

CO–POMAPPINGFOR

B.Sc(MATHEMATICS)

(W.E.F2020-21)

DEPARTMENTOFMATHEMATICS

S.A.S GOVT. DEGREE COLLEGE

DEPARTMENT OF MATHEMATICS

B.SC(MATHEMATICS)

VISION

1. To enable the rural and urban students strong in doing mathematics.
2. Encouraging them for further higher studies and to write competitive exams.
3. Instill analytical and logical thinking among students and promote mathematical thought as an important area of human thought.

MISSION

1. To develop the mathematical thinking of the students.
2. To learn mathematical software knowledge for further higher education.
3. To create an environment that supports to solve rural problems and give its usage to ground level by mathematical modelling etc.
4. To conduct seminar, group discussion, workshop etc. for the students.

DEPARTMENT OF MATHEMATICS

B.SC (MATHEMATICS)

Programme Outcomes (POs)

1. Acquire a comprehensive understanding of domain-specific knowledge and demonstrate their acquired skills effectively during practical transactions within the specific domain.
2. Demonstrate proficient analytical and problem-solving skills through the application of critical thinking strategies to address real-world situations effectively.
3. Master effective communication, collaborate skillfully with diverse stakeholders, nurture meaningful dialogues, build strong professional bonds in and beyond college.
4. Exhibit proficiency in ethically using information from diverse sources, analyzing and synthesizing data effectively for real-world research.
5. Exemplify ethical standards in personal and professional contexts, appreciate diverse cultures, evaluate social responsibility's impact on well-being, and advocate for women students' betterment.
6. Actively promote social awareness through community service, contributing to a more inclusive and compassionate global community.
7. Embrace continuous learning, create professional growth chances, and prioritize personality development and physical well-being for a holistic approach.
8. Foster self-confidence, advocate women empowerment, demonstrate expertise for growth in studies, employment, and entrepreneurship, creating a brighter and equitable future.

PROGRAM SPECIFIC OUTCOMES:

MATHS PHYSICS COMPUTER SCIENCE

- PSO1. Understand the concepts of vector spaces, group theory, quantum mechanics, optical, thermal, electrical, mechanical properties of materials, probability, algorithm design, database.
- PSO2. Analyze the concepts of mathematics, physics and computer science able to relate them in numerical programming of models of physical systems.
- PSO3. To impart knowledge of a broad range of Computer Science skills, tools, and mathematical techniques, and the capability of applying them to analyze and design complex systems.
- PSO4. Acquire logical and analytical skills to apply the concepts to model and solve real life problems in related areas.
- PSO5. Engage in professional development in the fields of Information Technology and Computer Science.

MATHS CLOUD COMPUTING COMPUTER SCIENCE

- PSO1. Acquire good knowledge and understanding in advanced areas of mathematics and statistics, chosen by the student from the given courses.
- PSO2. Design, implement, test, and evaluate a computer system, component, or algorithm to meet desired needs and to solve a computational problem
- PSO3. Demonstrate understanding of the principles and working of the hardware and software aspects of computer systems
- PSO4. Acquire the fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability; benefits, as well as current and future challenges
- PSO5. Understand the key security and compliance challenges of cloud computing

COURSE1:DIFFERENTIAL EQUATIONS

CO1.Demonstrate the fundamental concepts, principles, and techniques related to first-order and higher-order differential equations.

- Knowledge: Recall the fundamental concepts and principles of first-order and higher-order differential equations.
- Understanding: Explain the differences between first-order and higher-order differential equations and their significance in various applications.

CO2. Understand various methods and apply the methods to solve differential equations

- Understand: Explain the general principles behind each method, such as separation of variables and integrating factors, and how they relate to different types of differential equations.
- Application: Utilize the method of undetermined coefficients to solve a second-order linear homogeneous ordinary differential equation with constant coefficients.

CO3. Critically analyze and evaluate the solutions obtained for differential equations

- Analysis: Examine and identify the strengths and limitations of the solutions obtained for differential equations in different contexts.
- Evaluation: Assess the accuracy, validity, and applicability of the solutions, considering factors such as initial conditions and real-world implications.

CO No	Upon the successful completion of the course students will be able to	PO's/PSO's	Cognitive level
CO1	Demonstrate the fundamental concepts, principles, and techniques related to first-order and higher-order differential equations.	PO1, PO5	L1, L2, L3
CO2	Understand various methods and apply the methods to solve differential equations	PO1, PO2	L2, L3
CO3	Critically analyze and evaluate the solutions obtained for differential equations	PO2, PO3	L4, L5

Mapping COs to POs: Alignment on a Three-Point Scale from Weak to Strong

CO	PO							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				2		2	1
CO2	3	3					2	1
CO3		3	3	1			2	1

COURSE:THREEDIMENTIONALANALYTICALGEOMETRY

CO1.Acquirethe basicknowledgeofplanes,lines,spheres,andcones

- Remembering: Acquire fundamentalknowledgeabouttheproperties,equations,andcharacteristicsofplanes,lines,spheres,andcones.

CO2.Demonstratebasicideaoflines, spheres, andcones

- Understanding:Demonstrateafoundationalunderstandingoftheconceptsofplanes,spheres,andcones.
- Application:Applythebasicunderstandingoflines,spheres,andconestosolveproblemsinvolvingthesegeometricshapes.

CO3.Understandthepropertiesofplanes,lines,spheres,andconesandapplythemtosolveproblems

- Understanding:Understandtheinherent propertiesofplanes,lines,spheres,andconesandhowtheyrelatetogeometricproblem-solving.
- Applying:Applytheunderstandingofpropertiestosolveproblems involvingplanes,lines,spheres,andcones.

CO4.Demonstratingcriticalthinkingtochoosethemostsuitablegeometricapproachforagivenproblem.

- Applying:Applycriticalthinkingtoanalyzegivenproblemsandchooseappropriategeometric approaches.
- Analyzing:Analyzeproblemcharacteristicsandselect themost suitablegeometricapproach,showcasinghigher-orderthinkingskills

Mapping of CO's and PO's

CO No	Upon the successful completion of the course students will be able to	PO's/PSO's	Cognitive level
CO1	Acquire the basic knowledge of planes, lines, spheres, and cones	PO1	L1
CO2	Demonstrate and apply the basic idea of lines, spheres, and cones.	PO1, PO2	L2, L3
CO3	Understand the properties of planes, lines, spheres, and cones and apply them to solve problems.	PO1, PO2, PO4	L2, L3
CO4	Demonstrating critical thinking to choose the most suitable geometric approach for a given problem.	PO2, PO4	L3, L4

Mapping COs to POs: Alignment on a Three-Point Scale from Weak to Strong

CO	PO							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3							
CO2	3	3						
CO3	3	3		2				
CO4		3		2			1	1

COURSE3:ABSTRACTALGBRA

CO1.Acquirethebasicknowledgeandstructureofgroups,subgroups, cyclicgroups,andthesignificance ofthenotationofnormalsubgroups.

- Remembering: Recall the fundamental concepts of groups, subgroups, cyclic groups, andthe significanceofnotationfornormalsubgroups.
- Understanding:Understandthestructure andpropertiesof groups,subgroups,cyclicgroups,andtheimportanceofnormalsubgroups.

CO2. Studythebehaviorofpermutationsand operationsonthem.

- Understanding: Understand the behavior of permutations and the operations applied tothem.

CO3. Evaluate and analyze the concepts of homomorphisms, isomorphisms, and permutations,along withtheirpropertiesandapplications,including Cayley'stheorem.

- Analyzing: Analyze the concepts of homomorphisms, isomorphisms, permutations, andtheirproperties,including theirapplicationssuchasCayley'stheorem.
- Evaluating:Evaluatethesignificanceandpracticalapplicationsofhomomorphisms,isomorphi sms,and permutations,including theirroleinCayley'stheorem.

CO4. Understand the concepts of ring theory, including its connection with group theory, and beable to prove relevant theorems. Also, comprehend the applications of ring theory in variousfields.

- Understanding: Understand the foundational concepts of ring theory, its connection withgrouptheory,anditsrelevanceinvariousfields.
- Applying:Applytheunderstandingofringtheorytoproverelevanttheoremsanddemonstrate its applicationsindifferentcontexts.

Mapping of CO's and PO's

CO No	Upon the successful completion of the course students will be able to	PO's/PSO's	Cognitive level
CO1	Acquire the basic knowledge and structure of groups, subgroups, cyclic groups, and the significance of the notation of normal subgroups.	PO1, PO2	L1, L2
CO2	Study the behavior of permutations and operations on them.	PO1, PO2	L2
CO3	Evaluate and analyze the concepts of homomorphisms, isomorphisms, and permutations, along with their properties and applications, including Cayley's theorem.	PO1, PO2, PO4	L4, L5
CO4	Understand the concepts of ring theory, including its connection with group theory, and be able to prove relevant theorems. Also, comprehend the applications of ring theory in various fields.	PO1, PO2, PO7	L2, L3

Mapping CO to POs: Alignment on a Three-Point Scale from Weak to Strong

CO	PO							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	1						
CO2	3	3						
CO3	3	3		2			2	1
CO4	3	3					2	1

COURSE4:REAL ANALYSIS

CO1. Get a clear idea about the real numbers and real-valued functions

- Remembering: Obtain a foundational understanding of real numbers and real-valued functions.
- Understand: Understand the properties of real numbers, including algebraic and order properties, and apply them in analyzing sequences and intervals.

CO2. Obtain the skills to analyze and evaluate the convergence of a sequence/series.

- Analyzing: Analyze and evaluate the convergence of sequences and series.
- Evaluating: Apply higher-order evaluation skills to assess the convergence of sequences and series.

CO3. Test the continuity and differentiability of a function and apply Riemann integration.

- Understand: Grasp the definitions of continuity and differentiability of functions.
- Application: Apply tests to determine the continuity and differentiability of functions and utilize Riemann integration techniques.

CO4. Understand the geometrical interpretation of mean value theorems.

- Understand: Grasp the geometrical interpretation of mean value theorems in the context of real-valued functions.
- Application: Apply the conditions of continuity and differentiability to verify the applicability of Mean value theorems.

Mapping of CO's and PO's

CO No	Upon the successful completion of the course students will be able to	PO's/PSO's	Cognitive level
CO1	Get a clear idea about the real numbers and real-valued functions, sequences, series, limits, continuity, differentiability and integration	PO1	L1, L2
CO2	Obtain the skills to analyze and evaluate the convergence of a sequence/series.	PO2, PO4	L4, L5
CO3	Test the continuity and differentiability of a function and apply Riemann integration.	PO2, PO3, PO7	L3, L4, L5, L6
CO4	Understand the geometrical interpretation of mean value theorems and their applications.	PO2, PO4	L2, L3

Mapping COs to POs: Alignment on a Three-Point Scale from Weak to Strong

CO	PO							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3							
CO2		3		2			2	1
CO3		3	3				3	1
CO4		3		3				1

COURSE5:LINEARALGEBRA

CO1.Developa foundationalunderstandingofvectorspaces,subspaces,bases,anddimensions.

- Knowledge:Definevectorspaces,subspaces,bases,anddimensions.
- Understanding:Explaintherelationshipsbetweentheseconceptsandtheirsignificance inlinearalgebra.

CO2.Analyzethepropertiesofvectorspacesandsubspacesthroughmathematicalproofs.

- Application:Applymathematicalproofstodemonstratepropertiesofvectorspacesandsubspaces.
- Analysis:Analyzehowthesepropertieshold trueand what theyimplyaboutthenatureofvectorspaces andtheirsubsets.

CO3.Applytheconceptsoflineartransformationstosolveproblems invariouscontexts.

- Application:Applylineartransformationsto solveproblemsindifferentfields.
- Analysis: Analyze the effects of linear transformations on vectors and matrices

inCO4.UtilizetheCayley-Hamiltontheoremtofindtheinverseofamatrixandcalculatehigher powersofmatriceswithoutusingroutinemethods

- Evaluation:Evaluatethepracticalbenefitsandimplicationsofutilizingthetheoremformatrix calculations.
- Creative: Combine the knowledge of the Cayley-Hamilton theorem with matrixmanipulationtechniquesoffindinversesandcomputehigherpowersofmatrices

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Mapping of CO's and PO's

CO No	Upon the successful completion of the course students will be able to	PO's/PSO's	Cognitive level
CO1	Develop a foundational understanding of vector spaces, subspaces, bases, dimensions, Linear transformations and Inner product spaces	PO1	L1, L2
CO2	Analyze the properties of vector spaces and subspaces through mathematical proofs.	PO2, PO4	L3, L4
CO3	Apply the concepts of linear transformations to solve problems in various contexts.	PO2, PO7	L3, L4
CO4	Utilize the Cayley-Hamilton theorem to find the inverse of a matrix and calculate higher powers of matrices without using routine methods.	PO4	L5, L6

Mapping COs to POs: Alignment on a Three-Point Scale from Weak to Strong

CO	PO							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3							
CO2		3		2				1
CO3		3					2	1
CO4				2				1

