



Joya Gogoi College
Khumtai-785619
Golaghat (Assam)
Affiliated to Dibrugarh University

B. Sc Mathematics	
CBCS (Honours)	
Semester I	
Course Name	Course Outcome
C-1: Calculus	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none"> • Evaluate the behaviours and graphs of functions. • Use basic integration techniques to calculate area and volume. • Find higher order derivatives of functions, maximum, minimum etc. • Sketch parametric curves (e.g. cycloid, epicycloids etc).
C-2: Algebra	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none"> • Demonstrate the concepts and methods of classical algebra and preliminaries of number theory. • Develop the concept of linear transformation and its matrix representation. • Demonstrate the understanding of the concepts of vector space and dimensions. • Understand the problems that apply algebra to Chemistry, Economics, Computer science and Engineering.
GE-1: Differential Calculus	<p>After going through the course Students will be able to</p> <ul style="list-style-type: none"> • Understand the concepts of limit and continuity. • Find higher order derivatives of various kinds of function. • Trace parametric curves and polar curves. • To find tangent normal, curvature, asymptotes etc. • Expand functions using Taylor's series, Maclaurin's series.
Semester II	
C-3: Real Analysis	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none"> • Distinguish the various properties of real number. • Understand the concepts of different types of sequence and Series over \mathbb{R}. • Use various tests for convergence to find if the given sequence or series is converging or diverging.
C-4: Differential Equations	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none"> • Apply the techniques in solving various ordinary differential equations. • Solve various mathematical models used in real life problems by applying these techniques. • Plot second and third order solution family of differential equation.



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GE-2: Differential Equations	After going through this course, the students will be able to <ul style="list-style-type: none"> • Solve first and higher order linear differential equations. • Understand the concepts of linear and non-linear PDE. • Classify second order PDE into elliptic, parabolic and hyperbolic through illustrations.
Semester III	
C-5: Theory of Real Functions	After going through this course, the students will be able to <ul style="list-style-type: none"> • Describe and elaborate limit, continuity, and differentiability of real valued and/or real functions. • Understand various introductory theorems associated with real functions. • Expand functions using Taylor's series and Maclaurin's series expansions.
C-6: Group Theory I	After going through this course, the students will be able to <ul style="list-style-type: none"> • Demonstrate the understanding of binary operations and algebraic structure forming a group. • Discuss subgroups, cyclic subgroups, abelian subgroups etc. • Understand the concepts and standard properties of group homomorphisms.
.C-7: PDE and Systems of ODE	After going through this course, the students will be able to <ul style="list-style-type: none"> • Understand the basic concepts of PDE and solve using various techniques (Lagrange's method, Charpit's method, Jacobi's method) • Classify second order linear PDE, reduce it to canonical form and hence solve it. • Solve various physical problems (Vibrating String, Heat conduction) . • Solve IVPs using numerical methods. • Solve system of linear ODEs.
GE-3: Real Analysis	After going through this course, the students will be able to <ul style="list-style-type: none"> • Distinguish the various properties of real number. • Understand the concepts of different types of sequence and Series and their convergence. • Demonstrate Power series and evaluate its radius of convergence.
Semester IV	
C-8: Numerical Methods	After going through this course, the students will be able to <ul style="list-style-type: none"> • Find the roots of polynomial and transcendental equations.



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	<ul style="list-style-type: none"> • Solve system of linear equations using iterative methods. • Construct a polynomial for a given set of data using interpolation. • Evaluate integrals using numerical integration formulae. • Solve initial value problems using single and multi-step methods.
C-9: Riemann Integration and Series of Functions	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none"> • Discuss Riemann integration and its conditions of integrability. • Understand and demonstrate the continuity, differentiability and integrability of the limit function of a sequence and series of functions with the use of theorems on it. • Differentiate and integrate power series, find the radius of convergence.
C-10: Ring Theory and Linear Algebra I	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none"> • Demonstrate the understanding of binary operations and algebraic structure forming a ring. • Discuss subrings, integral domains, fields, ideals etc. • Understand the concepts and standard properties of ring homomorphisms and isomorphisms. • Understand the idea of linear transformation and its algebra along with the related concepts like rank, nullity, null space, range etc.
GE-4: Algebra	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none"> • Discuss various groups namely abelian, non-abelian groups, Z_n groups under addition modulo n etc. • Understand the concepts of subgroups, cyclic subgroups, concept of a subgroup generated by a subset. • Discuss subrings, integral domains, fields, ideals etc.
Semester V	
C-11: Multivariate Calculus	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none"> • Understand the concepts from one variable calculus to function of several variables. • Demonstrate and use various techniques of double and triple integrals. • Demonstrate the relation among line, double and triple integrals. • Think critically and solve application of real-world problems involving double and triple integrals.
C-12: Group Theory II	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none"> • Solve contemporary problems by applying results from



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	<p>preliminary concepts.</p> <ul style="list-style-type: none"> • Discuss group automorphism, direct products and Sylow's theorems and its consequences. • Use the theories and ideas in communication theory, electrical engineering, computer science and cryptography.
DSE-I: Analytical Geometry	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none"> • Learn the techniques of sketching conics and conicoids. • Classify quadratic equations representing lines, parabola, ellipse and hyperbola. • Solve various geometrical problems based on conics, sphere and conicoids analytically.
DSE- II: Mathematical Modeling	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none"> • Understand power series solutions of Differential equations. • Understand the idea of Laplace transformations and inverse Laplace transformations and their applications to solve differential equations. • Demonstrate various simulation and linear programming models and their applications.
Semester VI	
C-13: Metric Spaces and Complex Analysis	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none"> • Describe metric spaces and various properties associated with it. • Demonstrate limits, continuity and singularities for functions of complex variable. • Describe complex number system, its differentiation and integration, Laurent series, etc.
C-14: Ring Theory and Linear Algebra II	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none"> • Solve real world problems by applying theorems proof/solution techniques. • Understand the concept and idea of dual spaces, dual basis, transpose of a linear transformation etc. • Discuss polynomial rings over commutative rings and the concepts of PID, ED, UFD etc. • Find the matrix associated with a linear transformation w.r.t given basis.
DSE- III: Linear Programming	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none"> • Discuss linear programming problem, its formation and algebraic solution. • Demonstrate various optimization techniques pertaining to linear programming. • Apply linear programming to problems arising out of real-life problems.



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	<ul style="list-style-type: none">• Use the concepts of game theory in real life situations.
DSE-IV: Mathematical Methods	<p>After going through this course, the students will be able to</p> <ul style="list-style-type: none">• Discuss Fourier series and its various types which are very useful in physical science problems.• Solve Boundary value problems and Initial value problems in 1-D and 2-D cases, Laplace and Poisson equations in 2-D cases.