B.Sc. Mathematics Honours

6 Semester Course

List of the Courses

Sl No	Name of the Course	Semester	Course Code	Credit	Marks in the Course	Name of the Programme	Programme Code	Course outcome	**Activities with direct bearing on Employability/ Entrepreneurship/ Skill development**	**Introdcution year of new course**	**BoS Date**	**Percentage of Revision**	**BoS Date**
1	Algebra IA, Analysis IA, Analytical Geometry I & Vector Algebra, Differential Equations I	1	MTMA-P1	14	100	B.Sc Mathematics Hons	MTMA	Algebra IA: To learn the concept of relation, function, group, subgroup, permutation group, cyclic group, Lagrange's theorem and its application. It is required for next algebra and analysis courses. Analysis IA: To learn the concept of well ordering principal for N, mathematical induction, countability of sets with various examples, topology in R, sequence, functions and limit of a function. It is required for next analysis, topology courses. Analytical Geometry I & Vector Algebra: To learn the concept of orthogonal transformation, classification of conics, pair of straight lines, pole, polar, conjugate points and conjugate lines, conjugate diameters, vectors, vectors products and solution	Skill develpoment : Analytical and reasoning skills are developed by group discussion or free participation of students related to nontrivial problems in class. Employability :Group discussions and problem solving sessions in this course will help a student to develop analytical and reasoning skills required for teaching jobs at High School Level. Further, the students will develop mathematical reasoning skills required for various professional examinations like IAS, IPS, IFS, WBCS, clerical and officer level jobs in banking sectors.				

2	Algebra IB, Analysis IB, Linear Algebra I and Optimization Techniques	2	MTMA-P2	14	100	B.Sc Mathematics Hons	MTMA	Algebra IB: To learn the concept and applications of inequalities, complex numbers, theory of equations. This will help students for courses on number theory and analysis. Analysis IB: To learn the concept of series (in R), compact sets, continuous function, differentiation of function. This will help the student to take up advanced courses on analysis. Linear Algebra I: To learn the concept of matrix, determinant and vector space. This is required for next course on linear algebra, applications in LPP, multivariable calculus. Optimization Techniques: To learn the concept of basic feasible solution in L.P.P, simplex method, duality theory, transportation and	Skill develpoment : Analytical reasoning and business analytic skills are developed by group discussion or free participation of students related to nontrivial problems in class. Employability : Group discussions and problem solving sessions in this course will help a student to develop analytical and reasoning skills required for teaching jobs at High School Level, Indian forest services, clerical and officer level jobs in commercial sectors such as banking, insurance, share market, etc.				

3	Linear Algebra II A, Analysis IIA, Analytical Geometry II and Mechanics I	3	MTMA-P3	14	100	B.Sc Mathematics Hons	MTMA	Linear Algebra II A: To learn the concept of quotient space, linear transformation and its applications, congruence of matrices. This is required for next course on linear algebra, multivariable calculus, numerical analysis. Analysis IIA : To learn the concept of sequence and series of functions and power series. This is required for the advanced courses on differential equations and numerical analysis. Analytical Geometry II: To learn the concept of planes, straight line, sphere, conics, tangent plane, generating lines, transformation of rectangular axes by translation, rotation and their combinations, general equation of second degree in x, y, z ; nature of quadrics. This is required for courses on mechanics, differential	Skill develpoment : Analytical and reasoning skills are developed by group discussion or free participation of students related to nontrivial problems in class.			20	10.10.2018

4	Analysis II B, Linear Algebra II B, Differential Equations II, and Applications of Calculus	4	MTMA-P4	14	100	B.Sc Mathematics Hons	MTMA	Analysis II B: To learn the concept of metric space. This is useful for the topology and analysis courses. Linear Algebra II B : To learn the concept of eigen-value, eigen function, Cayley Hamilton theorem, inner-product space, operators. This is required for the multivariable analysis, differential geometry, numerical analysis courses and quantum mechanics. Differential Equations II : To learn the solution methods for P.D.E., Sturm-Liouville problem, Simultaneous linear differential equations, Series solution, Laplace transform. This is required for mechanics and advanced differential equation courses in post graduate level. Applications of Calculus: To learn the concept of tangents	Skill develpoment : Analytical and reasoning skills are developed by group discussion or free participation of students related to nontrivial problems in class. They will also learn to apply various analytical methods to solve real life problems as applications of differential equations. Employability :Group discussions and problem solving sessions in this course will help a student to develop analytical and reasoning skills required for teaching jobs at High School Level, Indian forest services, clerical and officer level jobs in commercial sectors such as banking, insurance, share market, etc.; Industrial research areas involving machine designing.			20	10.10.2018

5	Algebra III, Multivariable Calculus , Analysis IIIA	5	MTMA-P5	13	100	B.Sc Mathematics Hons	MTMA	Algebra III : To learn the concept of normal subgroups, isomorphism, class equation, group action, Sylow theorems and ring theory. This course is helpful for advance study of abstract algebra. Multivariable Calculus : To learn the concept of limit, continuity, differentiation of the functions from R^m to R^n and their applications. This paper is useful in further analysis studies and various applied papers. Analysis IIIA : To learn the concept of Riemann integration and function of bounded variation. This paper is useful in post-graduate analysis and it is useful in various applied topics in post graduate level.	Skill develpoment : Analytical and reasoning skills are developed by group discussion or free participation of students related to nontrivial problems in class. They will also learn to apply various analytical methods to solve real life problems using integration.			30	03.01.2015

6	Numerical Analysis, Vector Calculus, Mechanics II,	5	MTMA-P6	13	100	B.Sc Mathematics Hons	MTMA	Numerical Analysis: To learn the solution techniques of interpolation, differentiation, integration, ODE, finding roots of algebraic and transcendental equations, and system of linear equation by numerical methods. It is useful in advanced numerical analysis in postgraduate level. Vector Calculus: To learn the concept of gradient, divergence, curl, vector integration. It is useful in further study of mechanics, analysis. Mechanics II: To learn the concept of moment of inertia, D'Alembert's principle, equation of motion of a rigid body about a fixed axis, equations of motion of a rigid body moving in two dimensions, equations of motion under impulsive forces, planetary motion and Kepler's laws, motion on a	Employability : Group discussions and problem solving sessions in this course will help a student to develop analytical and reasoning skills required for teaching job in high school level, Indian forest service, banking examinations, jobs that require numerical modeling like software development etc. Skill develpoment : Analytical and reasoning skills are developed by group discussion or free participation of students related to nontrivial problems in class. They will also learn to apply various analytical methods to solve real life problems using numerical methods.			30	03.01.2015

7	Analysis IIIB, Number Theory, Probability Theory, Complex Analysis	6	MTMA-P7	13	100	B.Sc Mathematics Hons	MTMA	Analysis IIIB : To learn the concept of multiple integration, improper integration and Fourier series. It is required for advance study in analysis. Number Theory: Familiarize the students with different properties of integers. It is required for advance study in number theory. Probability Theory : To learn the concept of random variables, different probability distributions and inequalities. This course is required in various courses in pure and applied mathematics courses. Complex Analysis: To learn the concept of analytic function, elementary functions, sequence and series of complex valued functions. This course is required for further analysis course and advanced course in complex	Skill develpoment : Analytical and reasoning skills are developed by group discussion or free participation of students related to nontrivial problems in class. Employabality :Group discussions and problem solving sessions in this course will help a student to develop analytical and reasoning skills required for teaching jobs at High School Level, Indian forest services, clerical and officer level jobs in banking sectors			20	17.06.2014

8	Mechanics III, Computer fundamentals and Programming in C, Numerical Practical using Computer and Optional paper	6	MTMA-P8	13	100	B.Sc Mathematics Hons	MTMA	Mechanics III: To learn the concept of friction, virtual work, astatic equilibrium, stable and unstable equilibrium, equilibrium of flexible strings, forces in the three dimensions. It is required in advanced mechanics courses in post graduate level. Computer fundamentals and Programming in C: To learn C language and the concept of Boolean algebra. It is required for Numerical practical. Numerical Practical using Computer: To learn the solution techniques of numerical problems by C programme. It is required to use numerical computation in various courses in applied mathematics. Optional Paper: Tensor Calculus: To learn the concept of tensor algebra	Employyability : Group discussions and problem solving sessions in this course will help a student to appear for school service commission, Indian forest service, banking examinations, jobs that require numerical modeling like software development etc. Skill develpoment : Analytical and reasoning skills are developed by group discussion or free participation of students related to nontrivial problems in class. They will also learn to apply various analytical methods to solve real life problems using numerical applications and programming techniques.				

9	Classical Algebra, Modern Algebra and Differential Calculus	1	MTMG-P1	3	75	B. SC Mathematics General	MTMA	Classical Algebra : Familiarize the students with the basic concept of complex numbers, theory of equations, determinants and matrices. Modern Algebra: Familiarize the students with the basic concept of group theory , ing theory, vector space, eigen value and eigen vetor. Differential Calculus: To learn the basic concept of number system, basic properties of real valued functions, functions of two and three variables.	Skill develpoment : Algebraic and analytic skills are developed by group discussion or free participation of students related to nontrivial problems in class.				

10	Analytical Geometry of 2 Dimensions, Vector Algebra, Differential Calculus II, Integral Calculus, Ordinary Differential Equations I	2	MTMG-P2	3	75	B. SC Mathematics General	MTMA	Analytical Geometry of 2 Dimensions: To learn the basic concepts of orthogonal transformation, pair of straight lines, equation of tangent, polar equations. Vector Algebra : To learn the concept of vector products and to familiarize application of vectors in geometry and mechanics. Differential Calculus II : To learn the basic concept of sequence, series, real valued functions on an interval, application of calculus. Integral Calculus: To learn the basic concept of integral calculus. Ordinary Differential Equations I: To know the solution of first order linear differential equation.	Skill develpoment : Algebraic and analytic skills are developed by group discussion or free participation of students related to nontrivial problems in class.				

11	Geometry 3D, L.P.P., Numerical Analysis	3	MTMG-P3	3	75	B. SC Mathematics General	MTMA	Geometry 3D : To familiarize the equation of plane, straight line, sphere, tangents and cone. L.P.P. : To know the basic concept of linear programming problem, simplex method, duality, transportation and assignment problem. Numerical Analysis: To know the concept of operators, interpolation, integration and numerical equations.	Skill develpoment : Algebraic and analytic skills are developed by group discussion or free participation of students related to nontrivial problems in class.				
12	Integral Calculus II, Ordinary Differential Equation II, Probability and Statistics	4	MTMG-P4	3	75	B. SC Mathematics General	MTMA	Integral Calculus II: To know the concept of improper integration, double integration , application of integral calculus. Ordinary Differential Equation II: To know the solution techniques of 2nd order ODE and orthogonal trajectories. Probability and Statistics: To learn the basics of elementary statistics, probability theory, sampling theory.	Skill develpoment : Algebraic and analytic skills are developed by group discussion or free participation of students related to nontrivial problems in class.				