



# **SOURASHTRA COLLEGE, MADURAI- 625004**

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

## **B.Sc. INFORMATION TECHNOLOGY- SYLLABUS**

**(Under CBCS based on OBE)**

**(with effect from 2021-22)**

486

### **DEPARTMENT PROFILE**

The Department of Information Technology was established in the year 2000 with B.Sc., Information Technology 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 750 (17 batches) Information Technology graduates and they are all well placed in India & abroad. The Department has been producing excellent results over a period of 16 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 Technology domain in their career.
- Enable to have sound knowledge of the theory behind the core subjects
- To attain an ability to use current techniques, skills, and tools necessary for computing practice.
- To communicate effectively, both orally and in writing and engaged in collaborative teamwork.
- To expose the current trends in computing which will enable them to become leaders in the IT field.

### **MISSION**

The Mission of the Department is to facilitate quality education in information technology domain to achieve higher goals in technical area for professional development. 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.

Signature of the Chairman/HOD

**Passed in the BOS Meeting held on 18-03-2020**



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487

### **DISTRIBUTION OF CREDITS (UG PROGRAMME)**

<b>PART</b>	<b>SEM</b>	<b>COURSES</b>	<b>NO.OF COURSES</b>	<b>HOURS</b>	<b>CREDITS</b>	<b>TOTAL CREDITS</b>
I	I-IV	LANGUAGE	4	6	3	12
II	I-IV	ENGLISH	4	6	3	12
III	I-VI	CORE	15-20	4-6	4-5	60
III	I-IV	ALLIED	4	5	5	20
III	V,VI	ELECTIVE	3	5	5	15
IV	I-V	SKILL BASED SUBJECT(SBS)	6	2	2	12
IV	I	VALUE EDUCATION	1	2	2	2
IV	II	ENVIRONMENTAL STUDIES	1	2	2	2
IV	III,IV	NON-MAJOR ELECTIVE(NME)	2	2	2	4
V	IV	EXT.ACTIVITY	1	0	1	1
<b>TOTAL CREDITS</b>						<b>140</b>



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488

### **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.

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



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489

### **PROGRAMME SPECIFIC OUTCOMES (PSOs)**

On completion of B.Sc. Information Technology Programme, the students are expected to

<b>PSO 1</b>	develop as 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
<b>PSO 2</b>	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.
<b>PSO 3</b>	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
<b>PSO 4</b>	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
<b>PSO 5</b>	understand, assess and commit to professional and ethical principles, norms and responsibilities of the cyber world through Digital Literacy, and the ability for work efficacy as a part of a team and engage effectively with diverse stakeholders
<b>PSO 6</b>	embark on new ventures and initiatives with critical thinking and desire for more continuous learning focusing on life skills.



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490

### I SEMESTER

S. No.	Sub. Code	Subject Title	Hours / Week	Exam (Hrs.)	Total Marks	Credits
1	21UACT11/ H11/S11	Tamil/ Hindi/ Sanskrit	6	3	100	3
2	21UACE11	English	6	3	100	3
3	21UITC11	Core 1: Programming in C	5	3	100	4
4	21UITCP1	Core 2: Programming in C Lab	5	3	100	4
5	21UITA11	Allied 1: Discrete Structures	4	3	100	4
6	21UITS11	SBS 1: Digital Computer Fundamentals	2	3	100	2
7	21UACVE1	Value Education	2	3	100	2
		<b>TOTAL</b>	30		700	22

### II SEMESTER

S. No.	Sub. Code	Subject Title	Hours / Week	Exam (Hrs.)	Total Marks	Credits
1	21UACT21/ H21/S21	Tamil/ Hindi/ Sanskrit	6	3	100	3
2	21UACE21	English	6	3	100	3
3	21UITC21	Core 3: Fundamentals of Data Structure	5	3	100	4
4	21UITCP2	Core 4: Data Structure Using C Lab	5	3	100	4
5	21UITA21	Allied 2: Statistics	4	3	100	4
6	21UITS21	SBS 2: Computer Organization and Architecture	2	3	100	2
7	21UACES1	Environmental Studies	2	3	100	2
		<b>TOTAL</b>	30		700	22



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491

### III SEMESTER

S. No	Sub. Code	Subject Title	Hours / Week	Exam (Hrs.)	Total Marks	Credits
1		Tamil/ Hindi/ Sanskrit	6	3	100	3
2		English	6	3	100	3
3		Core 5: OOP's using C++	5	3	100	4
4		Core 6: OOP's using C++ Lab	5	3	100	4
5		Allied 3: Resource Management Technique	4	3	100	4
6		SBS 3: Office Automation Lab	2	3	100	2
7		NME -1	2	3	100	2
		<b>TOTAL</b>	30		700	22

### IV SEMESTER

S. No	Sub. Code	Subject Title	Hours / Week	Exam (Hrs.)	Total Marks	Credits
1		Tamil/ Hindi/ Sanskrit	6	3	100	3
2		English	6	3	100	3
3		Core 7: Programming in Java	5	3	100	4
4		Core 8: Programming in Java Lab	5	3	100	4
5		Allied 4: Numerical Methods	4	3	100	4
6		SBS 4: Multimedia Lab	2	3	100	2
7		NME -2	2	3	100	2
8		Ext Activity		-	100	1
		<b>TOTAL</b>	30		800	23



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492

### V SEMESTER

S. No	Sub. Code	Subject Title	Hours / Week	Exam (Hrs.)	Total Marks	Credits
1		Core 9: Operating System	6	3	100	4
2		Core 10: Relational Database Management System	5	3	100	4
3		Core 11: Web Technology Lab	5	3	100	4
4		Core 12: TCP/IP	5	3	100	4
5		Elective 1: Web Technology	5	3	100	5
6		SBS 5: Software Testing	2	3	100	2
7		SBS 6: Oracle & PL/SQL Lab	2	3	100	2
8		Soft Skills		-	100	
		<b>TOTAL</b>	30		800	25

### VI SEMESTER

S. No	Sub. Code	Subject Title	Hours / Week	Exam (Hrs.)	Total Marks	Credits
1		Core 13: Programming in Python	5	3	100	4
2		Core 14: Python Programming Lab	5	3	100	4
3		Core 15: Software Engineering	5	3	100	4
4		Core 16: Open Source (PHP)	5	3	100	4
5		Elective 2: Principles of Information Security	5	3	100	5
6		Elective 3: Project	5	3	100	5
7		GK		-	100	
		<b>TOTAL</b>	30		700	26



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493

### **I SEMESTER**

<b>S. No.</b>	<b>Sub. Code</b>	<b>Subject Title</b>	<b>Hours / Week</b>	<b>Exam (Hrs.)</b>	<b>CA</b>	<b>SE</b>	<b>Total Marks</b>	<b>Credits</b>
1	21UACT11/ H11/S11	Tamil/ Hindi/ Sanskrit	6	3	25	75	100	3
2	21UACE11	English	6	3	25	75	100	3
3	21UITC11	Core 1: Programming in C	5	3	25	75	100	4
4	21UITCP1	Core 2: Programming in C Lab	5	3	40	60	100	4
5	21UITA11	Allied 1: Discrete Structures	4	3	25	75	100	4
6	21UITS11	SBS 1: Digital Computer Fundamentals	2	3	25	75	100	2
7	21UACVE1	Value Education	2	3	25	75	100	2
		<b>TOTAL</b>	30				700	22





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494

Course code	Course Title	Category	L	T	P	Credits
21UITC11	PROGRAMMING IN C	Core-1	5	-	-	4

L – Lecture

T – Tutorial

P – Practical

Year	Semester	Internal	External	Total
I	I	25	75	100

### 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 introduce and form a firm foundation in programming
- To stress the importance of clarity , simplicity and the efficiency in writing programs
- To develop programming skills using the fundamentals and basics of C language
- To develop programs using the basic elements like control statements, Arrays and Strings

### COURSE OUTCOMES (COs):

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

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	apply the basic concepts and develop program to find solutions for simple problems	K1
CO 2	design programs to solve complex problems by using suitable control statements	K2,K3
CO 3	analyze the problem and design efficient program using functions	K1,K3
CO 4	use array and structure to handle volume of data	K1,K3
CO 5	use advanced data structures Pointers and files for data processing	K2,K3

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



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495

### 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.

#### 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: Creating Processing, Opening and Closing a data file.

#### TEXT BOOK

1. 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:TheCompleteReference",4thEdition.TMHEdition,2000.
3. Gottfried B.S, "Programming with C", Second Edition, TMH Pub. Co. Ltd., New Delhi1996.
4. KanetkarY., "LetusC",BPBPub.,NewDelhi,1999.

#### ONLINE RESOURCES:

1. [http://www.kciti.edu/wp-content/uploads/2017/07/cprogramming\\_tutorial.pdf](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	S					
CO2		M	L			M
CO3	M					
CO4	M		M	S		L
CO5	M	M	M	S	M	L

S – STRONG

M – MEDIUM

L - LOW

COURSE DESIGNER: Prof. S. E. Hemapriya

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496

Course code	Course Title	Category	L	T	P	Credits
21UITCP1	PROGRAMMING IN C LAB	Core-2	-	-	5	4

L – Lecture

T – Tutorial

P – Practical

Year	Semester	Internal	External	Total
I	I	40	60	100

### OBJECTIVES

- It aims to train the student to the basic concepts of the C-programming language
- To improve the programming skills through C language

### 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

1. 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.

### Recursion

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

### Matrix Manipulation

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



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497

### **Sorting and Searching**

1. Insertion Sort
2. Bubble Sort
3. Linear Search
4. Binary Search

### **Functions**

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

### **Structures**

1. Mark Sheet Preparation using structure
2. Paybill Preparation using structure

### **Files**

1. Inventory Control using files
2. Maintaining Book Information using files

**COURSE DESIGNER: Prof. S.E. Hemapriya**



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498

Course code	Course Title	Category	L	T	P	Credits
21UITA11	DISCRETE STRUCTURES	Allied-1	4	-	-	4

L – Lecture

T – Tutorial

P – Practical

Year	Semester	Internal	External	Total
I	I	25	75	100

### 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 Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	identify the basic concepts Set theory & Relations	K1
CO 2	gain knowledge about Matrix Algebra	K2,K3
CO 3	inculcate the idea of Logics using Truth tables	K1,K3
CO 4	gain knowledge about the basic concepts of Graph Theory and its applications	K1,K3
CO 5	acquire knowledge about Graph Theory, sub graphs and Connectedness solve relevant problems	K2,K3

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



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499

### 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

**Relations:** Relations – Representation of a Relation – Operations on Relations – Equivalence Relation .

#### 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.

#### 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.

#### UNIT - IV: Graph theory and Sub Graphs:

Introduction-Definitions and examples-Degrees-Sub graphs-isomorphism-Matrices– Operations on Graphs.

#### UNIT -V: Connectedness:

Introduction-Walks, Trials and Paths-Connectedness and Components.

#### TEXT BOOKS:

1. **Discrete Mathematics**, Dr. M.K. Venkataraman, Dr. N. Sridharan and Dr. N. Chandrasekaran, National Publishing Company, 2000. (for Units I, II and III)
2. **Invitation to Graph Theory**, S. Arumugam and S. Ramachandran, SciTech Publications, June 2001(for Unit IV Page no 5-16 and 24-27,Unit V Pages 34-42).

#### REFERENCE BOOKS:

1. **Modern Algebra**, S. Arumugam & A. Thangapandi Issac, Scitech publications, 2005
2. **Graph Theory with Applications to Engineering and Computer Science**, Narsingh Deo, Prentice Hall of India Pvt.Ltd.,(For units IV and V)

#### ONLINE RESOURCES:

1. <https://www.coursera.org/specializations/discrete-mathematics>
2. <https://www.javatpoint.com/discrete-mathematics-tutorial>
3. <https://medium.com/basecs/a-gentle-introduction-to-graph-theory-77969829ead8>

#### Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S					
CO2		M	L			M
CO3	M					
CO4	M		M	S		L
CO5	M	M	M	S	M	L

S – STRONG

M – MEDIUM

L - LOW

**COURSE DESIGNER: Prof. A. R. Ganeshbabu**

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500

Course code	Course Title	Category	L	T	P	Credits
21UITS11	DIGITAL COMPUTER FUNDAMENTALS	SBS-1	2	-	-	2

L – Lecture

T – Tutorial

P – Practical

Year	Semester	Internal	External	Total
I	I	25	75	100

### 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.

### COURSE OUTCOMES (COs):

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

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	describe the basics of Number Systems, Codes	K1
CO 2	understand the concept of logic gates and Boolean Laws and Theorems.	K1,K2
CO 3	develop the logic circuit using k-map and truthtables.	K2,K3
CO 4	know the design of multiplexer, demultiplexer, decoder and encoder.	K2,K3
CO 5	know binary addition and apply the concept of flipflop.	K2,K3

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



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501

### DIGITAL COMPUTER FUNDAMENTALS

#### UNIT-I

Binary Numbers – binary to decimal – decimal to binary – octal – hexa decimal – ASCII code – Excess-3 code – Gray Code.

#### UNIT-II

Basic gates - Inverter – OR gates – AND gates –Universal Logic gates- NOR gates – NAND gates –Boolean Laws and Theorems.

#### UNIT-III

Sum of product method – K-Map truth tables – Pairs,Quads , Octets – K-Map simplifications – Don't care – product of sum method – product of sum simplification.

#### UNIT-IV

Multiplexers – Demultiplexers – 1- of - 16 Decoders- BCD-to-Decimal Decoder – 7 segment decoders – Encoders – Exclusive-OR gates – parity generators – checkers.

#### UNIT-V

Binary Addition – Binary Subtraction – 2's & 1's complement representation – Complement Arithmetic – Arithmetic building blocks- Flip-flops: Edge triggered RS Flip-flop-Edge triggered JK Flip-flop.

#### TEXT BOOK:

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 5.8

UNIT II : Chapters: 3.1 to 3.8

UNIT III: Chapters: 4.1 to 4.8

UNIT IV: Chapters: 6.1 to 6.8, 8.1, 8.3, 8.4, 8.5, 8.7

UNIT V : Chapters: 9.1 to 9.5, 10.1, 10.3

#### REFERENCE BOOKS:

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

#### ONLINE RESOURCES:

1. <https://www.mheducation.co.in/digital-principles-and-applications-sie-9789339203405-india>
2. [http://jnuprdistance.com/assets/lms/LMS%20JNU/B.Sc.\(IT\)/Sem%20I/Digital%20Computer%20Fundamentals/Version%20I/Digital%20Computer%20Fundamentals.pdf](http://jnuprdistance.com/assets/lms/LMS%20JNU/B.Sc.(IT)/Sem%20I/Digital%20Computer%20Fundamentals/Version%20I/Digital%20Computer%20Fundamentals.pdf)

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S					
CO2		M	L			M
CO3	S					
CO4	M		M	S		L
CO5	M	M	M	S	M	L

S – STRONG

M – MEDIUM

L – LOW

**COURSE DESIGNER: Prof. R. P. Umadevi**

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## **B.Sc. INFORMATION TECHNOLOGY- SYLLABUS**

**(Under CBCS based on OBE)**

**(with effect from 2021-22)**

502

### **II SEMESTER**

<b>S. No.</b>	<b>Sub. Code</b>	<b>Subject Title</b>	<b>Hrs. / Week</b>	<b>Exam (Hrs.)</b>	<b>CA</b>	<b>SE</b>	<b>Total Marks</b>	<b>Cre dits</b>
1	21UACT21/ H21/S21	Tamil/ Hindi/ Sanskrit	6	3	25	75	100	3
2	21UACE21	English	6	3	25	75	100	3
3	21UITC21	Core 3: Fundamentals of Data Structure	5	3	25	75	100	4
4	21UITCP2	Core 4: Data Structure Using C Lab	5	3	40	60	100	4
5	21UITA21	Allied 2: Statistics	4	3	25	75	100	4
6	21UITS21	SBS 2: Computer Organization and Architecture	2	3	25	75	100	2
7	21UACES1	Environmental Studies	2	3	25	75	100	2
		<b>TOTAL</b>	<b>30</b>				<b>700</b>	<b>22</b>



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503

Course code	Course Title	Category	L	T	P	Credits
21UITC21	FUNDAMENTALS OF DATA STRUCTURES	Core-1	5	-	-	4

L – Lecture

T – Tutorial

P – Practical

Year	Semester	Internal	External	Total
I	II	25	75	100

### COURSE DESCRIPTION:

This course aims to impart fundamental knowledge 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 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.

### COURSE OUTCOMES (COs):

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

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand about Needs and Types of Data Structures and Categories of Problem Solving	K1
CO 2	get the Knowledge about Stack and Their implementation and representation	K2,K3
CO 3	learn about Queue, Dequeue and the implementation of Linkedlist	K3
CO 4	understand about the various types of sorting	K3
CO 5	get the knowledge of Trees and Binary Trees and Tree Traversals	K2,K3

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



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504

### FUNDAMENTALS OF DATA STRUCTURES

#### UNIT- I

Need for data structures – data types – Abstract data types (ADT) -Definition of data structure – types of data structures – Algorithm analysis: – problem solving – categories of problem solving – Problem solving strategies with examples.

#### UNIT- II

**Stack:** Introduction – ADT stack – Implementation of Stack: Representation using arrays and Linked lists – Applications of stack: Well formedness of parenthesis-Syntax checking using stacks –Infix, Prefix and Postfix forms of expressions – Recursive functions – Tower of Hanoi

#### UNIT- III

**Queues:** Introduction – Implementation of Basic operations on Array based – On Linked list based - circular queues - Dequeue.

**Linked List** – Introduction - Memory allocation – Benefits and limitations – Types – Basic operations of Singly Linked List – Insertion – Print – Deletion

#### UNIT-IV

**Sorting** – Introduction – types – bubble sort – Insertion – shell – Selection – Merge – Quick sort – Heap Sort – Radix sort .

#### UNIT-V

**Trees** –Introduction - Binary trees – types of binary trees – complete, almost complete and strictly binary trees – skew trees – Representation of Binary trees : Linear Representation- Simple Algorithms on Binary trees - Binary tree traversals – inorder, preorder and postorder traversal.

#### TEXT BOOKS:

Chitra, Rajan - Data Structures – Vijay Nicole Publishers Kumars Naimipour.Narosa publication, 2004.

#### **CHAPTERS and SECTIONS (For UNIT-I, II, III,IV and V)**

Unit I: Chapter 1: Page no -1-6 Chapter 2: page No - 9-13

Unit II: Chapter 5: Page No. 81 to 104

Unit III: Chapter 6: Page no 111 to 121 Chapter 4 : Page No. 41 to 46 , 49, 54.

Unit IV: Chapter 11: Page No 253 to 287

Unit V: Chapter 7: Page No 125 to 139

#### REFERENCE BOOKS:

1. Classical Data Structures – D.Samanta, PHI, 2008

2. Fundamentals of computer algorithms, Ellis Horowitz and Sartaj Sahni, Galgotia book house.

#### ONLINE RESOURCES:

1. [https:// www.javatpoint.com/data-structure-tutorial](https://www.javatpoint.com/data-structure-tutorial)

2. [https:// www.tutorialride.com/data-structures](https://www.tutorialride.com/data-structures)

3. [https:// www.geeksforgeeks.org/data-structures/](https://www.geeksforgeeks.org/data-structures/)

#### **Mapping of CO with PSO**

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S					
CO2		M	L			S
CO3	S					
CO4	M		M	S		L
CO5	M	M	S	S	M	L

S – STRONG

M – MEDIUM

L – LOW

**COURSE DESIGNER: Prof. R. P. Umadevi**

**Passed in the BOS Meeting held on 18-03-2020**



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505

Course code	Course Title	Category	L	T	P	Credits
21UITCP2	DATA STRUCTURES USING C LAB	Core-4	-	-	5	4

L – Lecture

T – Tutorial

P – Practical

Year	Semester	Internal	External	Total
I	II	40	60	100

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 create menu driven options to implement QUEUE to perform the following  
(i) Insertion (ii) Deletion (iii) Modification (iv) Listing of elements
5. 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.
6. Write a C Program to count the total nodes of the linked list.
7. Write a C program to insert an element at the end of the linked list.
8. Write a C program to insert an element at the beginning of a doubly linked list.
9. Write a C program to display the hashtable, using the mid square method.
10. Write a program to demonstrate Binary Search.
11. Write a C program to insert nodes into a Binary tree and to traverse in pre order.
12. Write a C program to traverse the given binary tree using all traversal methods.
13. Write a C program to arrange a set of numbers in ascending order using QUICKSORT.

**COURSE DESIGNER: Prof. S.E. Hemapriya**

**Passed in the BOS Meeting held on 18-03-2020**



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## B.Sc. INFORMATION TECHNOLOGY- SYLLABUS

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506

Course code	Course Title	Category	L	T	P	Credits
21UITA21	STATISTICS	Allied-2	4	-	-	4

L – Lecture

T – Tutorial

P – Practical

Year	Semester	Internal	External	Total
I	II	25	75	100

### 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 (COs):

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	K1
CO 2	gain knowledge about Measures of Dispersion	K2,K3
CO 3	inculcate the idea of Curve Fitting, Correlation & Regression	K1,K3
CO 4	gain knowledge about the basic concepts of Probability & Random variables	K1,K3
CO 5	gain knowledge about theoretical Discrete & Continuous distributions	K2,K3

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



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507

### STATISTICS

#### UNIT – I

**CENTRAL TENDENCIES:** Introduction –Arithmetic Mean (AM) – Partition values (Median, Quartiles, Deciles and Percentiles) – Geometric Mean and Harmonic Mean.

#### 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 – Skewness – Kurtosis

#### 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

#### UNIT – IV

**TESTS OF SIGNIFICANCE** (Small samples)(Only Example Problems): t-Distribution-Difference between the mean of a sample and that of a population –Difference between two samples-F-Test-Observed Sample Correlation.

#### UNIT – V

**Test Based Chi Square-Distribution** (Only Example Problems): Introduction-Chi Square Test for Population Variance- Chi Square Test for goodness of fit- Chi Square Test for Independence of Attributes.

#### TEXT BOOK:

**STATISTICS**, By “Dr. S. ARUMUGAM & A.THANGAPANDI ISSAC”, NEW GAMMA PUBLISHING HOUSE, July 2013

Unit I: chapter 2 Page no11-58

Unit II: chapter 3 and 4 .Page no.60-80 Page no: 82-91

Unit III: chapter 5.Page no95-105

Unit IV: chapter 15: Pages no 434-454

Unit V: chapter 16: Page no 455-480

#### 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

#### ONLINE RESOURCES:

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	S					
CO2		M	L			M
CO3	M					
CO4	M		M	S		L
CO5	M	M	M	S	M	L

S – STRONG

M – MEDIUM

L - LOW

**COURSE DESIGNER: Prof. S.K. Ganesh Babu**

**Passed in the BOS Meeting held on 18-03-2020**



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## B.Sc. INFORMATION TECHNOLOGY- SYLLABUS

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508

Course code	Course Title	Category	L	T	P	Credits
21UITS21	SBS-2: COMPUTER ORGANIZATION & ARCHITECTURE	SBS-2	2	-	-	2

L – Lecture

T – Tutorial

P – Practical

Year	Semester	Internal	External	Total
I	II	25	75	100

### COURSE DESCRIPTION:

This course helps to gain the knowledge and understands 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):

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

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	acquire knowledge on registers, instructions , timing and control	K1
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	K2,K3
CO 3	identify the memory requirement of a CPU and and understands the working principles of parallel processing and pipeline processing	K1,K2
CO 4	gain knowledge on usage of I/O interfaces and various types of data transfers	K1, K2
CO 5	understand various types of memory and its organizations	K1

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



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### COMPUTER ORGANIZATION & ARCHITECTURE

#### UNIT - I

Instruction Codes \_ Computer Registers – Computer Instructions – Timing and Control – Instruction Cycle.

#### UNIT - II

General Register Organization – Stack Organization – Instruction Formats – Addressing Modes.

#### UNIT - III

Parallel processing-Pipelining-Arithmetic and 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 – Virtual Memory.

#### TEXT BOOK:

Computer System Architecture – M. Morris Mano 3<sup>rd</sup> 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 - 12.6

#### REFERENCE BOOKS:

Computer Organization V. Carl Hamacher, Zconko G. Vranesic, Safwat G. Zaky 4<sup>th</sup> Edition, McGraw-Hill International Editions.

#### WEB RESOURCES:

- <https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials>
- <https://nptel.ac.in/courses/106105163/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S		L			
CO2		M	L			M
CO3	M	M			L	
CO4			M	S		L
CO5	M			S	L	L

S – STRONG

M – MEDIUM

L - LOW

**COURSE DESIGNER: Prof. R.P. Umadevi**

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