



SOURASHTRA COLLEGE, MADURAI- 625004

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

B.Sc. MATHEMATICS WITH COMPUTER APPLICATIONS

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

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DEPARTMENT PROFILE:

The Department of Mathematics (Computer Application) was established in the year 2010. The Under Graduate Programme was started in 2010. Since then, the Department has completed four batches and more than 100 students have received the degree. Our Department graduates are well placed in and around India. The Department has been producing excellent results over a period of 8 years. The Department has been successfully functioning with a well equipped Computer Laboratory, and a Department Library.

VISION:

Aims to create an erudite, disciplined and well-rounded mathematician by imparting high quality subject knowledge and life values to excel both academically and professionally.

MISSION:

- To guide, teach mathematical knowledge and support the students towards mathematical excellence by embracing them into our group of mathematicians, share our ideas, grow in knowledge and thus improving their capabilities and apply all learned concepts to excel in all fields.
- To develop quantitative, computational, reasoning, problem solving skills and critical thinking for the upcoming mathematicians to model, formulate and solve real life applications.
- To encourage the students with strong foundational skills and abilities to pursue higher studies and research.

Signature of the Chairman/HOD

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



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DISTRIBUTION OF CREDITS

S. No.	PART	No. of. Papers	Credits
1	I- LANGUAGE	4	12
2	II-ENGLISH	4	12
3	III CORE	16	64
	III ALLIED	4	16
	III ELECTIVE	3	15
4	IV SBS	6	12
	IV NME	2	4
	IV VE	1	2
	IV EVS	1	2
5	EXT .ACT	1	1
6	SELF STUDY	2 (S.S & GK)	0
	TOTAL	44	140

Semester	Credits
I	22
II	22
III	23
IV	24
V	23
VI	26
Total	140

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Undergraduate (UG) Programme Outcomes (POs)

The 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.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

After the completion of UG Programme, students will be able to

PSO1	develop required skills such as arithmetical/analytical/computer programming skills etc., and provide a systematic understanding of the fundamental concepts and theories of Mathematics.
PSO2	expertise with skills to handle data, problems, to frame hypothesis, evaluate and validate results, and apply various concepts.
PSO3	gain advanced knowledge in the field of various applications of Mathematics and apply knowledge of principles, concepts and results in specific subject area to analyze.
PSO4	get the mathematical ability and abstract intelligence and get equipped for higher Mathematics and to become good academicians
PSO5	pursue higher studies which in turn will offer them job opportunities in various sectors like banks, central government institutions etc.,

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B.Sc. MATHEMATICS WITH COMPUTER APPLICATIONS - MATHEMATICS WITH COMPUTER APPLICATIONS COURSE STRUCTURE I SEMESTER

S. No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1	21UACT11/ H11/S11	Tamil/Hindi/ Sanskrit	6	3	25	75	100	3
2	21UACE11	English	6	3	25	75	100	3
3	21UMCC11	Core – I Differential Calculus	5	3	25	75	100	4
4	21UMCC12	Core – 2 Theory of Equations	5	3	25	75	100	4
5	21UMCA11	Allied -1 Programming in C	4	3	25	75	100	4
6	21UMCSP1	SBS -1 C Lab	2	3	40	60	100	2
7	21UACVE1	Value Education	2	3	25	75	100	2
		TOTAL	30					22

II SEMESTER

S. No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1	21UACT21/ H21/S21	Tamil/Hindi/ Sanskrit	6	3	25	75	100	3
2	21UACE21	English	6	3	25	75	100	3
3	21UMCC21	Core – 3 Integral Calculus	5	3	25	75	100	4
4	21UMCC22	Core – 4 Analytical Geometry and Three Dimensions	5	3	25	75	100	4
5	21UMCA21	Allied Data Structures and Algorithms	4	3	25	75	100	4
6	21UMCSP2	SBS -2 Data Structure Lab	2	3	40	60	100	2
7	21UACES1	Environmental Studies	2	3	25	75	100	2
		TOTAL	30					22

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III SEMESTER

S. No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1		Tamil/Hindi/Sanskrit	6	3	25	75	100	3
2		English	6	3	25	75	100	3
3		Core – 5 Mechanics	5	3	25	75	100	5
4		Core – 6 Graph Theory	5	3	25	75	100	4
5		Allied – 3 Object Oriented Programming in C++	4	3	25	75	100	4
6		SBS -3 Object Oriented Programming in C++ Lab	2	3	40	60	100	2
7		NME	2	3	25	75	100	2
		TOTAL	30					23

IV SEMESTER

S. No.	Sub. Code	Subject Title	Hrs./ Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1		Tamil/Hindi/Sanskrit	6	3	25	75	100	3
2		English	6	3	25	75	100	3
3		Core – 7 Differential Equations	5	3	25	75	100	5
4		Core – 8 Sequences and Series	5	3	25	75	100	4
5		Allied – 4 Programming in JAVA	4	3	25	75	100	4
6		SBS – 4 JAVA Programming Lab	2	3	40	60	100	2
7		NME	2	3	25	75	100	2
		Extension Activity						1
		TOTAL	30					24

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V SEMESTER

S. No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1		Core – 9 Modern Algebra	6	3	25	75	100	4
2		Core – 10 Real Analysis	6	3	25	75	100	4
3		Core – 11 Operations Research - I	6	3	25	75	100	4
4		Core – 12 Web Technology	4	3	25	75	100	4
5		SBS – 5 Web Technology Lab	2	3	40	60	100	2
6		Elective – 1 Statistics I	6	3	25	75	100	5
7		Elective – 2 Number Theory	6	3	25	75	100	5
8		Elective – 3 Python - Theory	4	3	25	75	100	3
9		Soft skill	-	-	50	50	100	
		TOTAL	30					23

VI SEMESTER

S. No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1		Core – 13 Linear Algebra	5	3	25	75	100	4
2		Core – 14 Complex Analysis	5	3	25	75	100	4
3		Core – 15 Operations Research – II	5	3	25	75	100	4
4		Core – 16 Mathematics for competitive Examinations	3	3	25	75	100	2
5		SBS 6 Python Programming Lab	2	3	40	60	100	2
6		Elective – 5 Numerical Analysis	5	3	25	75	100	5
7		Elective – 6 Discrete Mathematics	5	3	25	75	100	5
		Elective – 7 Fuzzy Sets	5	3	25	75	100	5
8		General Knowledge	-	3	-	-	100	
		TOTAL	30					26

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I SEMESTER

S. No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1	21UACT11/ H11/S11	Tamil/Hindi/ Sanskrit	6	3	25	75	100	3
2	21UACE11	English	6	3	25	75	100	3
3	21UMCC11	Core paper – I Differential Calculus	5	3	25	75	100	4
4	21UMCC12	Core – 2 Theory of equations	5	3	25	75	100	4
5	21UMCA11	Allied -1 Programming in C	4	3	25	75	100	4
6	21UMCSP1	SBS -1 C Lab	2	3	40	60	100	2
7	21UACVE1	Value Education	2	3	25	75	100	2
		TOTAL	30					22

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CORE 1	DIFFERENTIAL CALCULUS	SUBJECT CODE : 21UMCC11
SEMESTER - I	5 HOURS / WEEK	CREDITS : 4

COURSE DESCRIPTION:

This course is designed to teach various concepts of differentiation to the students

OBJECTIVES:

- To apply the differentiation methods for higher derivatives and n^{th} order differentiation using Leibnitz formula.
- To define polar sub tangent and subnormal and angle between the curves.
- To explain curvatures and pedal equation of curves.
- To calculate the evolutes and envelopes.
- To explain the maxima and minima value of functions of two variables.

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)
CO1	calculate the differentiation of any type of functions.	K1, K2
CO2	describe the concepts of sub tangent and subnormal and length of arc.	K1, K2
CO3	find the radius of curvature and pedal equation to the given curves.	K1, K3
CO4	calculate the evolutes and the envelopes of the given curves.	K2, K3
CO5	find the maximum and minimum values to the functions and Jacobian	K1, K3

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

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DIFFERENTIAL CALCULUS

UNIT - I

Higher derivatives- n^{th} derivative of some standard functions – Leibnitz theorem.

UNIT - II

Applications of differentiation – Tangent, normal, sub tangent, subnormal, polar sub tangent, polar subnormal, polar curves- Angle of intersection of two polar curves.

UNIT - III

Pedal equation of a curve - Curvature.

UNIT - IV

Evolutes – Centre and circle of curvature – Envelopes.

UNIT - V

Maxima and minima of functions of two variables (Examples only) – Jacobians.

TEXT BOOK:

Calculus - Arumugam and Issac (New gamma publishing house – January 2011)

UNIT I - sec 2.11 to 2.13 (page no 43 to 71)

UNIT II - sec 3.1,3.2 (page no. 91 to 110)

UNIT III - sec 3.3,3.4 (page no. 111 to 143)

UNIT IV - sec 3.5,3.6 (page no. 144 to 164).

UNIT V - sec 3.7, 3.9 (page no. 165 to179) (page no. 195 to 202).

REFERENCE BOOKS :

1. Calculus Volume I – T.K.Manikkavasagam Pillai, Natarajan (S.Viswanathan Publications)
2. Differential Calculus – Santhi Narayanan (S.Chand Publications)

Mapping of CO with PSO

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

S – STRONG M – MEDIUM L - LOW

COURSE DESIGNER: Prof. S.K.Ganeshbabu

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CORE 2	THEORY OF EQUATIONS	SUBJECT CODE : 21UMCC12
SEMESTER - I	5 HOURS / WEEK	CREDITS : 4

COURSE DESCRIPTION:

This course is designed to learn various concepts of solving equations

OBJECTIVES:

- To understand the methods of forming an equations
- To understand the symmetric functions of roots and Newton's theorem.
- To solve the reciprocal equations.
- To get the knowledge about the increase or decrease the roots.
- To find the roots using Newton's, Horner's, Cardon's and Ferrari methods.

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 the methods of forming equations	K1, K2
CO2	understand the symmetric functions of roots and Newton's theorem.	K1, K3
CO3	solve the reciprocal equations	K3
CO4	discuss the increase or decrease the roots.	K2
CO5	find the roots using Newton's, Horner's, Cardon's and Ferrari methods	K3

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

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THEORY OF EQUATIONS

UNIT- I

Formation of equations - relation between the roots and coefficients of equation.

UNIT - II

Symmetric functions of the roots – sum of the powers of the roots of an equation – Newton's theorem.

UNIT - III

Transformations of equations – roots multiplied by a given number – reciprocal roots – reciprocal equations.

UNIT- IV

Standard form to increase or decrease the roots of the given equation by the given quantity – removal of terms – Horner's method

UNIT - V

Descarte's rule of sign – Cardon's method – Ferrari's method.

TEXT BOOK:

Algebra Volume I by T.K. MANICAVACHAGAM PILLI, T. NATARAJAN AND K.S.GANAPATHY

S.Viswanathan Printers and Publishers Pvt. Ltd.,

UNIT I - sec 1 to 11 (page number 282 to 303)

UNIT II - sec 12 to 14 (page number 303 to 317)

UNIT III - sec 15, 16 (page number 318 to 327)

UNIT IV - sec 17 to 20, 30 (page no. 327 to 340, 376 to 381).

UNIT V - sec 24, 34.1, 35 (page no. 351 to 355, 390 to 398).

REFERENCE BOOK :

1. ALGEBRA by S.ARUMUGAM and THANGAPANDI ISAAC (New Gamma Publications)

2. ALGEBRA (Part I) by N.P.BALI (Laxmi Publications)

Mapping of CO with PSO

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

S – STRONG

M – MEDIUM

L - LOW

COURSE DESIGNER: Prof. V.B.Shakila

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ALLIED 1	PROGRAMMING IN C	SUBJECT CODE: 21UMCA11
SEMESTER- I	4 Hours/Week	CREDITS : 4

COURSE OBJECTIVES:

- 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	identify the basic concepts needed for program development	K1
CO 2	apply the basic concepts and develop program to find solutions for simple problems	K2,K3
CO 3	design programs to solve complex problems by using suitable control statements	K1,K3
CO 4	analyze the problem and design efficient program using functions	K1,K3
CO 5	use array and structure to handle volume of data	K2,K3

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

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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.

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: The Complete Reference", 4th Edition. TMH Edition, 2000.
3. Gottfried B.S, "Programming with C", Second Edition, TMH Pub. Co. Ltd., New Delhi 1996.
4. Kanetkar Y., "Letus C", BPB Pub., New Delhi, 1999.

Mapping of CO with PSO

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

S – STRONG

M – MEDIUM

L - LOW

COURSE DESIGNER: Prof. J.R. Nathan

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SBS 1	C PROGRAMMING LAB	SUBJECT CODE: 21UMCSP1
SEMESTER - I	2 HOURS/WEEK	CREDITS : 2

OBJECTIVES:

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

I SUMMATION OF SERIES

1. Sin(x), 2. Cos(x), 3. Exp(x) (Comparison with built in functions)

II 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.

III Recursion

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

IV Matrix Manipulation

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

V Sorting and Searching

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

COURSE DESIGNER: Prof. J.R. Nathan

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II SEMESTER

S. No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1	21UACT21/ H21/S21	Tamil/Hindi/ Sanskrit	6	3	25	75	100	3
2	21UACE21	English	6	3	25	75	100	3
3	21UMCC21	Core – 3 Integral Calculus	5	3	25	75	100	4
4	21UMCC22	Core – 4 Analytical Geometry and Three Dimensions	5	3	25	75	100	4
5	21UMCA21	Allied Data Structures and Algorithms	4	3	25	75	100	4
6	21UMCSP2	SBS -2 Data Structure Lab	2	3	40	60	100	2
7	21UACES1	Environmental Studies	2	3	25	75	100	2
		TOTAL	30					22

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CORE 3	INTEGRAL CALCULUS	SUBJECT CODE : 21UMCC21
SEMESTER - II	5 HOURS / WEEK	CREDITS : 4

COURSE DESCRIPTION:

This course is designed to learn various concepts of Integration.

OBJECTIVES:

- To calculate the reduction formula for various functions.
- To explain the method of evaluating double integral problems.
- To evaluate the triple integrals.
- To explain the beta and gamma functions.
- To get the equivalent series of functions as Fourier series

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	to find the reduction formula for various functions.	K1, K2
CO2	to evaluate the double integral problems.	K1,K2
CO3	to evaluate the triple integrals	K1, K3
CO4	to do the problems using beta and gamma functions.	K2, K3
CO5	to solve problems on Fourier series	K1, K3

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

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INTEGRAL CALCULUS

UNIT - I

Reduction formulae

UNIT - II

Evaluation of double integrals.

UNIT - III

Triple integrals

UNIT - IV

Beta and Gamma functions

UNIT - V

Fourier Series – full range – half range –arbitrary range.

TEXT BOOKS:

1. Calculus - Arumugam and Issac

2. Fourier Series by Arumugam Isaac – New Gamma Publications (November 2012)

New gamma publishing house – January 2011

Unit I – Sec 2.8 (page no. 381 to 396)

Unit II – Sec 3.2 (page no. 409 to 422)

Unit III – Sec 3.4 (page no. 426 to 429)

Unit IV – Sec 4.1 (page no. 440 to 456)

Unit V – Sec 1.3 to 1.5 (page number F 27 to FS 45)

Mapping of CO with PSO

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

S – STRONG

M – MEDIUM

L - LOW

COURSE DESIGNER: Prof. S.K. Ganeshbabu

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CORE 4	ANALYTICAL GEOMETRY AND 3D	SUBJECT CODE : 21UMCC22
SEMESTER - II	HOURS : 5 Hours / week	CREDITS : 4

COURSE DESCRIPTION:

This course is designed to learn various concepts of Integration.

OBJECTIVES:

- To explain angle and distance between two planes, lengths of perpendicular, bisecting planes
- To calculate the Symmetric form of Straight line , image of a point about a plane, image of line about a plane
- To explain the Plane and straight line, angle between a plane and a straight line, coplanar lines.
- To evaluate the Shortest Distance between two lines, skew lines, intersection of four planes
- To explain the Sphere, equation of the sphere, equation of the tangent plane orthogonal sphere.

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	To explain angle and distance between two planes, lengths of perpendicular, bisecting planes	K1, K2
CO2	To calculate the Symmetric form of Straight line , image of a point about a plane, image of line about a plane	K2, K3
CO3	To explain the Plane and straight line, angle between a plane and a straight line, coplanar lines.	K2
CO4	To evaluate the Shortest Distance between two lines, skew lines, intersection of four planes	K1, K3
CO5	To explain the Sphere, equation of the sphere, equation of the tangent plane, orthogonal sphere.	K1, K2, K3

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

ANALYTICAL GEOMETRY AND 3D

UNIT - I

Plane – Angle between two planes – lengths of perpendicular – distance between two planes –bisecting planes

UNIT - II

Straight line : Symmetric form – image of a point about a plane – image of line about a plane

UNIT - III

Plane and straight line – angle between a plane and a straight line – coplanar lines.

UNIT - IV

Shortest Distance between two lines – skew lines – intersection of four planes

UNIT - V

Sphere – equation of the sphere – equation of the tangent plane – orthogonal sphere.

TEXT BOOKS:

- THREE DIMENSION ANALYTICAL GEOMETRY AND VECTOR CALCULUS by DR.S. ARUMUGAM AND ISSAC. Publications: New Gamma 2006.
- Text book of analytical geometry of three dimension (for unit V only) by T.K.M. PILLAI AND T. NATARAJAN.

Mapping of CO with PSO

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

S – STRONG

M – MEDIUM

L - LOW

COURSE DESIGNER: Prof. K. Prabakaran

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ALLIED 2	DATA STRUCTURES AND ALGORITHMS	SUBJECT CODE: 21UMCA21
SEMESTER - II	4 HOURS/WEEK	CREDITS : 4

OBJECTIVES:

- To introduce the various data structures and their implementations
- To study various sorting algorithms

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	give knowledge about Matrix Algebra	K2,K3
CO 3	inculcate the idea of Logics using Truth tables	K1,K3
CO 4	acquire knowledge about the basic concepts of Graph Theory and its applications	K1,K3
CO 5	use array and structure to handle volume of data	K2,K3

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

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DATA STRUCTURES AND ALGORITHMS

UNIT - I

Introduction of algorithms, analyzing algorithms, Arrays : Representation of Arrays, Implementation of Stacks and queues, Application of Stack: Evaluation of Expression - Infix to postfix Conversion - Multiple stacks and Queues, Sparse Matrices.

UNIT - II

Linked list : Singly Linked list - Linked stacks and queues - polynomial addition - More on linked Lists - Doubly linked List and Dynamic Storage Management - Garbage collection and compaction.

UNIT - III

Trees: Basic Terminology - Binary Trees - Binary Tree representations - Binary trees - Traversal - More on Binary Trees - Threaded Binary trees - counting Binary trees. Graphs: Terminology and Representations - Traversals, connected components and spanning Trees, Single Source Shortest path problem.

UNIT - IV

Symbol Tables : Static Tree Tables - Dynamic Tree Tables - Hash Tables : Hashing Functions - overflow Handling. External sorting : Storage Devices - sorting with Disks : K-way merging - sorting with tapes.

UNIT - V

Internal sorting : Insertion sort - Quick sort - 2 way Merge sort - Heap sort - shell sort - sorting on keys. Files: Files, Queries and sequential organizations - Index Techniques - File organization.

TEXT BOOKS:

1. Ellis Horowitz, Sartaj Shani, Data Structures, Galgotia publication.

REFERENCE BOOKS:

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

Mapping of CO with PSO

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

S – STRONG

M – MEDIUM

L - LOW

COURSE DESIGNER: Prof. J.R. Nathan

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SBS 2	DATA STRUCTURES USING C LAB	SUBJECT CODE: 21UMCSP2
SEMESTER : II	2 HOURS/WEEK	CREDITS : 2

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 hash table using the mid square
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. J.R. Nathan

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