

GOVERNMENT COLLEGE For WOMEN (Autonomous), Mandya.
Department of Mathematics
Academic Year-2020-21
(Revised CBCS Scheme 2018-19 Onwards)

Criterion –II- Teaching - Learning and Evaluation

2.6 Teaching – Learning Process

2.6. Student Performance and Learning Outcomes

2.6.1 Programme outcomes, programme Specific outcomes and Course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide web link)

The B.Sc.(PCM & PMCs) Programme enables students to:

NAME OF THE PROGRAMME	PROGRAMME OUTCOMES
B. Sc- (PCM &PMCs)	<ul style="list-style-type: none"> ➤ The students should have the elementary knowledge of concepts in different subjects being covered as part of their UG programme - Understand the interrelations between the different subjects and develop the ability to identify the links. ➤ Students should develop proficiency in research and analytical skills. ➤ Students should have an applicable set of professional skills to guarantee a productive career. ➤ Students should be able work commendably in multi-disciplinary environment. ➤ Students should have basic awareness of the methods, approaches or theories used in attaining and interpreting data related to their disciplines. ➤ Students should develop effective oral and written communication skills and develop competency in presenting information they have acquired. ➤ The participants should become responsible citizens with human values.

Programme Specific Outcomes: Mathematics

NAME OF THE PROGRAMME	PROGRAMME SPECIFIC OUTCOMES
<p style="text-align: center;">B. Sc- Mathematics (PCM & PMCs)</p>	<ul style="list-style-type: none">➤ To provide students a justifiable education in different areas of Mathematics.➤ To incorporate knowledge, skill and attitude that will provide an environment of learning and creativity among the students.➤ To develop the skills necessary to formulate and understand proofs.➤ Think critically and communicate clearly, the mathematical concepts and solutions to real-world problems.➤ Students should be able to solve problems using varied collection of noteworthy mathematical methods.➤ Enhancing student's overall development and to equip them with mathematical modeling abilities, problem solving skills, creative talent.➤ Ability to pursue advanced studies and research in pure and applied mathematical science.➤ Procure awareness in advanced areas of mathematics and its applications.

COURSE OUTCOMES: MATHEMATICS

S.N.	PROGRAMME	COURSE	COURSE OUTCOMES
1.	B.Sc: I-Sem	Algebra-I & Calculus-I And Practicals-I	<p>After Completion of the course, Student will be able to</p> <ul style="list-style-type: none"> ➤ Understand rank of a matrix, reducing to row reduced echelon form, Gauss-Jordan method of finding the inverse, solving system of linear equations. ➤ Consistency of linear system of equations, procedure to test the consistency of a system of equations in n unknowns, system of linear homogeneous equations. ➤ Comprehend Eigen values, Eigen vectors ➤ Describe the relation between roots and coefficients, Transform the equations and Find the multiple roots. ➤ Solve the reciprocal equations. ➤ Apply Cardon’s method to find roots of a cubic equation and Descarte’s Method for biquadratic equation. ➤ Understand Successive differentiation and Leibnitz’s theorem for nth derivative of product of two functions. ➤ Solve the problems on maxima, minima, concavity, convexity and point of inflection. ➤ Find angle between the radius vector and the tangent, angle of intersection, pedal equations, radius of curvature, center of curvature and evolutes. ➤ Derive the Reduction formulae and solve problems. ➤ Solving problems on Algebra-I & Calculus-I by using maxima software.
2	B.Sc: II-Sem	Differential Calculus-II & Theory of numbers And Practical-II	<p>After Completion of the course, Student will be able to</p> <ul style="list-style-type: none"> ➤ Define limit, Continuity, Differentiability and solve the problems. ➤ State, Prove and verify the mean values theorems. ➤ Find the Taylor’s infinite series, Maclaurin’s infinite series and evaluate the indeterminate form limits.

			<ul style="list-style-type: none"> ➤ Know the concepts of functions of two or more variable and find the partial derivatives of the given function. ➤ State, prove and verify Euler's theorem. ➤ Find the total derivatives and Jacobians ➤ Define the concept of divisibility, prime number and explain the division algorithm, Euclid's algorithm, GCD, congruence, linear congruence, Fermat's theorem and Wilson's theorem. ➤ Use Fermat's theorem and Wilson's theorem. ➤ Solving problems on Differential Calculus-II & Theory of numbers by using maxima software.
3	B.Sc: III-Sem	Algebra-II & Differential Equations and Practicals-III	After Completion of the course, Student will be able to
			<ul style="list-style-type: none"> ➤ Define the group , Subgroup and give examples ➤ Prove the theorems on group and subgroup. ➤ Understand Lagrange's theorem, Euler's theorem and Fermat's theorem, cyclic groups. ➤ Define normal subgroups, quotient groups, Cosets and prove the theorems. ➤ Understand homomorphism, kernel of a homomorphism, isomorphism. ➤ Solve first order differential equations utilizing the standard techniques for separable, exact, linear, homogeneous, or Bernoulli cases. ➤ Find the complete solution of a non-homogeneous differential equation as a linear combination of the complementary function and a particular solution. ➤ Solving problems on Algebra-II & Differential Equations by using maxima
4	B.Sc: IV-Sem	Differential Equations-II and	After Completion of the course, Student will be able to
			<ul style="list-style-type: none"> ➤ Solve the ordinary second order linear differential equations with variable co-efficient using different methods.

		Real Analysis-I And Practicals-IV	<ul style="list-style-type: none"> ➤ Understand the simultaneous equations and total differential equations ➤ Form the partial differential equations and solve the partial differential equations. ➤ Evaluate the line, double and triple integrals and find the surface area and volume. ➤ Define the lower and upper Reimann sum and lower and upper Reimann integral and prove the properties. ➤ State and prove the necessary and sufficient condition for Reimann integrability and prove the properties. ➤ Solving problems on Differential Equations-II and Real Analysis-I by using maxima software
5	B.Sc: V-Sem	DSE: MATH-01 Real Analysis-II and Algebra-III And Practicals-V	<p>After Completion of the course, Student will be able to</p> <ul style="list-style-type: none"> ➤ Comprehend different types of sequences, verify whether the given sequence is convergent, divergent and oscillatory or not and discuss the behavior of Monotonic sequence. ➤ Give examples for convergence, divergence and oscillating series, discuss the behavior of the geometric series and verify the given series is convergent or divergent by using different test. ➤ Define ring, types of rings, integral domain, field and subring and give examples, solve the problem, and prove the properties. ➤ Understand the concepts of Ideals, Algebra of ideals, prime ideals and maximal ideals and find the units and associates. ➤ Discuss the polynomial rings and solve problems. ➤ Solving problems on Real Analysis-II & Algebra-III Mathematics by using maxima software

		DSE: MATH-02 Applied Mathematics-I	<ul style="list-style-type: none"> ➤ Understand the Laplace transform of standard functions, derivative of functions, integrals of functions, alpha functions and inverse Laplace transforms, convolution theorem and solve first and second ODE's with constants coefficients. ➤ Solving problems on Summation of series ➤ Define the Gamma and Beta function, explain properties of Gamma Beta functions and derive relation between Beta and Gamma functions. ➤ Evaluate integrals by Beta and Gamma functions. ➤ Find Fourier series expansions for given functions and find Cosine and Sine series expansions for given functions.
		SEC: MATH-01 Numerical Analysis-I	<p>After Completion of the course, Student will be able to</p> <ul style="list-style-type: none"> ➤ Find the numerical solutions of algebraic and transcendental equations by using Bisection method, Regula falsi and newton-Raphson method. ➤ Understand numerical methods to find solution of first order linear differential equations: solution by using Euler's method, Euler's modified method, Range Kutta fourth order and Picard's method.
		SEC: MATH-02 Numerical Analysis-II	<p>After Completion of the course, Student will be able to</p> <ul style="list-style-type: none"> ➤ Calculate Numerical Solution of Non-Homogeneous Equations using Gauss Elimination Method, Gauss Jordan Method, Gauss-Seidel iteration .
6	B.Sc:VI-Sem	DSE: MATH-03 Algebra-IV & Complex	<p>After Completion of the course, Student will be able to</p> <ul style="list-style-type: none"> ➤ Understand Vector Space, Quotient space; explain direct sum, linear span and linear independence, basis and inner product.

	Analysis-I And Practicals-VI	<ul style="list-style-type: none"> ➤ Discuss the linear transformations, rank, nullity. ➤ Find the characteristic equation, Eigen values and Eigen vectors of a matrix. ➤ Obtain the equation to a circle and straight line in complex form, define and analyze limits and continuity for complex functions. ➤ Understand the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations and determine whether a given function is analytic and construct the analytic function using Milne Thomson method and the concept of harmonic function. ➤ Understand basic methods of complex integration and its application in contour integration. Evaluate complex contour integrals directly and by the fundamental theorem, and prove Liouville's theorem and fundamental theorem of algebra. ➤ Problem solve on Algebra-IV & Complex Analysis-I by using maxima software
	DSE: MATH-04 Fourier Transforms & Graph Theory	After Completion of the course, Student will be able to <ul style="list-style-type: none"> ➤ Analyze Finite and infinite Fourier transforms, discuss Fourier transform properties. ➤ Find Fourier sine and cosine transforms and inverse transforms. ➤ Define the Jacobian of a transformation, Identity transformation, Reflection, Translation, Rotation, Stretching and Inversion. ➤ Find the cross ratio and understand the concept of conformal mapping and discuss the transformations of the functions $w=z^2$, $w=\sin(z)$, $w=e^z$, $w=(1/2)(z+1/z)$. ➤ Define the isomorphism, subgraphs, operation on graphs, walks, paths, circuits, connected and disconnected graphs, Euler graphs, Hamiltonian

			<p>graphs.</p> <ul style="list-style-type: none"> ➤ Formulate and prove central theorems about trees, matching and connectivity. ➤ Apply principles and concepts of graph theory in practical situations.
		SEC: MATH-03 Numerical Analysis-III	<p>After Completion of the course, Student will be able to</p> <ul style="list-style-type: none"> ➤ Define Basic concepts of operator's Δ, E and ∇. ➤ Find the difference of polynomial and Solve problems using Newton-Gregory forward formula and Newton-Gregory backward formula. ➤ Evaluate the definite integrals using Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule and weddle's rule.
		SEC: MATH-04 Numerical Analysis-IV	<p>After Completion of the course, Student will be able to</p> <ul style="list-style-type: none"> ➤ Understand Numerical methods to solve partial differential equations, classification of second order equations ➤ Solve finite difference approximation to derivatives ➤ Will be able to find solution of Laplace's equation and Poisson's equation.

Head of the Department

Principal