Department of Mathematics
B.Sc.,Mathematics
(2022-2023)

Program Outcomes:

S.No	OUTCOMES
PO1	Logical thinking, critical analysis, and reasoning skills will be highly improved.
PO2	Express mathematical ideas clearly and concisely to others
PO3	Ability to apply suitable mathematical techniques to handle problems in physical and related sciences.
PO4	To demonstrate conceptual understanding of basic definitions, and theorems in Mathematics and should be able to describe elaborately with examples.
PO5	Ability to solve mathematical problems by applying the skills such as critical thinking, logical reasoning, and abstraction
PO6	Select appropriate mathematical models and tools to solve the problems including those in real-life contexts.
PO7	Mathematics has its own universal language of symbols and notations. Students are expected to apply the Mathematics language appropriately while expressing mathematical ideas in both oral and written form.
PO8	Problem-solving techniques in mathematics will enhance the knowledge of students to formulate and solve any real-world problems independently.
PO9	Develop the knowledge of abstract mathematical concepts.
PO10	Enhance the employability skills in both public and private sector jobs.

Program Specific Outcomes:

S.No	OUTCOMES
PSO1	Prepare and Motivate Students for Research Studies in Mathematics and Related Fields.
PSO2	Provide Advanced Knowledge on Topics in Pure Mathematics, Empowering the Students to Pursue Higher Degrees at Reputed Academic Institutions.
PSO3	Having an Ability to use Mathematics in Techniques, Skills, Resources on Real Life
PSO4	Having Problem Solving Ability- to Assess Social Issues (Societal, Health, Safety, Legal and Cultural) as a Mathematician.
PSO5	Having Adaptive Thinking and Adaptability in Relation to Environmental Context and Sustainable Development.
PSO6	Having a Clear Understanding of Professional and Ethical Responsibility.

Semester: I

Subject Name: Algebra   **No. of Hours per Week:** 05

Subject Code: FMA11   **Credit:** 03

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
I (Regulation 2022-2023)	Algebra	03	1. After studied unit -1, the student will be able to demonstrate the knowledge of the relationship between roots and coefficients of the given equation. 2. After studied unit -2, the student will be able to carry out the calculations of approximate roots of the given polynomial equation. 3. After studied unit -3, the student will be able to find the sum to infinity of the given binomial/exponential/logarithmic series. 4. After studied unit -4, the student will be able to demonstrate the knowledge of matrices and calculate the Eigen values and Eigen vectors of a given square matrix. 5. After studied unit -5, the student will be able to discuss the basic number theory concepts.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	M	M
CO2	M	M	S	M	M	S	S	S	M	S
CO3	S	S	S	M	M	M	M	M	M	M
CO4	S	M	S	S	M	S	S	M	M	M
CO5	M	M	M	S	S	S	M	S	M	S

PO – Programme Outcome   CO – Course outcome

S – Strong   M-Medium   L – Low (may be avoided)

Semester: I

Subject Name: Trigonometry

Subject Code: FMA12

No. of Hours per Week: 05

Credit: 03

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
I (Regulation 2022-2023)	Trigonometry	03	1. After studied unit -1, the student will be able to write the expansions of cosnθ and sinnθ in powers of cosθ and sinθ. 2. After studied unit -2, the student will be able to expand the powers of sines and cosines of θ in terms of functions of multiples of θ 3. After studied unit -3, the student will be able to discuss the concepts of hyperbolic functions. 4. After studied unit -4, the student will be able to demonstrate knowledge of the logarithm of complex quantities. 5. After studied unit -5, the student will be able to carry out the calculations of summation of trigonometric series

Mapping with Programme outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	M	M	M	M
CO2	M	M	M	S	S	S	M	S	S	M
CO3	S	S	S	S	M	M	S	S	M	S
CO4	M	S	S	S	S	M	M	M	M	M
CO5	S	S	S	M	M	M	M	M	M	M

PO – Programme Outcome   CO – Course outcome

S – Strong   M-Medium   L – Low (may be avoided)

Semester: I

Subject Name: Numerical Methods - I   **No. of Hours per Week:** 04

Subject Code: FAMA 13A   **Credit:** 03

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
I (Regulation 2022-2023)	Numerical Methods - I	03	1. After studied unit -1, the student will be able to solve simultaneous linear equations by Gauss elimination method, Gauss-Jordan Method, and Gauss-Seidel method. 2. After studied unit -2, the student will be able to calculate interpolation values by applying Gregory-Newton‟s forward and backward formulae. 3. After studied unit -3, the student will be able to calculate the central interpolation values by applying central differences formulae. 4. After studied unit -4, the student will be able to estimate one or more missing terms of the given set of data. 5. After studied unit -5, the student will be able to estimate the interpolation value for unequal intervals based on Lagrange‟s formula of inverse interpolation

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	S	S	S	S
CO2	S	S	S	S	M	S	S	S	M	S
CO3	M	S	S	S	S	S	M	S	M	M
CO4	S	S	M	S	S	M	S	S	S	S
CO5	S	M	S	M	S	S	S	M	M	S

PO – Programme Outcome   CO – Course outcome
S – Strong M – Medium   L – Low (may be avoided)

Semester: II

Subject Name: Calculus   **No. of Hours per Week:** 04

Subject Code: FMA21   **Credit:** 03

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
II (Regulation 2022-2023)	Calculus	03	1. After studied unit -1, the student will be able to determine the extreme values of the given function. 2. After studied unit -2, the student will be able to demonstrate knowledge of Cartesian and polar coordinates. 3. After studied unit -3, the student will be able to gain knowledge of curvature, evolutes, and envelope concepts. 4. After studied unit -4, the student will be able to evaluate definite integration problems and able to apply reduction formulae. 5. After studied unit -5, the student will be able to evaluate double and triple integrals.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	M	S	M	S
CO2	M	S	S	S	S	S	M	M	S	M
CO3	M	M	M	S	S	S	S	S	M	M
CO4	M	S	S	S	S	S	S	S	M	S
CO5	S	M	M	S	M	M	M	S	S	S

PO – Programme Outcome,   CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: II

Subject Name: Analytical Geometry of three dimensions   **No. of Hours per Week:** 04

Subject Code: FMA22   **Credit:** 03

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
II (Regulation 2022-2023)	Analytical Geometry of three dimensions	03	1. After studied unit -1, the student will be able to demonstrate knowledge of the plane and its applications. 2. After studied unit -2, the student will be able to gain knowledge of straight lines and their applications. 3. After studied unit -3, the student will be able to carry out sphere-related problems. 4. After studied unit -4, the student will be able to know the concepts of the cone, right circular cone, and enveloping cone. 5. After studied unit -5, the student will be able to carry out the calculations of the problems related to the cylinder.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	S	S	S	S	M
CO2	M	M	M	S	S	S	S	S	M	M
CO3	M	M	M	S	S	S	S	S	S	S
CO4	S	S	S	S	M	M	M	M	S	S
CO5	S	M	M	M	M	M	M	M	M	S

PO – Programme Outcome,   CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: II

Subject Name: Numerical Methods - II   **No. of Hours per Week:** 04

Subject Code: FAMA23A   **Credit:** 03

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
II (Regulation 2022-2023)	Numerical Methods - II	03	1. After studied unit -1, the student will be able to evaluate derivatives by applying Newton"s forward and backward differences formulae. 2. After studied unit -2, the student will be able to evaluate integrations by applying the trapezoidal rule, Simpson"s rules, and Weddle"s rule. 3. After studied unit -3, the student will be able to find a complete solution to linear difference equations . 4. After studied unit -4, the student will be able to estimate approximate numerical solutions of algebraic and transcendental equations. 5. After studied unit -5, the student will be able to estimate approximate numerical solutions of ordinary differential equations by Euler, Picard, Taylor, and RungeKutta methods.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	S	M	S	S
CO2	M	S	S	S	M	M	S	S	M	S
CO3	M	S	S	S	S	S	M	S	S	M
CO4	S	S	M	S	S	S	S	S	S	S
CO5	M	M	S	M	S	S	S	M	M	S

PO – Programme Outcome,   CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: III

Subject Name: Differential Equations   **No. of Hours per Week:** 06

Subject Code: CMA31   **Credit:** 04

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
III (Regulation 2020-2021)	Differential Equations	04	1. After studied unit -1, the student will be able to know the various methods of solving the first-order higher degree differential equations. 2. After studied unit -2, the student will be able to carry out the different methods of solving the second order differential equations. 3. After studied unit -3, the student will be able to understand the concepts of total differential equations and solve the problems. 4. After studied unit -4, the student will be able to demonstrate knowledge of Laplace transform and its applications. 5. After studied unit -5, the student will be able to solve partial differential equations.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	M	S	S	S	S
CO2	S	S	S	S	S	M	M	M	S	M
CO3	M	M	M	M	S	S	S	S	S	S
CO4	S	S	S	S	M	M	M	M	M	S
CO5	S	S	S	S	M	M	M	M	M	M

PO – Programme Outcome,   CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: III

Subject Name: Mathematical Statistics - I **No. of Hours per Week:** 04

Subject Code: CMA13B **Credit:** 03

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
III (Regulation 2020-2021)	Mathematical Statistics - I	03	1. After studied unit -1, the student will be able to express the techniques of conditional probability and Baye"s theorem with examples 2. After studied unit -2, the student will be able to calculate expectation, and distribution function. 3. After studied unit -3, the student will be able to express Chebychev"s inequality and its applications. 4. After studied unit -4, the student will be able to interpret the different types of correlation coefficient and lines of regression with examples. 5..After studied unit -5, the student will be able to apply domain knowledge for discrete and continuous distributions with examples.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	S	S	S	S
CO2	S	S	S	S	M	S	S	S	M	S
CO3	M	S	S	S	S	S	M	S	S	M
CO4	S	S	M	S	S	M	S	S	S	S
CO5	S	M	S	M	S	S	S	S	S	S

PO – Programme Outcome,   CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: IV

Subject Name: Mathematics For Competitive Examinations-I   **No. of Hours per Week:** 03

Subject Code: CSMA32   **Credit:** 02

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
IV (Regulation 2020-2021)	Mathematics For Competitive Examinations-I	02	1. After studied unit-1, the student will be able to answer the questions related to the number system. 2. After studied unit-2, the student will be able to answer real-life simple problems by applying the HCF and/or LCM. 3. After studied unit-3, the student will be able to apply the correct sequence of operations to find out the value of a given mathematical expression. 4. After studied unit-4, the student will be able to solve the problems involving square roots, cube roots, and average. 5. After studied unit-5, the student will be able to carry out the problems related to ages, and simplify products and quotients involving surds

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	M	S	S	M
CO2	M	S	S	S	S	S	S	M	M	S
CO3	M	S	S	S	S	S	M	S	S	S
CO4	S	S	S	M	S	S	M	M	M	S
CO5	S	M	S	M	M	M	M	S	S	S

PO – Programme Outcome,   CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: III

Subject Name: Basic Mathematics   **No. of Hours per Week:** 02

Subject Code: CNMA33   **Credit:** 02

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
III (Regulation 2017-2018)	Basic Mathematics	02	1. After studied unit -1, the student will be able to define subset, proper subset, and equivalent sets and write sets using set notations. 2. After studied unit -2, the student will be able to describe various number systems and convert one number system into another. 3. After studied unit -3, the student will be able to express logical statements and prepares the truth tables. 4. After studied unit -4, the student will be able to find the determinant values 2x2, and 3x3 matrices and solve a system of equations by applying Cramer''s rule. 5. After studied unit -5, the student will be able to get a strong background in matrices and be able to solve a system of non-homogeneous equation

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	M	M	M
CO2	S	S	S	S	M	M	S	S	S	S
CO3	S	M	S	M	S	S	M	S	M	S
CO4	S	S	M	S	S	S	S	M	S	S
CO5	S	M	S	S	M	S	S	S	S	M

PO – Programme Outcome,   CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: IV

Subject Name: Vector Analysis and Fourier analysis   **No. of Hours per Week:** 05

Subject Code: CMA41   **Credit:** 04

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
IV (Regulation 2020-2021)	Vector Analysis and Fourier Analysis	04	1. After studied unit -1, the student will be able to demonstrate knowledge of the physical and geometrical meaning of the derivative and its applications. 2. After studied unit -2, the student will be able to know the concepts of divergence, curl of a vector, and their physical interpretations. 3. After studied unit -3, the student will be able to evaluate the line, surface, and volume integrals. 4. After studied unit -4, the student will be able to know the applications of Stoke"s, Gauss divergence, and Green"s theorems. 5. After studied unit -5, the student will be able to express the given function as a Fourier series.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	M
CO3	M	M	M	M	S	S	S	M	S	S
CO4	M	M	M	M	M	S	S	S	S	M
CO5	M	S	S	S	S	M	M	S	S	S

PO – Programme Outcome,   CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Subject Name: Mechanics   **No. of Hours per Week:** 04

Subject Code: CMA42   **Credit:** 04

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
IV (Regulation 2020-2021)	Mechanics	04	1. After studied unit -1, the student will be able to know about the forces and equilibrium of a particle. 2. After studied unit -2, the student will be able to identify the parallel forces and couples and solve related problems. 3. After studied unit -3, the student will be able to demonstrate knowledge of friction and its applications. 4. After studied unit -4, the student will be able to carry out problems related to impact and laws of impact. 5. After studied unit -5, the student will be able to demonstrate knowledge of the central orbits.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	S	S	S	S	M	M	M
CO2	M	M	M	M	S	S	M	M	S	S
CO3	S	M	S	S	M	M	M	M	M	M
CO4	S	S	M	M	M	M	M	M	M	M
CO5	M	M	S	S	S	M	M	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: IV

Subject Name: Mathematical Statistics - II   **No. of Hours per Week:** 04

Subject Code: CAMA23B   **Credit:** 03

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
IV (Regulation 2020-2021)	Mathematical Statistics - II	03	1. After studied unit -1, the student will be able to demonstrate sampling, parameter, and significance with examples. 2. After studied unit -2, the student will be able to know about Chi-square distribution and its applications. 3. After studied unit -3, the student will be able to illustrate Students t-distribution and the applications of F-distribution. 4. After studied unit -4, the student will be able to state null and alternate hypotheses to the given problem and test the hypothesis. 5. After studied unit -5, the student will be able to apply ANOVA techniques

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	S	S	M	S	S	S	M
CO2	S	S	S	S	M	S	S	M	M	S
CO3	M	S	S	S	S	S	M	S	S	M
CO4	S	S	M	S	S	M	S	S	S	S
CO5	S	M	S	M	S	M	S	S	M	M

PO – Programme Outcome,   CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: IV

Subject Name: Mathematics for Competitive Examinations – II   **No. of Hours per Week:** 02

Subject Code: CSMA43   **Credit:** 02

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
IV (Regulation 2020-2021)	Mathematics for Competitive Examinations – II	02	1. After studied unit-1, the students will be able to solve real-life problems related to percentages. 2. After studied unit-2, the student will be able to carry out the problems related to profit and loss 3. After studied unit-3, the student will be able to carry out problems related to ratio and proportion 4. After studied unit-4, the student will be able to demonstrate knowledge of logarithms, partnership, and chain rule and solve the related problems. 5. After studied unit-1, the students will be able to solve real-life problems related to time and work.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	M	S	S	S	M
CO2	M	S	S	M	S	M	S	M	M	S
CO3	S	M	M	S	M	S	M	S	S	M
CO4	M	S	M	M	S	M	S	S	M	S
CO5	S	S	S	M	S	S	M	M	S	M

PO – Programme Outcome,   CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

Semester: IV

Subject Name: Foundation Mathematics for
Competitive Examinations

No. of Hours per Week: 02

Subject Code: CNMA44

Credit: 02

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
IV (Regulation 2020-2021)	Foundation Mathematics for Competitive Examinations	02	1. After studied unit-1, the student will be able to solve real-life problems related to percentages. 2. After studied unit-2, the student will be able to carry out real-world problems related to profit and loss. 3. After studied unit-3, the student will be able to demonstrate knowledge of real-life problems based on the ratio and proportions. 4. After studied unit-4, the student will be able to demonstrate knowledge of the work rate formula and apply this technique to solve several real-life problems. 5. After studied unit-5, the students will be able to solve real-life problems based on simple and compound interest.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	M	S	S	M	S	S	S
CO2	M	S	S	S	M	S	S	M	M	S
CO3	S	M	S	S	S	S	M	S	S	M
CO4	S	S	S	M	S	S	M	M	M	S
CO5	S	M	S	M	M	M	S	S	M	M

PO – Programme Outcome,   CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

Semester: V

Subject Name: Abstract Algebra　　　　　　　**No. of Hours per Week:** 06

Subject Code:　CMA51　　　　　　　　　　　　**Credit:** 04

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
V (Regulation 2020-2021)	Abstract Algebra	04	1. After studied unit-1, the student will be able to determine whether a given set is a group under a binary operation and find its subgroup. 2. After studied unit-2, the student will be able to demonstrate knowledge of normal subgroup, homomorphism, and isomorphism. 3. After studied unit-3, the student will be able to carry out the problems based on permutation. 4. After studied unit-4, the student will be able to demonstrate knowledge of rings, ideals, and integral domain. 5. After studied unit-5, the student will be able to understand the concepts of ideals and Euclidean rings.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	M	S	S	M
CO2	S	S	S	S	S	M	S	S	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	S	S	M	S	S	S	S	S	S
CO5	S	S	M	S	M	M	S	S	S	S

PO – Programme Outcome,　CO – Course outcome

S – Strong,　M – Medium,　L – Low (may be avoided)

Semester: V

Subject Name: Real Analysis - I
No. of Hours per Week: 06

Subject Code: CMA52
Credit: 04

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
V (Regulation 2020-2021)	Real Analysis - I	04	1. After studied unit -1, the student will be able to identify countable sets, the limit of a sequence, and its convergence. 2. After studied unit -2, the student will be able to demonstrate knowledge of divergent sequence, bounded sequence, monotone sequence, and Cauchy sequence. 3. After studied unit -3, the student will be able to carry out convergence and divergence of series and related problems. 4. After studied unit -4, the student will be able to express metric spaces and convergent and divergent sequences in a metric space 5. After studied unit -5, the student will be able to demonstrate knowledge of open sets and closed sets with suitable examples.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	S	S	S	S	M	M	M	S
CO2	S	S	M	M	M	M	M	M	M	S
CO3	S	S	S	M	M	S	S	M	S	S
CO4	M	M	M	S	S	S	M	M	M	M
CO5	M	S	S	M	M	M	M	S	S	M

PO – Programme Outcome,   CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

Semester: V

Subject Name: Complex Analysis-I   **No. of Hours per Week:** 06

Subject Code: CMA53   **Credit:** 04

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
V (Regulation 2020-2021)	Complex Analysis - I	04	1. After studied unit-1, the student will be able to gain knowledge about complex functions and their nature, continuous functions, necessary and sufficient conditions of an analytic function 2. After studied unit-2, the student will be able to demonstrate knowledge of elementary transformations, conformal and bilinear transformations with examples. 3. After studied unit-3, the student will be able to evaluate contour integrals using Cauchy's integral formula. 4.To Find Cauchy-Riemann equations in polar form-properties of Analytic functions-. 5 .To Solve Necessary and sufficient conditions for Analytic functions-problems

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	M	S	M
CO2	M	S	M	M	S	M	S	M	M	S
CO3	S	M	S	S	M	S	S	M	S	M
CO4	M	M	M	S	S	S	M	M	S	S
CO5	M	S	S	M	M	M	M	S	S	M

PO – Programme Outcome,   CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: V

Subject Name: Programming in C Language   **No. of Hours per Week:** 03

Subject Code: CMA54   **Credit:** 03

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
V (Regulation 2020-2021)	Programming in C Language	03	1. After studied unit -1, the student will be able to demonstrate „c" tokens, keywords, the basic structure of C programs and the execution of a „C" Program. 2. After studied unit -2, the student will be able to express the nature of constants, variables, data types, declaration of variables, and assigning values to variables. 3. After studied unit -3, the student will be able to describe valuation of expressions and usage of various operators. 4. After studied unit -4, the student will be able to express the logic using control statements. 5. After studied unit -5, the student will be able to demonstrate knowledge pertaining to arrays.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	M	S	M	S	M	M
CO2	M	S	M	M	S	S	M	S	M	M
CO3	M	S	M	M	M	S	S	M	M	S
CO4	S	M	S	S	S	M	M	S	S	M
CO5	S	S	M	S	M	S	M	S	S	M

PO – Programme Outcome,   CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: V

Subject Name: Linear Programming   **No. of Hours per Week:** 03

Subject Code: CEMA55A   **Credit:** 03

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
V (Regulation 2020-2021)	Linear Programming	03	1. After studied unit-1, the student will be able to formulate a real-world problem into an LPP and carry out the calculations of the simplex method. 2. After studied unit-2, the student will be able to solve transportation problems. 3. After studied unit-3, the student will be able to understand analogies between transportation problems and assignment models. 4. After studied unit-4, the student will be able to demonstrate knowledge of game theory and its applications. 5. After studied unit-5, the student will be able to know the concept of simulation and solve the problems by applying the Monte Carlo simulation technique.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	S	S	S	M
CO2	M	S	S	M	S	S	S	S	S	S
CO3	S	S	M	S	M	S	M	S	S	S
CO4	S	M	S	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	M

PO – Programme Outcome,   CO – Course outcome
 S – Strong, M – Medium, L – Low (may be avoided)

Semester: V

Subject Name: Mathematics For Competitive Examinations-III   **No. of Hours per Week:** 03

Subject Code: CSMA56   **Credit:** 02

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
V (Regulation 2020-2021)	Mathematics For Competitive Examinations-III	02	1. After studied unit -1, the student will be able to solve the problems related to time and distance. 2. After studied unit -2, the student will be able to carry out the boat and stream, train, and speed- based questions. 3. After studied unit -3, the student will answer the questions based on alligation or mixture. Aspirants preparing for the upcoming competitive examinations will be able to answer such questions in a faster way. 4. After studied unit -4, the student will be able to carry out problems related to compound interest. 5. After studied unit -5, the student will be able to demonstrate knowledge of area-related problems.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	M	S	S	M
CO2	M	S	S	S	S	S	S	M	M	S
CO3	M	S	S	S	S	S	M	S	S	S
CO4	S	S	S	M	S	S	M	M	M	S
CO5	S	M	S	M	M	M	M	S	S	S

PO – Programme Outcome,   CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: VI

Subject Name: Linear Algebra

No. of Hours per Week: 05

Subject Code: CMA61

Credit: 04

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
VI (Regulation 2020-2021)	Linear Algebra	04	1. After studied unit -1, the student will be able to identify linear dependent and independent vectors. 2. After studied unit -2, the student will be able to classify orthogonal and orthonormal vectors. 3. After studied unit -3, the student will be able to know about the algebra of linear transformations. 4. After studied unit -4, the student will be able to know about the matrix of a linear transformation and its properties. 5. After studied unit -5, the student will be able to solve a system of linear equations

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	M	S	S	S	M
CO2	S	S	S	S	M	S	S	M	M	S
CO3	M	S	S	S	M	S	M	S	S	M
CO4	S	S	M	S	S	M	S	M	M	S
CO5	S	M	S	M	S	M	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: VI

Subject Name: Real Analysis- II   **No. of Hours per Week:** 06

Subject Code: CMA62   **Credit:** 04

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
VI (Regulation 2020-2021)	Real Analysis II	04	1. After studied unit-1, the student will be able to demonstrate knowledge of connected sets and complete metric spaces with suitable examples. 2. After studied unit-2, the student will be able to identify the functions which are continuous and uniformly continuous. 3. After studied unit-3, the student will be able to express about Riemann integration and its properties. 4. After studied unit-4, the student will be able to carry out the problems related to Rolle‟s theorem and the law of mean. 5. After studied unit-5, the student will be able to demonstrate knowledge of pointwise convergence, uniform convergence of sequences of functions, and of series of functions.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	M	S
CO2	M	S	S	S	M	M	S	S	S	M
CO3	S	S	M	S	S	S	S	S	S	S
CO4	M	S	S	S	S	S	M	S	S	S
CO5	S	M	S	S	S	S	S	M	S	M

PO – Programme Outcome,   CO – Course outcome

S – Strong,   M – Medium,   L – Low (may be avoided)

Semester: VI

Subject Name: Complex Analysis II   **No. of Hours per Week:** 05

Subject Code: CMA63   **Credit:** 04

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
VI (Regulation 2020-2021)	Complex Analysis II	04	1. After studied unit-1, the student will be able to gain knowledge about complex functions and their nature, continuous functions, necessary and sufficient conditions of an analytic function 2. After studied unit-2, the student will be able to demonstrate knowledge of elementary transformations, conformal and bilinear transformations with examples. 3. After studied unit-3, the student will be able to evaluate contour integrals using Cauchy"s integral formula. 4. After studied unit-4, the student will be able to express a function as Taylor series or Laurent"s series at the given domain, and also determine the circle or annulus of convergence power series expansions of analytic functions. 5. After studied unit-5, the student will be able to carry out the problems related to the evaluation of improper integrals.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	M	S	M	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	M	S	S	S	M	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	M

PO – Programme Outcome,   CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: VI

Subject Name: Graph Theory   **No. of Hours per Week:** 03

Subject Code: CEMA64A   **Credit:** 03

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
VI (Regulation 2020-2021)	Graph Theory	03	1. After studied unit -1, the student will be able to know various graph structures and isomorphism between graphs. 2. After studied unit -2, the student will be able to know the representation of the graphs in matrix form. 3. After studied unit -3, the student will be able to know the concepts of connected graph, component, cut point, and bridge of a graph. 4. After studied unit -4, the student will be able to know about trees and their applications. 5. After studied unit -5, the student will be able to demonstrate knowledge of Eulerian and Hamiltonian graphs.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	M	M	S	S	S	S
CO2	M	M	M	S	M	M	S	S	M	S
CO3	M	M	M	S	M	S	S	S	S	S
CO4	S	S	M	M	S	M	M	S	M	S
CO5	S	S	S	M	S	S	M	M	S	M

PO – Programme Outcome,   CO – Course outcome

S – Strong,   M – Medium,   L – Low (may be avoided)

Semester: VI

Subject Name: Fuzzy Mathematics

No. of Hours per Week: 03

Subject Code: CEMA65A

Credit: 03

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
VI (Regulation 2020-2021)	Fuzzy Mathematics	03	1.. After studied unit -1, the student will be able to know fuzzy sets and their operations. 2. After studied unit -2, the student will be able to know the addition and product of two fuzzy sets. 3. After studied unit -3, the student will be able to demonstrate knowledge of fuzzy relations and logic-connectives. 4. After studied unit -4, the student will be able to express about fuzzy subgroup, homomorphic image, and pre-image of subgroupoid. 5. After studied unit -5, the student will be able to demonstrate knowledge of fuzzy invariant subgroups and subrings.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	M	M	M	S	S	S	M
CO2	M	M	M	S	M	M	S	M	S	M
CO3	M	M	M	M	M	S	M	S	S	M
CO4	S	M	M	S	M	M	M	S	M	S
CO5	M	S	M	S	S	S	M	M	S	M

PO – Programme Outcome,   CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

Semester: VI

Subject Name: Operations Research   **No. of Hours per Week:** 03

Subject Code: CSMA66   **Credit:** 02

Course Outcomes:

Semester	Course Name	Course Credit	Course Outcomes
VI (Regulation 2020-2021)	Operations Research	02	1. After studied unit -1, the student will be able to determine the critical activities of a repeated project and its completion time. 2. After studied unit -2, the student will be able to determine the duration of activities of a new project based on three-time estimates. 3. After studied unit -3, the student will be able to carry out the EOQ level of various inventory control models. 4. After studied unit -4, the student will be able to calculate processing times of sequencing of jobs through 2, 3, and m machines. 5. After studied unit -5, the student will be able to find out the length of the queue, and waiting time in the queue under single and multi-channel queuing models.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	M	S
CO2	M	S	S	S	M	M	S	S	S	M
CO3	S	S	M	S	S	S	S	S	S	S
CO4	M	S	S	S	S	S	M	S	S	S
CO5	S	M	S	S	S	S	S	M	S	M

PO – Programme Outcome,   CO – Course outcome
S – Strong,   M – Medium,   L – Low (may be avoided)