

Annai Hajira Women's College

Melapalayam, Tirunelveli 627 005
(A Unit of As-Sathiq Educational Society)
(Affiliated to Manonmaniam Sundaranar University)

Department of Mathematics

UG-Programme

B. Sc., Mathematics

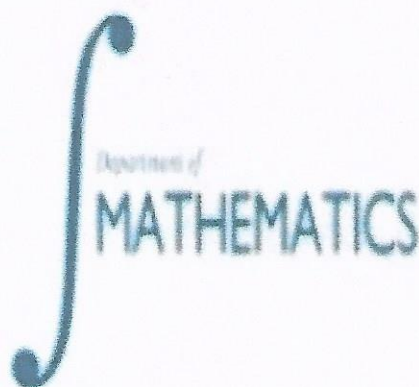
Choice Based Credit System

(with effect from the academic year 2017 – 2018 onwards)

Syllabus 2017 – 2020, 2018 – 2021, 2019 - 2022

PO, PSO & COs of Mathematics

Course Code: MA



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UG - Programme - Course Structure under CBCS

B. Sc - Mathematics

(Applicable to the candidates admitted from the academic year 2017 -2018 onwards)

FIRST SEMESTER

Sub – Code	Subject Title	Lecture Hours	Credits
S1TL11	Part – I Tamil	6	4
S2EN11	Part – II English	6	4
SMMA11	Part – III Core – 1: Calculus	5	4
SMMA12	Core – 2 : Classical Algebra	5	4
SAMA11	Allied 1 : Algebra & Differential Equations	6	4
SEVS11	Part – IV- Common : Environmental Studies	2	2
Total		30	22

SECOND SEMESTER

Sub – Code	Subject Title	Lecture Hours	Credits
S1TL21	Part – I Tamil	6	4
S2EN21	Part – II English	6	4
SMMA21	Part – III Core – 3 : Analytical Geometry of Three Dimensions	5	4
SMMA22	Core – 4 : Differential Equations	5	4
SAMA21	Allied 2 : Vector Calculus & Fourier Series	6	4
SVBE21	Part – IV : Value Based Education	2	2
Total		30	22

THIRD SEMESTER

Sub – Code	Subject Title	Lecture Hours	Credits
S1TL31	Part – I Tamil	6	4
S2EN31	Part – II English	6	4
SMMA31	Part – III Core -5 Real Analysis –I	6	4
SAST11	Allied II : Statistics I	6	3
SSMA3A	Skill Based: Vector Calculus	4	4
SYOG3A	Common : Yoga	2	2
Total		30	21

FOURTH SEMESTER

Sub - Code	Subject Title	Lecture Hours	Credits
S1TL41	Part – I Tamil	6	4
S2EN41	Part – II English	6	4
SMMA41	Core – 6: Abstract Algebra I	6	4
SAST21	Allied II: Statistics II	6	3
SSMA4A	Skill Based : Trigonometry, Laplace Transforms & Fourier Series	4	4
SCDE4A	Common : Computers for Digital Era	2	2
S5EA41	Extension Activities : NCC/NSS/YRC/YWF/PE	-	1
Total		30	22

FIFTH SEMESTER

Sub - Code	Subject Title	Lecture Hours	Credits
SMMA51	Core -7 : Abstract Algebra II	5	4
SMMA52	Core -8 : Real Analysis II	5	4
SMMA53	Core – 9 : Statics	5	4
SMMA54	Core – 10 : Transforms and their applications	5	4
SEMA5B	Major Elective I : Discrete Mathematics	4	4
SEMA5D	Major Elective II : Operations Research I	4	4
SCSB5A	Skill Based Common : Personality Development	2	2
Total		30	26

SIXTH SEMESTER

Sub - Code	Subject Title	Lecture Hours	Credits
SMMA61	Core -11 : Complex Analysis	5	4
SMMA62	Core –12 : Number Theory	4	4
SMMA63	Core – 13 : Graph Theory	5	4
SMMA64	Core – 14 : Dynamics	4	4
SMMA65	Core – 15 : Numerical methods	4	4
SEMA6B	Major Elective III : Fuzzy Mathematics	4	4
SEMA6D	Major Elective IV : Operations Research II	4	4
Total		30	28

Programme Outcomes

On successful completion of B.Sc., program in Mathematics, the students are able to have	
PO1	Bachelor's Degree in Mathematics is the culmination of in – depth knowledge of Algebra, Calculus, Geometry, Differential Equations and Several other branches of Mathematics. This also leads to study of related areas like computer science, Statistics. Thus, this program helps the learners in building a social foundation for higher studies in Mathematics.
PO2	The skills and knowledge gained has intrinsic beauty, which leads to proficiency in analytic reasoning. This can be utilized in modelling and solving real life problems.
PO3	Students undergoing this program learn to logically questions assertions, to recognise patterns and to distinguish between essential and irrelevant aspects of problems. They also share ideas and insights while seeking and benefitting from knowledge and insight of others. This helps them to learn behave responsibly in a rapidly changing society.
PO4	Students completing this program will be able to present Mathematics clearly and precisely, make vague ideas precise by formulating them in the language of Mathematics, describe mathematical ideas from multiple perspectives and explain fundamental concepts of Mathematics to non-mathematicians.
PO5	Completion of this program will also enable the learners to join teaching profession in primary and secondary schools.
PO6	This program will also help students to enhance their employability for government jobs, jobs in banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

Programme Specific Outcome

After the completion of B.Sc., program in Mathematics, the students are able to have	
PSO1	A Solid Foundation in Knowledge: B. Sc., Degree is the culmination of depth knowledge of my core branches of Mathematics such as Calculus, Classical Algebra, Analytical Geometry, Differential Equations, Sequence and series, Abstract Algebra, Real and Complex Analysis, Number Theory, Mechanics, Operations Research, Statistics, Graph Theory, Discrete Mathematics, Trigonometry, Transforms and their Applications and C++/Python. Thus, this program helps students in creating a solid foundation for further higher studies and research in Mathematics.
PSO2	A Competency in Skills: The skills and knowledge gained have intrinsic logic which leads to proficiency in analytical reasoning critical understanding, analysis and synthetic in order to solve theoretical and practical problems. This can orient students towards applications of Mathematics in other disciplines and moreover, it can also be applied in modelling and solving the real-life problems.
PSO3	Problem Solving Techniques: Students undergoing this program learn to logically understand the question assertions to clarify the patterns and to evaluate the difference between the necessities and unnecessities of the problems which helps to analyse the problem clearly and to take correct decision for solving the problems.
PSO4	Interdisciplinary and Research Skills: Students completing this program will be able to create and present mathematical concepts clearly and precisely, to describe mathematical ideas from multiple perspectives and to explain fundamental concepts of mathematics to non-mathematics people in a better manner.
PSO5	A Proficiency in Employments: The program will help students build up with employability for government jobs, jobs in banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

Course Outcome

FIRST SEMESTER

The students are able to:

<p>SMMA11</p>	<p>Part III Core 1: Calculus</p>	<p>CO1 Apply the mathematical knowledge to analyze the properties of a curve such as curvature, radius of curvature. CO2 Understand the concept of pedal equation and study about involute, evolute and asymptotes. CO3 Study about singular points and curve tracing. CO4 Classify double and triple integrals. CO5 Identify Beta and gamma function and to apply the rules of beta and gamma function in evaluating double and triple integrals.</p>
<p>SMMA12</p>	<p>Core 2 : Classical Algebra</p>	<p>CO1 Understand the basic theory of Equations CO2 Understand the sum of the powers of the roots of an equation. Find the roots of the equations by Newton's Theorem. CO3 Study how to transform the equation. Find the number of real roots using Descartes rule of signs. CO4 Solve appropriate solution of equations using Newton's and Horner's method. CO5 Solve biquadratic and cubic equations using Ferrari's method and Cardon's method.</p>
<p>SAMA11</p>	<p>Allied I : Allied Mathematics Algebra and Differential equations</p>	<p>CO1 Construct different types of equations and to compare and to find the relationships between roots and coefficients. CO2 Identify the transformation of equations and to find approximate solutions to equations by making use of Newton's method and Korner's method. CO3 Identify types of matrices and to find the characteristic equation of matrix. Eigen values and eigen vectors can be determined by applying Cayley Hamilton Theorem. CO4 Distinguish the differential equations of first order and higher degrees and to identify the equations which are all solvable for p, s, y and the equations in the standard form $Pp+Qq = R$. CO5 Identify and distinguish Laplace transformation and inverse Laplace transformation.</p>
<p>SEVS11</p>	<p>Part IV: Environmental Studies</p>	<p>CO1 Understand the definition, scope and importance of natural resources and associated problems. CO2 Study the different types of ecosystems, ecological succession food chains, food webs and ecological pyramids. CO3 Understand the definition of biodiversity and also study how to conserve. CO4 Analyze the various factors causing environmental pollution CO5 Study various social issues which affect our environment.</p>

SECOND SEMESTER

The students are able to:

SMMA21	Part III Core 3: Analytical Geometry of Three Dimensions	<p>CO1 Analyze the 3D-co-ordinate systems and how to find the direction cosines and direction ratios.</p> <p>CO2 Find the angle between planes, the length of the perpendicular and angle of bisection.</p> <p>CO3 Find and classify the equation of lines in different forms and calculate the image of the point, image of a line and to distinguish lines and planes. The angle between the line and plane can be determined. coplanar lines can be shown and the shortest distance between two lines</p> <p>CO4 The equations of spheres and circles of intersection can be interpreted and to illustrate and analyze the tangency of sphere.</p> <p>CO5 Solve the equation of a cone, cone with vertex at the origin, Tangent plane and normal Quadratic cone with the vertex at origin, Right circular cone, Cylinder, Right circular cylinder, enveloping cylinder.</p>
SMMA22	Core 4: Differential Equations	<p>CO1 Solve the differential equations which are all solvable for x, y, p and Clairaut's form. Also, to illustrate the method of solving the differential equations of the form $f_1(D)x + g_1(D)y = h_1(t)$, $f_2(D)x + g_2(D)y = h_2(t)$.</p> <p>CO2 Identify and solve the second order linear differential equation with constant coefficients.</p> <p>CO3 Interpret the linear equations of second order with variable coefficients, homogeneous equations, equation reducible to homogeneous equation.</p> <p>CO4 Solve Partial differential equations, Formation of equations by elimination of arbitrary constants and functions.</p> <p>CO5 Understand the application of differential equations and also study growth and decay, chemical reaction, Newton's law of cooling, Brochistocrone problem and simple electric circuit.</p>
SAMA21	Allied II: Allied Mathematics Vector Calculus & Fourier Series	<p>CO1 Analyze what is meant by vector differentiation and how to apply vector differentiation and its properties.</p> <p>CO2 Evaluate the double and triple integrals.</p> <p>CO3 Analyze and apply vector integration. By making use of Vector integration line, surface and volume integrals can be interpreted.</p> <p>CO4 Analyze and apply Green's, Stokes and divergence theorems.</p> <p>CO5 Determine the functions whether the functions are odd or even. By making use of these concepts half range series can be found out.</p>
SVBE21	Part IV: Value Based Education	<p>CO1 State the various parameters of social justice and also list the factors responsible for social justice.</p> <p>CO2 Discuss the rights of marginalized people like women, children, dalits, minorities, physically challenged etc.</p> <p>CO3 Examine the social issues caused due to alcoholism, drug addiction, poverty, unemployment etc.</p> <p>CO4 Understand the concept of globalization.</p> <p>CO5 Appraise the values, ethics, duties and responsibilities of each individual in the society.</p>

THIRD SEMESTER

The students are able to:

SMMA31	Part III Core : 5 Real Analysis I	<p>CO1 Analyse the real number system and also to classify rational and irrational numbers. To find the upper bounds, least upper bounds and maximum element and to elaborate triangle inequality and Cauchy-Schwartz inequality.</p> <p>CO2 Categorize the sequences as bounded sequences, monotonic sequences, convergent sequences and divergent sequences. Also, to find the algebra of limits.</p> <p>CO3 Demonstrate the behaviour of monotonic sequences and to apply Cauchy's first limit theorem. Make use of Cauchy's Second limit theorem and Cesaro's Theorem. Construct subsequence and to explain Cauchy's general principle of convergence.</p> <p>CO4 Interpret the series and to apply n^{th} term test, Comparison test, Kummer's test, D'Alembert's ratio test, Raabe's test, Gauss test and root test to compile the nature of the series.</p> <p>CO5 Understand Alternating series, Leibnitz's test. Apply the test for convergence of series of arbitrary terms. Also, to identify the Power series and to determine the radius of convergence.</p>
SAST11	Allied -I Statistics -I	<p>CO1 Find and relate the concepts of moments, skewness and kurtosis and to demonstrate the method of least squares and to classify parabolic, exponential and logarithmic curves.</p> <p>CO2 Interpret correlation and regression and to illustrate Karl's Pearson's coefficient of correlation and also the lines of regression and coefficient of regression.</p> <p>CO3 Develop the statistical techniques used in the theory of attributes and to analyze consistency of data and criteria independence and to interpret Yule's coefficient of association.</p> <p>CO4 Explain distribution function and its properties, able to find mathematical expectation and to find the cumulants using generating function.</p> <p>CO5 Solve discrete and continuous probability distributions, explain about discrete distributions like Binomial and Poisson distribution and their properties.</p>
SSMA3A	Part IV Skill Based Vector Calculus	<p>CO1 Classify the vector point function and scalar point function. Determine the derivative of product of scalar and vector function.</p> <p>CO2 Find divergence, curl. Make use of the Laplacian operator.</p> <p>CO3 Interpret the integration of point function and to illustrate line integral. To solve surface integral.</p> <p>CO4 Analyze and solve the Volume integral. Also, to illustrate and make use of Gauss Divergence Theorem to solve problems.</p> <p>CO5 To solve problems based on Green's Theorem and Stoke's Theorem.</p>

FOURTH SEMESTER

The students are able to:

SMMA41	Part III Core 6 Abstract Algebra I	<p>CO1 Explain the definitions of groups and its examples. Also, to determine the order of an element. Illustrate about Subgroups.</p> <p>CO2 Interpret cyclic groups and to find the generators of cyclic subgroups. Illustrate and apply Lagrange's Theorem, Euler's Theorem and Fermat's Theorem.</p> <p>CO3 Elaborate about Normal subgroups and group homomorphism. Illustrate Isomorphism, Automorphism. Also, to apply Cayley's theorem wherever required.</p> <p>CO4 Compare and classify Rings and its types. Illustrate about Integral domain and Fields. To summarize about maximal and minimal ideals.</p> <p>CO5 Utilize the concept of homomorphism and isomorphism on rings. Also, to find kernel of homomorphism and to make use of fundamental theorem.</p>
SAST21	Allied II Statistics II	<p>CO1 To list out the characteristics of index numbers and to find Laspeyer's and Paache's, Fisher and Bowley's Edgeworth's index numbers. The method to classify and analyse the unit test, commodity reversal test, time reversal test and circular tests can be shown.</p> <p>CO2 Construct testing of hypothesis and to distinguish null hypothesis and alternative hypothesis. Type I and Type II errors can be classified. The level of significance and test of significance for large samples can be explained.</p> <p>CO3 Identify the distributions such as t-distributions and F-distribution. By making use of t-test the single mean and difference of means can be found out. Variance ratio test based on Chi-square distribution by making use of this the goodness of fit can be decided.</p> <p>CO4 To find analysis of variance. One way and two-way classified data can be explained and to Randomize Block Design. Latin squares can be analysed and constructed.</p> <p>CO5 To explain statistical quality control and its advantages. Process control can be illustrated by making use of this control chart, range chart, P- chart can be designed.</p>
SSMA4A	Skill Based: Trigonometry, Laplace Transforms and Fourier Series	<p>CO1 Summarize about Trigonometry and to illustrate about the expansion of $\sin^n x$, $\cos^n x$, $\sin^n x$, $\cos^n x$.</p> <p>CO2 Obtain the relationship between hyperbolic functions and circular function. Explain about inverse hyperbolic functions. To find summation of the series using C+ is method. Use visualization, spatial reasoning, as well as geometric properties and strategies to model and solve problems involving exponential and trigonometric functions, as well as their inverses</p> <p>CO3 Illustrate Laplace Transforms.</p> <p>CO4 Solving linear differential equations with constant coefficients and simultaneous equations using Laplace Transforms.</p> <p>CO5 Solve problems based on Fourier Series. Identify the odd and even functions and to deduce half range series.</p>

FIFTH SEMESTER

The students are able to:

SMMA51	Part – III Core -7 : Abstract Algebra II	<p>CO1 Explain the definitions and general properties of vector spaces. Also, to explain subspace. They know where to apply fundamental theorem of homomorphism.</p> <p>CO2 Determine the span of a set and to check whether the given set is Linearly dependent or not. Also, to find basis and dimensions.</p> <p>CO3 Illustrate and apply Rank Nullity theorem. Explain the definitions and examples of inner product space. Apply Gram Schmidt Orthogonalization process.</p> <p>CO4 Construct matrices and also to summarize the elementary transformations. Determine the Inverse of matrix and rank of a matrix. To make use of Cayley Hamilton Theorem. To make use of Cayley Hamilton Theorem.</p> <p>CO5 Determine Eigen values and Eigen Vectors. Identify bilinear forms and quadratic forms. Also, to deduce diagonal form from quadratic form.</p>
SMMA52	Core -8 : Real Analysis II	<p>CO1 Explain about Metric spaces and to construct an open ball. Also, to interpret interior.</p> <p>CO2 Interpret about closed sets and to find closure. To determine limit points. Analyze about complete metric space. Discuss about Cantor's intersection theorem and Baire's Category theorem.</p> <p>CO3 Summarize continuity. Illustrate about uniform continuity. Discuss about discontinuous functions of R.</p> <p>CO4 Explain about Connectedness and to deduce the connected subsets of R. To obtain the relationship between Connectedness and continuity. Illustrate about Compactness. Illustrate and make use of Heineborel Theorem.</p> <p>CO5 Explain about Reimann Integral, understand the concept of derivates. Explain about Rolle's theorem and Mean Value theorems.</p>
SMMA53	Core – 9 : Statics	<p>CO1 Explain the forces acting at a point and to apply the parallelogram law of forces, Triangle law of forces and Lami's theorem.</p> <p>CO2 Interpret parallel forces and moments. Analyse the resultant of two parallel forces and the resultant of two unlike unequal parallel forces. To apply Varignon's theorem.</p> <p>CO3 Summarize equilibrium of three forces acting on a rigid body and to illustrate threecoplanar forces theorem and to make use of the above theorem to solve problems.</p> <p>CO4 Explain about laws of friction. Also, to determine the angle of friction and Illustrate about the equilibrium of a particle and to make use of the concepts to solve the problems.</p> <p>CO5 Interpret the equilibrium of strings. To deducethe equation of catenary and its geometrical properties.</p>

SMMA54	Core – 10: Transforms and their applications	<p>CO1 Apply Fourier transforms and to explain the properties.</p> <p>CO2 Solve problems on infinite Fourier cosine and Sine Transforms</p> <p>CO3 Identify and solve Finite Fourier transforms.</p> <p>CO4 Illustrate Z transforms and its properties.</p> <p>CO5 Utilize inverse Z transforms to solve difference equations.</p>
SEMA5B	Major Elective I: Discrete Mathematics	<p>CO1 illustrate and use the statements, notations and connectives. Construct truth table and utilize conditional and biconditional statements.</p> <p>CO2 Analyze and explain predicate calculus.</p> <p>CO3 Elaborate Groups and Monoids. Also, to develop Group codes.</p> <p>CO4 Construct Lattices and special lattices. Analyze and explain Boolean algebra.</p> <p>CO5 Convert from one form to another form (Decimal, Binary, Octal, Hexadecimal). Evaluate Binary addition, subtraction, multiplication and division.</p>
SEMA5D	Major Elective II: Operations Research I	<p>CO1 Solve Linear Programming Problem by making use of Graphical method, Simplex method.</p> <p>CO2 Interpret the concept of duality. Classify primal and dual problems. Utilizing the concept of duality, solve problems on dual simplex method.</p> <p>CO3 Solve Transportation problems by making use of North – west corner rule, Matrix- Minima method, Vogel’s Approximation rule. Evaluate Degeneracy and unbalanced transportation problems</p> <p>CO4 Determine the solution for Assignment problems.</p> <p>CO5 Solve sequencing problems.</p>
SCSB5A	Skill Based Common : Personality Development	<p>CO1 Develop, exhibit and accurate sense of self.</p> <p>CO2 Develop and nurture a deep understanding of personal Motivation.</p> <p>CO3 Develop an understanding and practice personal and Professional responsibility.</p> <p>CO4 Demonstrate knowledge of personal beliefs and values and a commitment to continue personal reflection and reassessment.</p> <p>CO5 Learn to balance confidence with humility.</p> <p>CO6 Assert strengthened personal character and further an enhanced ethical sense.</p>

SIXTH SEMESTER

The students are able to:

SMMA61	Part – III Core -11: Complex Analysis	<p>CO1 Understand the concept of analytical functions and study Functions of a complex variable and to utilize Cauchy - Riemann equations. Illustrate harmonic functions.</p> <p>CO2 Understand the concept of definite integrals, contours. Illustrate Cauchy – Goursat theorem. Illustrate and use Cauchy integral formula and Morera’s theorem.</p> <p>CO3 Illustrate Series expansions and understand the concept zeros, residues. Explain Cauchy’s Residue Theorem.</p> <p>CO4 Apply Cauhy residual theorem to evaluate improper, definite integrals involving sines and cosiness.</p> <p>CO5 Illustrate conformal mappings. Study the basic properties of bilinear maps.</p>
SMMA62	Core –12: Number Theory	<p>CO1 Explain Peano’s theorem and to utilize mathematical induction. Also, to make use of binomial theorem.</p> <p>CO2 Illustrate Division Algorithm. Determine GCD. To deduce the Diaphantine Equation $ax+by = c$.</p> <p>CO3 Interpret the fundamental theorem of arithmetic. Explain The Sieve of Eratosthenes and to use Goldbach Conjecture.</p> <p>CO4 Summarize the basic properties of congruences and to apply Chinese Remainder Theorem</p> <p>CO5 Elaborate Fermat’s Theorem, Wilson’s Theorem and to apply Kraitichik Factorization Method.</p>
SMMA63	Core – 13: Graph Theory	<p>CO1 Construct graph and to explain its definition. Determine degrees. Also, to perform operations on graph.</p> <p>CO2 Understand the concept of Degree sequences, graphic sequences, walks, trails and paths, connectedness and components – connectivity.</p> <p>CO3 Understand the concept of Eulerian graphs, Hamiltonian graphs, characterization of trees – center of a tree.</p> <p>CO4 Interpret planar graphs and to determine chromatic numbers and chromatic index.</p> <p>CO5 Explain chromatic polynomials and the properties of digraphs.</p>
SMMA64	Core – 14: Dynamics	<p>CO1 Illustrate Projectiles and to find the equation of path, range and maximum height and time of flight.</p> <p>CO2 Elaborate about the collision of elastic bodies. Interpret law of impact and classify direct and oblique impact.</p> <p>CO3 Determine simple harmonic motion in a straight line. Summarize the composition of SHM of the same period in the same line and along two perpendicular directions.</p> <p>CO4 Interpret motion under the action of central forces. Derive velocity and acceleration in polar coordinates.</p> <p>CO5 Study the concept of Differential Equation of central orbit. Also, to deduce the pedal equation of central orbit.</p>

SMMA65	<p align="center">Core – 15: Numerical methods</p>	<p>CO1 Obtain numerical solutions of algebraic and transcendental equations by making use of various methods.</p> <p>CO2 Find finite difference for first and higher order differences. To classify Forward and backward differences.</p> <p>CO3 To apply interpolation formula in Newton's Forward and backward, Gauss forward and backward formula.</p> <p>CO4 Make use of numerical differentiation and integration in Newton's forward and backward differences for differentiation. Also, to utilize Trapezoidal rule and Simpson's 1/3 and 3/8 rule.</p> <p>CO5 Solve Difference equations and to determine the order and degree of difference equation. Solve linear difference equation and find complementary function and to deduce particular integral of the function.</p>
SEMA6B	<p align="center">Major Elective III: Fuzzy Mathematics</p>	<p>CO1 Explain Crisp Sets and fuzzy Sets and illustrate the characteristics and significance of Paradigm shift.</p> <p>CO2 Elaborate the Additional properties of α-cuts and the extension principle for fuzzy sets.</p> <p>CO3 Perform fuzzy set operations. Also, to determine fuzzy complements, fuzzy intersections and fuzzy unions.</p> <p>CO4 Determine fuzzy Numbers and Linguistic variables. Apply arithmetic operations on intervals and on fuzzy numbers. Construct Lattice of fuzzy numbers.</p> <p>CO5 Analyze and classify fuzzy Decision Making, Individual Decision Making, Multi-person decision making problems.</p>
SEMA6D	<p align="center">Major Elective IV: Operations Research II</p>	<p>CO1 Interpret the games and strategies. Solve two-person zero sum games. Make use of mixed Strategies and dominance property.</p> <p>CO2 Analyze the replacement of items that deteriorate with time. Illustrate replace montage of a machine - taking money value into consideration and elaborate the replacement of items that completely fail suddenly and Staffing problems.</p> <p>CO3 Explain the queuing models and to classify into (M/M/1: /FCFS), (M/M/1 : ∞/FCFS),(M/M/S : /FCFS).</p> <p>CO4 Compose network scheduling using PERT / CPM. Explain the rules of network construction. Make use of PERT calculation.</p> <p>CO5 Analyze and solve inventory control problems. Learn the concept of Types of Inventories – Inventory decisions – Deterministic inventory Problem– EOQ problems with shortages.</p>

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