



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 Clanguage

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