners through incessant upgradation of curriculum.

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GRADUATE ATTRIBUTES

1. **(KB) A knowledge base for computer science**: Demonstrated competence in university level mathematics, natural sciences, computer science fundamentals, and specialized computer science knowledge appropriate to the program.

2. **(PA) Problem analysis**: An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex computer science problems in order to reach substantiated conclusions

3. **(Inv.) Investigation**: An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data and synthesis of information in order to reach valid conclusions.

4. **(Des.) Design:** An ability to design solutions for complex, open–ended computer science problems and to design systems, components or processes that meet specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations.

5. **(Tools) Use of computer science tools**: An ability to create, select, apply, adapt, and extend appropriate techniques, resources, and modern engineering tools to a range of computer science activities, from simple to complex, with an understanding of the associated limitations.

6. **(Team) Individual and teamwork**: An ability to work effectively as a member and leader in teams, preferably in a multi–disciplinary setting.

7. **(Comm.) Communication skills**: An ability to communicate complex computer science concepts within the profession and with society at large. Such ability includes reading, writing, speaking and listening, and the ability to comprehend and write effective reports and design documentation, and to give and effectively respond to clear instructions.

8. **(Prof.) Professionalism**: An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest.

9. **(Impacts) Impact of computer science on society and the environment**: An ability to analyze social and environmental aspects of computer science activities. Such ability includes an understanding of the interactions that computer science has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.

10. **(Ethics) Ethics and equity**: An ability to apply professional ethics, accountability, and equity.

11. **(Econ.) Economics and project management**: An ability to appropriately incorporate economics and business practices including project, risk, and change management into the practice of computer science and to understand their limitations.

12. **(LL) Life–long learning**: An ability to identify and to address their own educational needs in a changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge

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PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)
The B. Sc. Computer Science Graduates of the Sourashtra College will:

PEO 1	get professional career by acquiring knowledge in Scientific, Mathematics and Computing and Engineering principles.
PEO 2	apply, analyse, design, optimize and implement skills in order to formulate and solve Computer Science, Engineering and Multidisciplinary problems.
PEO 3	implement fundamental domain knowledge of core courses for developing effective computing solutions by incorporating creativity and logical solutions by incorporating creativity and logical reasoning.
PEO 4	deliver professional services with updated technologies in Computer Science based career.
PEO 5	develop leadership skills and incorporate ethics, team work with effective communication & time management in the profession.
PEO 6	undergo higher studies, certifications and research programs as per market needs.

UNDERGRADUATE (UG) PROGRAMME OUTCOMES (POs)

Undergraduate (B.A., **B.Sc.,** B.Com., B.C.A., B.B.A., etc.,) is a 3 – year degree Programme with 6 semesters consisting the following Programme Outcomes (POs) under various criteria including critical thinking, problem solving, effective communication, societal/ citizenship/ ethical credibility, sustainable growth and employable abilities.

PO 1	**Critical Thinking**: Intellectual exploration of knowledge towards actions in clear and rational manner by understanding the logical connections between ideas and decisions.
PO 2	**Problem Solving**: Understanding the task/ problem followed by planning and narrow execution strategy that effectively provides the solution.
PO 3	**Effective Communication**: Knowledge dissemination by oral and verbal mechanisms to the various components of our society.
PO 4	**Societal/ Citizenship/ Ethical Credibility**: Realization of various value systems/ moral dimensions and demonstrate the empathetic social concern as well as equity in all the decisions, executions and actions.
PO 5	**Environmental Concern and Sustainable Growth**: Understanding the emerging environmental challenges and provide the possible contribution in sustainable development that integrates environment, economy and employment.
PO 6	**Skill Development and Employable Abilities**: Adequate training in relevant skill sector and creating employable abilities among the under graduates.

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PROGRAMME SPECIFIC OUTCOMES (PSOs)

On completion of **B.Sc. Computer Science Programme**, the students are expected to

PSO 1	develop professionally competent citizens by applying the scientific knowledge of Computer Science with the ability to think clearly, rationally and creatively to support in evolving solutions to the social/public/scientific issues with responsible democratic participation
PSO 2	enterprise resourcefulness to identify, plan, formulate, design and evaluate solutions for complex computing problems that address the specific needs with appropriate consideration for Societal, Cultural, Environmental and Industrial domains.
PSO 3	develop holistically to ignite the lateral thinking ability in problem solving, acquisition of new skills, open–minded and organized way of facing problems with self-awareness and evolving analytical solutions
PSO 4	create and initiate innovations effectively and communicate efficiently with the computing community and society at large to bridge the gap between computing industry and academia
PSO 5	understand, assess and commit to professional and ethical principles, norms and responsibilities of the cyber world through Digital Literacy, and be able for work efficacy as a part of a team and engage effectively with diverse stakeholders
PSO 6	able to and willingly embark on new ventures and initiatives with critical thinking and desire for more continuous learning focusing on life skills.

DISTRIBUTION OF CREDITS (UG PROGRAMME)

PART	SEM	COURSES	NO. OF COURSES	HOURS	CREDITS	TOTAL CREDITS
I	I–IV	LANGUAGE	4	6	3	12
II	I–IV	ENGLISH	4	6	3	12
III	I–VI	CORE	16	5–6	4	64
III	I–IV	ALLIED	4	4	4	16
III	V–VI	ELECTIVE	3	5	5	15
IV	I–IV	SKILL BASED SUBJECT	6	2	2	12
IV	I	VALUE EDUCATION	1	2	2	2
IV	I	ENVIRONMENTAL STUDIES	1	2	2	2
IV	III, IV	NON MAJOR ELECTIVE	2	2	2	4
V	IV	EXTENSION ACTIVITY	1	0	1	1
	V	SELF – STUDY (SOFT SKILLS)	1	0	0	0
	VI	SELF –STUDY (G.K. (ONLINE))	1	0	0	0
TOTAL						**140**
Any online courses in SWAYAM PORTAL						

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B.Sc. COMPUTER SCIENCE – COURSE STRUCTURE
SEMESTER – I

S. No	Course Code	Course Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	24UACT11	**Part – I: Tamil** – பொதுத் தமிழ் – I	6	3	25	75	100	3
	24UACH11	**Hindi** – General Hindi – I						
	24UACS11	**Sanskrit** – Poetry, Grammar and History of Sanskrit Literature						
2.	24UACE11	**Part – II: English** – General English – I	6	3	25	75	100	3
3.	24UCSC11	**Part – III: Core – 1:** Programming in C	4	3	25	75	100	4
4.	24UCSCP1	**Part – III: Core – 2: Lab :** Programming in C	6	3	40	60	100	4
5.	24UCSA11	**Part – III: Allied – 1:** Discrete Structures	4	3	25	75	100	4
6.	24UCSS11	**Part – IV: SBS – 1:** Digital Computer Fundamentals	2	3	25	75	100	2
7.	24UACVE1	**Part – IV:** Value Education	2	3	25	75	100	2
		TOTAL	**30**				**700**	**22**

SEMESTER – II

S. No	Course Code	Course Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	24UACT21	**Part – I: Tamil** – பொதுத் தமிழ் – II	6	3	25	75	100	3
	24UACH21	**Hindi** – General Hindi – II						
	24UACS21	**Sanskrit** – Prose, Grammar and History of Sanskrit Literature						
2.	24UACE21	**Part – II: English** – General English – II	6	3	25	75	100	3
3.	24UCSC21	**Part – III: Core – 3:** Data Structures and Algorithms	4	3	25	75	100	4
4.	24UCSCP2	**Part – III: Core – 4: Lab :** Data Structures Using C	6	3	40	60	100	4
5.	24UCSA21	**Part – III: Allied – 2:** Probability and Statistics	4	3	25	75	100	4
6.	24UCSS21	**Part – IV: SBS – 2:** Computer Organization & Architecture	2	3	25	75	100	2
7.	24UACES1	**Part – IV:** Environmental Studies	2	3	25	75	100	2
		TOTAL	**30**				**700**	**22**

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SEMESTER – III

S. No	Course Code	Course Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.		**Part – I:Tamil** – காப்பியமும் நாடகமும் **Hindi** – Hindi – III **Sanskrit** – Sanskrit – III	6	3	25	75	100	3
2.		**Part – II: English** – English For Enrichment – III	6	3	25	75	100	3
3.		**Part – III: Core – 5:** Object Oriented Programming Using C++	5	3	25	75	100	5
4.		**Part – III: Core – 6: Lab:** Object Oriented Programming Using C++	5	3	40	60	100	3
5.		**Part – III: Allied – 3:** Operations Research – I	4	3	25	75	100	4
6.		**Part – IV:SBS – 3: Lab:** Linux And Shell Programming	2	3	40	60	100	2
7.		**Part – IV:NME – 1:** Office Automation	2	3	25	75	100	2
		TOTAL	**30**				**700**	**22**

SEMESTER – IV

S. No	Course Code	Course Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.		**Part – I: Tamil** – சங்க இலக்கியமும் அற இலக்கியமும் **Hindi** – Hindi – IV **Sanskrit** – Sanskrit – IV	6	3	25	75	100	3
2.		**Part – II: English** – English For Enrichment – IV	6	3	25	75	100	3
3.		**Part – III: Core – 7:** Programming In Java	5	3	25	75	100	5
4.		**Part – III: Core – 8: Lab :** Java Programming	5	3	40	60	100	3
5.		**Part – III: Allied – 4:** Numerical Methods	4	3	25	75	100	4
6.		**Part – IV:SBS – 4: Lab :** Visual Programming	2	3	40	60	100	2
7.		**Part – IV:NME – 2:** Introduction to Internet	2	3	25	75	100	2
8.		**Part–V:** Extension Activities	–	–	–	–	100	1
		TOTAL	**30**				**800**	**23**

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SEMESTER – V

S. No	Course Code	Course Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.		**Part – III: Core – 9:** Relational Database Management Systems	5	3	25	75	100	4
2.		**Part – III: Core – 10:** Operating System Concepts	5	3	25	75	100	4
3.		**Part – III: Core – 11:** Software Engineering	5	3	25	75	100	4
4.		**Part – III: Core – 12: Lab :** Open Source Programming using PHP & MYSQL	6	3	40	60	100	4
5.		**Part – III: Elective – 1***	5	3	25	75	100	5
		Data Communication and Computer Networks						
		PHP Programming						
		Python Programming						
		Artificial Intelligence						
6.		**Part – IV: SBS – 5:** Quantitative Aptitude	2	3	25	75	100	2
7.		**Part – IV: SBS – 6: Lab :** SQL and PLSQL	2	3	40	60	100	2
8.		Soft Skills (Self–Study)	–	–	–	–	100	–
		TOTAL	**30**				**800**	**25**

*One elective course to be chosen from FOUR courses

SEMESTER – VI

S. No	Course Code	Course Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.		**Part – III: Core – 13:** Data Mining and Warehousing	5	3	25	75	100	5
2.		**Part – III: Core – 14:** Computer Graphics	5	3	25	75	100	5
3.		**Part – III: Core – 15: Lab :** Python Programming	5	3	40	60	100	3
4.		**Part – III: Core – 16: Lab :** Web Design	5	3	40	60	100	3
5.		**Part – III: Elective – 2***	5	3	25	75	100	5
		Web Technology						
		Cloud Computing						
		Machine Learning using Python						
		Cyber security						
6.		**Part – III: Elective – 3:** Project & Viva–Voce	5	3	40	60	100	5
7.		General Knowledge (Self–Study)	–	–	–	–	100	–
		TOTAL	**30**				**700**	**26**

*One elective course to be chosen from FOUR courses

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COURSE STRUCTURE – I SEMESTER

S. No	Course Code	Course Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	24UACT11	**Part – I: Tamil** – பொதுத் தமிழ் – I	6	3	25	75	100	3
	24UACH11	**Hindi** – General Hindi – I						
	24UACS11	**Sanskrit** – Poetry, Grammar and History of Sanskrit Literature						
2.	24UACE11	**Part – II: English** – General English – I	6	3	25	75	100	3
3.	24UCSC11	**Part – III: Core – 1:** Programming in C	4	3	25	75	100	4
4.	24UCSCP1	**Part – III: Core – 2: Lab :** Programming in C	6	3	40	60	100	4
5.	24UCSA11	**Part – III: Allied – 1:** Discrete Structures	4	3	25	75	100	4
6.	24UCSS11	**Part – IV: SBS – 1:** Digital Computer Fundamentals	2	3	25	75	100	2
7.	24UACVE1	**Part – IV:** Value Education	2	3	25	75	100	2
		TOTAL	**30**				**700**	**22**

CA – Class Assessment (Internal)

SE – Summative Examination

SBS – Skill Based Subject

NME – Non –Major Elective

T – Theory

P – Practical

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCSC11	PROGRAMMING IN C	CORE – 1	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:

This course helps to provide the fundamental knowledge of a programming language and its features which enhances the user to write general purpose application programs.

COURSE OBJECTIVES:

- To inculcate fundamental knowledge of programming
- To develop programming skills using the fundamentals and basics of C language
- To stress the importance of clarity , simplicity and the efficiency in writing programs

COURSE OUTCOMES (COs):

After the completion of the Course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	apply the basic concepts and develop program to find solutions for simple problems	Upto K3
CO 2	design programs to solve complex problems by using suitable control statements	Upto K3
CO 3	analyze the problem and design efficient program using functions	Upto K3
CO 4	use array and structure to handle volume of data	Upto K3
CO 5	use advanced data structures pointers and files for data processing	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

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PROGRAMMING IN C

UNIT – I:
C fundamentals Character set – Identifier and keywords – data types –constants – Variables – Declarations – Expressions – Statements – Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators – Library functions.

UNIT – II:
Data input output functions – Simple C programs – Flow of control – if, if–else, while, do–while, for loop, Nested control structures – Switch, break and continue, go to statements – Comma operator.

UNIT – III:
Functions –Definition – proto–types – Passing arguments – Recursions. Storage Classes – Automatic, External, Static, Register Variables – Multi–file programs – Preprocessor directives–Macro substitution–File inclusion–Compiler Control Directives

UNIT – IV:
Arrays – Defining and processing – Passing arrays to functions – Multi–dimension arrays – Arrays and String. Structures – User defined data types – Passing structures to functions – Self–referential structures – Unions – Bit wise operations.

UNIT – V:
Pointers – Declarations – Passing pointers to Functions – Operation in Pointers–Pointer and Arrays – Arrays of Pointers – Structures and Pointers – Files: Sequential and random file Creation and Processing – Command line arguments.

TEXT BOOK:
  E. Balagurusamy, *Programming in ANSI C*, Fifth Edition, Tata McGraw Hill.

REFERENCE BOOKS:
1. B.W. Kernighan and D. M. Ritchie, *The C Programming Language*, 2nd Edition, PHI, 1988.
2. H. Schildt, *C: The Complete Reference*",4thEdition.TMHEdition,2000.
3. Gottfried B.S, "*Programming with C*, Second Edition, TMH Pub. Co. Ltd., New Delhi1996.
4. Kanetkar Y., *Let us* , BPB Pub., NewDelhi,1999.

DIGITAL TOOLS:
1. **http://www.kciti.edu/wp–content/uploads/2017/07/cprogramming_tutorial.pdf**
2. **https://www.skiet.org/downloads/cprogrammingquestion.pdf**
3. **https://phy.ntnu.edu.tw/~cchen/pdf/ctutor.pdf**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	1	1	3
CO2	2	2	1	1	1	1
CO3	1	1	2	3	1	1
CO4	1	3	1	1	1	3
CO5	1	1	2	2	2	2

3. Advanced Application   2. Intermediate Development   1. Introductory Level
COURSE DESIGNER: Dr. T.D.VENKATESWARAN

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCSCP1	**LAB: PROGRAMMING IN C**	**CORE–2 LAB**	–	6	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	**I**	**40**	**60**	**100**

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	✓

COURSE DESCRIPTION:

This course helps to provide the fundamental knowledge of a programming language and its features which enhances the user to write general purpose application programs.

COURSE OBJECTIVES:

- To inculcate fundamental knowledge of programming
- To develop programming skills using the fundamentals and basics of C language
- To stress the importance of clarity , simplicity and the efficiency in writing programs
- It aims to train the student to the basic concepts of the C–programming language
- To improve the programming skills through C language

COURSE OUTCOMES (COs):

After the completion of the Course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand basic C program	**Upto K3**
CO 2	design various programs using if, if..else, for, while, do..while, switch..case	**Upto K3**
CO 3	execute programs using Arrays and strings	**Upto K3**
CO 4	execute programs using Structures and Functions	**Upto K3**
CO 5	execute programs using Files	**Upto K3**

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

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LAB: PROGRAMMING IN C

LIST OF EXPERIMENTS

Expression Evaluation
1. Finding Simple Interest and Compound Interest
2. Centigrade to Fahrenheit and Fahrenheit to Centigrade
3. Finding roots of a quadratic equation
4. Finding Standard Deviation and Variance

Conditional Statements
1. EB Bill Generation
2. Print Grade of a student
3. Checking Prime Number, Perfect Number, Armstrong Number, Adam Number
4. Sum of the digits of a number

Summation of Series
Sin(x), 2. Cos(x), 3. Exp (x) (Comparison with built in functions)

String Manipulation
1. Counting the number of vowels, consonants, words, white spaces in a line of text and array of lines.
2. Reverse a string and check for palindrome.
3. Sub string detection, count and removal.
4. Finding and replacing substrings.

Functions
1. Finding Factorial
2. Finding NCP value using recursion
3. Finding biggest element

Recursion
1. $^{n}P_r, {}^{n}C_r$
2. GCD of two numbers
3. Fibonacci sequence
4. Maximum & Minimum

Sorting and Searching
1. Insertion Sort
2. Bubble Sort
3. Linear Search
4. Binary Search

Matrix Manipulation
1. Addition and Subtraction
2. Multiplication
3. Transpose, and trace of a matrix
4. Determinant of a Matrix

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Structures

    1. Mark Sheet Preparation using structure

    2. Pay bill Preparation using structure

Preprocessor Directives

      Simple programs using Preprocessor Directives

Files

    1. Inventory Control using files

    2. Maintaining Book Information using files

COURSE DESIGNER: Dr. T.D.VENKATESWARAN

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCSA11	**DISCRETE STRUCTURES**	**ALLIED – 1**	**4**	**–**	**4**

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	**I**	**25**	**75**	**100**

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:

This course helps to provide the fundamental knowledge of Discrete structures like Set theory, Relations, Functions, Matrices, Logic, Graph Theory

COURSE OBJECTIVES:

- To teach the basic concepts of Set theory and Relations
- To impart knowledge on solving problems using logic
- To solve various problems using matrices.
- To give the basic concepts of Graph theory and its applications

COURSE OUTCOMES (COs):

After the completion of the Course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	identify the basic concepts Set theory & Relations	**Upto K3**
CO 2	gain knowledge about Matrix Algebra	**Upto K3**
CO 3	understand the idea of Logics using Truth tables	**Upto K3**
CO 4	receive knowledge about the basic concepts of Graph Theory and its applications	**Upto K3**
CO 5	use array and structure to handle volume of data	**Upto K3**

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLICATION

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DISCRETE STRUCTURES

UNIT– I: SET THEORY

Sets – Notation and Description of sets – Subsets – Venn–Euler diagram –Operations on sets – Properties on Set operations – Verification of the Basic Laws of Algebra by Venn diagrams – The Principle of Duality–Worked examples – Theorems (Statements only).

Relations: Relations – Representation of a Relation – Operations on Relations – Equivalence Relation–Worked examples – Theorems (Statements only).

UNIT– II: MATRIX ALGEBRA

Introduction – Matrix operations – Inverse of a square matrix – Elementary operations and Rank of a Matrix – Simultaneous equations – Eigen values and Eigen vectors–Worked examples – Theorems (Statements only).

UNIT– III: LOGIC

Introduction – TF statements – Connectives – Atomic and Compound statements – Well formed Formulae – The Truth Table of a Formula – Tautological Implications and Equivalence of Formulae implication and equivalence of formulae–Worked examples – Theorems (Statements only).

UNIT– IV: GRAPH THEORY: **BASIC CONCEPTS**

Definitions – Incidence and Degree – Subgraph – Graph Isomorphisms – Some special Classes of Graphs – Paths– Cycles – Connectedness –Worked examples – Theorems (Statements only).

UNIT– V: MATRIX REPRESENTATION OF GRAPHS

The Adjacency Matrix of Undirected Graph – Incidence Matrix – Path Matrix – **Trees –** Centres in a tree – Fundamental Circuits – **Spanning Trees** – Minimum spanning tree – Kruskal's algorithm – Prim's algorithm– Worked examples –Theorems (Statements only).

TEXT BOOK:

Discrete Mathematics by Dr. M.K. Venkataraman, Dr. N. Sridharan and Dr. N. Chandrasekaran, National Publishing Company, 2000.

UNIT–I   : 1.1 – 1.24, 2.6 – 2.27   UNIT–II   : 6.1–6.31, 6.37–6.44
UNIT–III : 9.1–9.34   UNIT–IV : 11.1–11.33
UNIT–V   : 11.34–11.39, 11.54–11.64, 11.68–11.76
(NOTE: In all UNITS, Worked examples only and Theorems (Statements only))

REFERENCE BOOK:

Modern Algebra, S. Arumugam & A. Thangapandi Issac, Scitech publications, 2005

DIGITAL TOOLS:

4.   **https://www.coursera.org/specializations/discrete–mathematics**
5.   **https://www.javatpoint.com/discrete–mathematics–tutorial**
6.   **https://medium.com/basecs/a–gentle–introduction–to–graph–theory–7969829ead8**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	1	1	3
CO2	2	2	1	1	1	1
CO3	1	1	2	3	1	1
CO4	1	3	1	1	1	3
CO5	1	1	2	2	2	2

3. Advanced Application   2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. V.K.VIJAYAKUMAR

SOURASHTRA COLLEGE, MADURAI – 625004
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B.Sc. COMPUTER SCIENCE – SYLLABUS
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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCSS11	DIGITAL COMPUTER FUNDAMENTALS	SBS – 1	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:

The course enables the students to design Digital Circuits using basic logic gates and simplified Boolean functions and to understand concepts of sequential circuits and combinational circuits

COURSE OBJECTIVES:

- To give knowledge about basic number systems like Binary, Octal, Decimal, Hexadecimal number system
- To inculcate knowledge on basic logic gates and Boolean algebra
- To give knowledge on the physical internal components of computers like Multiplexers, Decoders, Encoders, Flipflops, Registers and Counters

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	describe the basics of Number Systems, Codes and logic gates	Upto K3
CO 2	understand the concepts of Boolean Algebra and Karanaugh Maps.	Upto K3
CO 3	analyze the purpose and applications of Combinational and Sequential Logic	Upto K3
CO 4	discuss the various types of Combinational and Sequential Logic.	Upto K3
CO 5	explain the purpose, working principles and timing diagram of Registers and Counters.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

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DIGITAL COMPUTER FUNDAMENTALS

UNIT – I:

Binary number system – Binary to Decimal conversions – Decimal to Binary – Octal – Hexadecimal numbers –ASCII code – Excess–3 code – The basic gates – Inverter–OR Gates–AND Gates–Universal logic gates–NOR Gates – NAND Gates

UNIT – II:

Boolean laws and theorems – Sum of Products method – Truth tables to Karnaugh map– Pairs, Quads, Octets – Karnaugh map simplifications – Don't care conditions– Product of sum methods – Simplifications.

UNIT – III:

Multiplexers – De – Multiplexers –1– of –16 – Decoders – BCD – to – Decimal Decoders –7– segment decoders – Encoders

UNIT – IV:

Binary Addition – Binary Subtraction – 2's & 1's complement representation –2's Complement Arithmetic – Arithmetic building blocks – Half adder and Full adder – RS – flip flop – Clocked D – Flip Flop – Edge triggered JK Flip Flop

UNIT – V:

Types of Registers – Serial in Serial out–Serial in Parallel out – Ripple Counter – Synchronous Counter – Mod – 8 parallel binary counter.

TEXT BOOKS:

Digital Principles and Applications by Albert Paul Malvino and Donald P. Leach, Sixth Edition Tata McGraw–Hill–Edition

UNIT I: Chapters: 2.1 to 2.3, 5.1 to 5.7   UNIT II: Chapters: 3.1 to 3.8
UNIT III: Chapters: 4.1 to 4.6   UNIT IV: Chapters: 6.1 to 6.7, 8.1, 8.3, 8.5
UNIT V: Chapters: 9.1 to 9.3, 10.1, 10.3

REFERENCE BOOKS:

1. *Digital Computer Fundamentals* , by Thomas C.Bartee TMH 2007.
2. *Digital Circuits and Design*, by S.Salivahanan and S.Arivazhagan ,Vikas Publishers.2005

DIGITAL TOOLS:

1. **https://www.mheducation.co.in/digital–principles–and–applications–sie–9789339203405–india**
2. **http://jnujprdistance.com/assets/lms/LMS%20JNU/B.Sc.(IT)/Sem%20I/Digital%20Computer%20Fundamentals/Version%201/Digital%20Computer%20Fundamentals.pdf**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	1	1	1	2
CO2	2	2	1	2	1	3
CO3	3	2	1	1	2	2
CO4	2	1	2	2	2	3
CO5	1	1	1	1	1	1

3. Advanced Application   2. Intermediate Development   1. Introductory Level

COURSE DESIGNER: Prof. K. P. GNANESH

Passed in the BoS Meeting held on 09/03/2024   Signature of the Chairman

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COURSE STRUCTURE – II SEMESTER

S. No	Course Code	Course Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	24UACT21	**Part – I: Tamil –** பொதுத் தமிழ் – II	6	3	25	75	100	3
	24UACH21	**Hindi –** General Hindi – II						
	24UACS21	**Sanskrit –** Prose, Grammar and History of Sanskrit Literature						
2.	24UACE21	**Part – II: English –** General English – II	6	3	25	75	100	3
3.	24UCSC21	**Part – III: Core – 3:** Data Structures and Algorithms	4	3	25	75	100	4
4.	24UCSCP2	**Part – III: Core – 4: Lab :** Data Structures Using C	6	3	40	60	100	4
5.	24UCSA21	**Part – III: Allied – 2:** Probability and Statistics	4	3	25	75	100	4
6.	24UCSS21	**Part – IV: SBS – 2:** Computer Organization & Architecture	2	3	25	75	100	2
7.	24UACES1	**Part – IV:** Environmental Studies	2	3	25	75	100	2
		TOTAL	**30**				**700**	**22**

CA – Class Assessment (Internal)

SE – Summative Examination

SBS – Skill Based Subject

NME – Non –Major Elective

T – Theory

P – Practical

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCSC21	**DATA STRUCTURES AND ALGORITHMS**	**CORE – 3**	**4**	**–**	**4**

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	**II**	**25**	**75**	**100**

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:

This course aims to impart fundamental knowledge to organize and structure data to the design and implementation of efficient algorithms and program development. And also learn on application of data structures in problem solving using several predefined algorithms.

COURSE OBJECTIVES:

- To impart knowledge and skill on identifying apt data structures to solve problems efficiently.
- To impart skill to write time and space efficient algorithms.
- To give knowledge on the concepts and applications of (i) linear data structures viz., arrays, stacks, queues (ii) linked linear data structures viz., linked lists, linked stacks and linked queues and (iii) Non–linear data structures viz.,trees, binary trees
- To give knowledge on various sorting and searching algorithms
- To impart knowledge on solving problems using algorithmic techniques viz., Divide and Conquer, Greedy Approach

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	identify data structures needed to solve specific problems	**Upto K3**
CO 2	analyze the data structures for effective use in problem solving	**Upto K3**
CO 3	design and develop efficient algorithms in terms of Space and Time	**Upto K3**
CO 4	troubleshoot algorithms	**Upto K3**
CO 5	analyze time complexity of algorithms	**Upto K3**

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

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DATA STRUCTURES AND ALGORITHMS

UNIT– I: INTRODUCTION

Basic Terminology; Elementary data organization – Data structure operations – Complexity of algorithms – other saymptotic notations for complexity of algorithms

Arrays – Introduction – Linear Arrays – Representation of Linear Arrays in memory – Traversing Linear Arrays –Inserting and Deleting – Searching – Linear Search, binary Search – Multi dimensional arrays

UNIT–II: LINKED LIST

Introduction – Representation on Linked list in memory – Traversing a linked list – searching in a linked list – **Memory Allocation**: Garbage Collection – Inserting into a linked list – Deletion from a linked list

UNIT–III: STACK

Introduction – Array representation of stacks – Linked list representation of stacks – **Arithmetic Expression**: Polish Notation – Evaluation of a Postfix expression – transforming infix expression to postfix expression – **Recursio**n: Factorial , Fibonacci – Towers of Hanoi

Queue – Linked Representation of Queues – DeQueue

UNIT–IV: TREES

Binary Trees – Representing binary trees in memory – Traversing binary trees – Binary Search Trees – Searching and inserting in binary search trees – deleting a binary search tree

Algorithms – Introduction– What is an Algorithm – Algorithms Specification – Performance Analysis

Divide and Conquer – General Method – Binary Search – Finding the maximum and Minimum – Merge Sort – Quick Sort – Selection

UNIT–V: THE GREEDY METHOD

General Method – Knapsack problem – Job sequencing with deadlines – **Minimum cost spanning tree**: Prim's Algorithm – Kruskal Algorithm – Optimal Storage on tapes – optimal merge patterns – single source shortest path

TEXT BOOKS:

1. *Data Structures* by Seymour Lipschutz, Schaum's outlines, Tata McGraw Hill Education Private Limited, New Delhi. 2006.

2. *Fundamentals of Computer Algorithms*, Ellis Horowitz, Sartaj Shani, Galgotia publications Pvt. Ltd, New Delhi.

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REFERENCE BOOKS:
1. ***Data structures Using C*** Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J.Augenstein, Kindersley (India) Pvt.Ltd.,
2. ***Data Structures and Algorithms***, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, Pearson Education Pvt.Ltd.,

DIGITAL TOOLS:
1. https://www.computer–pdf.com/programming/781–tutorial–data–structure–and–algorithm–notes.html
2. https://www.cs.princeton.edu/courses/archive/spr11/cos247/lectures/08DsAlg.pdf
3. https://www.iare.ac.in/sites/default/files/lecture_notes/IARE_DS_LECTURE_NOTES_2.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	1	1	1	2
CO2	2	2	1	2	1	3
CO3	3	2	1	1	2	2
CO4	2	1	2	2	2	3
CO5	1	1	1	1	1	1

3. Advanced Application   2. Intermediate Development   1. Introductory Level
COURSE DESIGNER: Prof. D. V. JEYANTHI

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCSCP2	LAB: DATA STRUCTURES USING C	CORE – 4 LAB	6	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	40	60	100

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	✓

COURSE DESCRIPTION:
This course aims to impart fundamental knowledge to organize and structure data to the design and implementation of efficient algorithms and program development. And also learn on application of data structures in problem solving using several predefined algorithms.

COURSE OBJECTIVES:
- To impart knowledge and skill on identifying apt data structures to solve problems efficiently.
- To impart skill to write time and space efficient algorithms.
- To give knowledge on the concepts and applications of (i) linear data structures viz., arrays, stacks, queues (ii) linked linear data structures viz., linked lists, linked stacks and linked queues and (iii) Non–linear data structures viz.,trees, binary trees
- To give knowledge on various sorting and searching algorithms
- To impart knowledge on solving problems using algorithmic techniques viz., Divide and Conquer, Greedy Approach

COURSE OUTCOMES (COs):
After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	identify data structures needed to solve specific problems	Upto K3
CO 2	analyze the data structures for effective use in problem solving	Upto K3
CO 3	design and develop efficient algorithms in terms of Space and Time	Upto K3
CO 4	troubleshoot algorithms	Upto K3
CO 5	analyze time complexity of algorithms	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

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LAB: DATA STRUCTURES USING C

LIST OF EXPERIMENTS

1. Write a C program to create two array list of integers. Sort and store the elements of both of them in third list.
2. Write a C program to multiply two matrices A and B and store the resultant matrix in C using arrays.
3. Write a C program to experiment the operation of STACK using array.

4. Write a C program to experiment the operation of STACK using pointers

5. Write a C program to create menu driven options to implement QUEUE to perform the following
   (i) Insertion   (ii) Deletion   (iii) Modification   (iv) Listing of elements

6. Write a C program to create Linked list representations of employee records and do the following operations using pointers.
   i. To add a new record.
   ii. To delete an existing record.
   iii. To print the details about an employee.
   iv. To find the number of employees in the structure.

7. Write a C Program to count the total nodes of the linked list.

8. Write a C program to insert an element at the end of the linked list.

9. Write a C program to insert an element at the beginning of a doubly linked list.

10. Write a C program to display the hashtable, using the mid square method.

11. Write a program to demonstrate Linear Search.

12. Write a program to demonstrate Binary Search.

13. Write a C program to insert nodes into a Binary tree and to traverse in pre order.

14. Write a C program to traverse the given binary tree using all traversal methods.

15. Write a C program to arrange a set of numbers in ascending order using QUICKSORT.

COURSE DESIGNER: Prof. K. P.GNANESH

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCSA21	**PROBABILITY AND STATISTICS**	**ALLIED – 2**	**4**	**–**	**4**

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	**II**	**25**	**75**	**100**

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	☐

COURSE DESCRIPTION:

This course helps to provide the fundamental knowledge about Probability & Statistics

COURSE OBJECTIVES:

- To give knowledge about various types of statistical measures such as mean, median, mode, geometric mean, harmonic mean, standard deviation etc.,
- To give a foundation in statistical data analysis
- To solve real life problems using Correlation coefficient, regression, and theoretical probability distributions.

COURSE OUTCOMES (CO):

After the completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	identify the basic concepts Central tendencies	**Upto K3**
CO 2	gain knowledge about Measures of Dispersion	**Upto K3**
CO 3	receive the idea of Curve Fitting, Coorelation & Regression	**Upto K3**
CO 4	get knowledge about the basic concepts of Probability & Random variables	**Upto K3**
CO 5	acquire knowledge about theoretical Discrete & Continuous distributions	**Upto K3**

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLICATION

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PROBABILITY AND STATISTICS

UNIT –I : CENTRAL TENDENCIES

Introduction – Arithmetic Mean (AM) – Partition values (Median, Quartiles, Deciles and Percentiles) – Geometric Mean and Harmonic Mean – Relative advantages of different averages. (**Problems** – Solved Example Problems only– **Theorems**– Statements only)

UNIT – II : MEASURES OF DISPERSION

Introduction – Measures of Dispersion – Measures of dispersion – Range – Quartile Deviation – Mean Deviation – Standard deviation and Root mean square deviation – Coefficient of dispersion – Coefficient of variation – relative advantages of different measures of dispersion – Moments – Skewness – Kurtosis – (**Problems** – Solved Example Problems only– **Theorems**– Statements only)

UNIT – III : CURVE FITTING

Introduction – Principle of Least squares – Fitting of a straight line – Fitting of second degree parabola. **CORRELATION AND REGRESSION:** Introduction – Correlation – Karl Pearson coefficient of correlation – Rank Correlation – Repeated ranks – Regression – Lines of regression – (**Problems** – Solved Example Problems only– **Theorems**– Statements only)

UNIT – IV : PROBABILITY

Introduction – Probability – Conditional Probability – Example Problems only. **RANDOM VARIABLES**: Introduction – Random Variables – Discrete Random variable – Continuous random variable – Mathematical Expectations – (**Problems** – Solved Example Problems only – **Theorems**– Statements only)

UNIT –V : SOME SPECIAL DISTRIBUTIONS

Introduction – Binomial distribution – Mean & Variance of Binomial distribution – Solved Problems – Poisson distribution – Mean & Variance of Poisson distributions – Solved Problems – Normal distribution – Mean & Variance of Normal distributions– Solved Problems (**Problems** – Solved Example Problems only–**Theorems**– Statements only)

(**Excluding the Topics**: MGF, Median, Mode, Cumulants, Recurrence formula, Fitting distributions, Characteristic functions, Additive Property)

TEXT BOOK:
Statistics By Dr. S. Arumugam & A. Thangapandi Issac, New Gamma Publishing House, 2002
Unit I: 2.0 – 2.5: Pages: 11–59   **Unit II**: 3.0–3.2, 4.0–4.2 : Pages: 60–94
Unit III: 5.0, 5.1, 6.0, 6.1, 6.2, 6.3: Pages: 95–141
Unit IV: 11.0, 11.1, 11.2, 12.0, 12.1, 12.2, 12.3, 12.4: Pages: 274–300, 304–328
Unit V: 13.0, 13.1, 13.2, And 13.3, Pages: 343, 344, 353–356, 358–360, 365–369, 371, 372, 384–389

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REFERENCE BOOKS:
1. *Fundamentals of Mathematical Statistics* by S.C. Gupta & V.K. Kapoor, Sultan Chand and Sons, 2004.
2. *Elements of Mathematical Statistics* By S.C. Gupta & V.K. Kapoor, Sultan Chand & Sons, Third Edition, 2000

DIGITAL TOOLS:
1. http://math.iisc.ernet.in/~manju/UGstatprob16/statprob.pdf
2. http://wwwf.imperial.ac.uk/~ejm/ISE.2.6/NOTES.PDF

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	1	1	3
CO2	2	2	1	1	1	1
CO3	1	1	2	3	1	1
CO4	1	3	1	1	1	3
CO5	1	1	2	2	2	2

3. Advanced Application   2. Intermediate Development   1. Introductory Level

COURSE DESIGNER: Dr. V. K.VIJAYAKUMAR

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCSS21	COMPUTER ORGANIZATION AND ARCHITECTURE	SBS – 2	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:
This course helps to gain the knowledge and understand hardware components of a computer and impart knowledge about internal architecture of a computer system and the techniques used to connect various input/output system with the computer.

COURSE OBJECTIVES:
- To enrich the knowledge on hardware components of a computer
- To have knowledge on Instruction formats and Addressing modes
- To inculcate knowledge on working concepts of Input/output devices.
- To give knowledge on various types of memory and their hierarchies.

COURSE OUTCOMES (COs):
On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	acquire knowledge on registers, instructions , timing and control	Upto K3
CO 2	understand and explain various types of instruction format, addressing modes, data transfer and manipulation instruction and apply the basic concepts to develop assembler program	Upto K3
CO 3	identify the memory requirement of a CPU and understands the working principles of parallel processing and pipeline processing	Upto K3
CO 4	get knowledge on usage of I/O interfaces and various types of data transfers	Upto K3
CO 5	understand various types of memory and its organizations	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

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COMPUTER ORGANIZATION AND ARCHITECTURE

UNIT I:
Instruction Codes – Stored Program Organisation – Computer Registers – Common Bus Systems – Computer Instructions – Timing and Control – Instruction Cycle – Register Reference Instructions

UNIT II:
General Register Organization – Control word – Stack Organization –reverse polish notation – evaluation of arithmetic expressions – Instruction Formats – three address instructions – Two address instructions – one address instructions – zero address instructions – Addressing Modes.

UNIT III:
Parallel processing – Pipelining – Arithmetic Pipeline – Instruction Pipeline –Vector processing –Vector operation – memory interleaving – Super Computer.

UNIT IV:
I/O Interface – Asynchronous Data Transfer – Modes of I/O transfer – Direct Memory Access.

UNIT V:
Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory

TEXT BOOK:
Computer System Architecture by M. Morris Mano 3rd Edition

Unit I	Chapters:	5.1 – 5.5
Unit II	Chapters:	8.1 – 8.5
Unit III	Chapters:	9.1 – 9.4, 9.6
Unit IV	Chapters:	11.2 – 11.4, 11.6
Unit V	Chapters:	12.1 – 12.5

REFERENCE BOOK:
Computer Organization by V. Carl Hamacher, Zconko G. Vranesic, Safwat G. Zaky 4th Edition, McGraw–Hill International Editions.

DIGITAL TOOLS:
1. https://www.geeksforgeeks.org/computer–organization–and–architecture–tutorials
2. https://nptel.ac.in/courses/106105163/

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	1	1	3
CO2	2	2	1	1	1	1
CO3	1	1	2	3	1	1
CO4	1	3	1	1	1	3
CO5	1	1	2	2	2	2

3. Advanced Application   2. Intermediate Development   1. Introductory Level

COURSE DESIGNER: Prof. D.V. JEYANTHI

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SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE – SYLLABUS
(Under CBCS based on OBE) (For those admitted during 2024 – 2025 and after)

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RATIFICATION

In the current syllabus of II B.Sc. Computer Science, in IV semester, we have an Allied course (subject) namely "**OPERATIONS RESEARCH–II**", **Sub. code: 21UCSA41**". Students of both Aided & SF, find difficult to get through this paper in the End–semester examination.

Hence, as a chairman of BOS of Computer Science, it is decided to introduce a new course "**NUMERICAL METHODS**" in the place of "**OPERATIONS RESEARCH–II**", **Subject code: 22UCSA41**" **for those students who have joined from the academic year 2022 – 2023 onwards. The detailed syllabus is given below:**

Passed in the BoS Meeting held on 09/03/2024   **Signature of the Chairman**

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
22UCSA41	**NUMERICAL METHODS**	**ALLIED – 4**	**4**	**–**	**4**

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	**IV**	**25**	**75**	**100**

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:

This course provides an introduction to the basic concepts and techniques of numerical solution of algebraic equation, system of algebraic equation, numerical solution of differentiation, integration and applications to computer to science and to develop the mathematical skills of the students in the areas of numerical methods.

COURSE OBJECTIVES:

➢ Provides various iterative methods to find the roots of algebraic & Transcendental equations
➢ Provides various methods to solve a given system of linear equations
➢ Provides various methods to predict the result 'y' for a given value of 'x' from the given table of (x,y) values for the function y=f(x) using the interpolation
➢ Provides various methods to solve numerical differentiation & integration problems
➢ Provides various methods to solve a given numerical differential equations

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	get knowledge on various iterative methods to find the roots of algebraic & Transcendental equations	**Upto K3**
CO2	understand various methods to solve a given system of linear equations	**Upto K3**
CO3	know various methods to predict the result 'y' for a given value of 'x' from the given table of (x,y) values for the function y=f(x) using the interpolation	**Upto K3**
CO4	understand various methods to solve numerical differentiation & integration problems	**Upto K3**
CO5	get information on various methods to solve a given numerical differential equations	**UptoK3**

K1– KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY

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NUMERICAL METHODS

UNIT – I:

Algebraic and Transcendental equations: Errors in Numerical computation – Iteration methods – Bisection method – Regulafalsi method – Newton Raphson method (Example Problems only)

UNIT – II:

Gauss Elimination method –Gauss Jordan method – Gauss Jacobi method – Gauss Seidal method (Example Problems only)

UNIT – III:

Newton's Interpolation formula – Central Differences Interpolation formula – Lagrange's Interpolation formula – Inverse Interpolation (Example Problems only)

UNIT – IV:

Numerical Differentiation: Newton's Forward and Backward Difference formula
Numerical Integration: Trapezoidal rule – Simpson's one–third rule – Simpson's Three–Eight rule. Eigen values and Eigen vectors of a matrix (Example Problems only)

UNIT – V:

Numerical Solution of Differential Equation: Euler's method – Taylor's Series method – Runge –Kutta method (Example Problems only)

TEXT BOOKS:

Numerical Methods **by** S. Arumugam and Thangapandi Isaac, A. Soma Sundaram, Scitech Publications, Chennai 2002

Unit –1 Sections: 3.1 – 3.5,   **Unit – 2 Sections:** 4.3, 4.4, 4.7 and 4.8,

Unit – 3 Sections: 7.1, 7.2, 7.3, 7.6 **Unit – 4 Sections:** 8.1, 8.2, 8.5, 5.1

Unit – 5 Sections: 10.1. 10.3, 10.4

(NOTE: EXAMPLE PROBLEMS ONLY IN ALL UNITS)

REFERENCE BOOKS: **"*Numerical Methods*"** by T. Veerarajan and J. Ramchandran 2nd edition, Tata MC raw Hill 2006..

DIGITAL TOOLS:

1. http://csw.uobaghdad.edu.iq/wp–content/uploads/sites/30/uploads/computer%20science/Lectures/2nd%20year/NUM%20ANALYSIS.pdf
2. https://nptel.ac.in/content/storage2/courses/122104018/node109.html
3. http://faculty.olin.edu/bstorey/Notes/DiffEq.pdf
4. https://drive.google.com/file/d/1tEtzvlqM4GhXnwFDDRc6PWG5cfKaheAK/view
5. https://perhuaman.files.wordpress.com/2014/07/metodos–numericos.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	1	1	3
CO2	2	2	1	1	1	1
CO3	1	1	2	3	1	1
CO4	1	3	1	1	1	3
CO5	1	1	2	2	2	2

3. Advanced Application   2. Intermediate Development   1. Introductory Level

COURSE DESIGNER: Dr. V. K. VIJAYAKUMAR

Passed in the BoS Meeting held on 09/03/2024   **Signature of the Chairman**