

Lesson Plan for Course: B.Sc. (H) Class-2nd Year Code: MTMA Paper-III Marks: 100

- Course Name: Algebra, Real Analysis-II, Function of Several Variables, Appl. of Integral Calculus II
- Course coordinator: Biswajit Sarkar
- Course Outcomes:
 - CO-1. Understand limits of functions.
 - CO-2. Prove intermediate value theorem and fixed point theorem.
 - CO-3. Find sequential criterions of continuity and uniform continuity.
 - CO-4. Prove Rolle's theorem and apply this theorem to find Taylor's series expression.
 - CO-5. Understand limit and continuity of functions of two or more variables and Partial diff.
 - CO-6. Verify the total differentiability of a function and existence of directional derivatives.
 - CO-7. Apply method of Lagrange multipliers to solve some kind of optimization problems.
 - CO-8. Calculate double and triple integration over rectangular region and non-rectangular region.

Course planner

Month	Course Topic	Teacher	No. of Classes	Remarks*
July	Modern Algebra II	PD	04	Theoretical-16 Tutorial-05
	Real Analysis II		04	
	Linear Algebra II	SM	08	
	Classical Algebra II	BS	05	
August	Real Analysis II	PD	14	Theoretical-32 Tutorial-08
	Linear Algebra II	SM	16	
	Function of Several Variables	BS	10	
Sept	Real Analysis II	PD	15	Theoretical-25 Tutorial-08
	Linear Algebra II	SM	07	
	Application of Integral Calculus II		03	
	Function of Several Variables	BS	08	
Oct	Real Analysis II	PD	08	Theoretical-06 Tutorial-02
Nov	Real Analysis II	PD	06	Theoretical-04 Tutorial-02
Dec				Theoretical-00 Tutorial-00
Jan				Theoretical-00 Tutorial-00
Feb				Theoretical-00 Tutorial-00
Mar				Theoretical-00 Tutorial-00
Apr May Jun	Final Examination			
	Assessment: Test Examination		Total: 108	Theoretical-83 Tutorial-25

Books:

- Sitanshu Bandyopadhyay, Mathematical Analysis- Problems and Solutions, Academic publishers.
- A.K. Choudhury & P. Mondal, Mathematical Analysis- Real, Complex and Metric Spaces, New Central Book Agency.
- V. Karunakaran, Real Analysis, Pearson.
- Utpal Chatterjee, Advanced Mathematical Analysis, Academic Publishers.
- Subir Mukherjee, First course in Real Analysis, Academic Publishers.
- Shanti Narayan and Raisinghania, Elements of Real Analysis, S.Chand.
- Chakraborty & Ghosh, Algebra (Abstract and Linear), U. N. Dhur & Sons Pvt. Ltd..
- Sk Anarul Islam, Differential Calculus of Several Variables, Techno World.
- Ghosh & Maity, An introduction to integral Calculus, New Central Book Agency.

Lesson Plan for Course: B.Sc. (H) Class-2nd Year Code: MTMA Paper-IV Marks: 100

- Course Name: Geometry, Differential Equation-II, LPP & Game Theory, Particle Dynamics
- Course coordinator: Pintu Debnath
- Course Outcomes:
 - CO-1. Find equations of pair of tangents, chord of contact, poles and polars, conjugate points and conjugate lines of Circle, Parabola, Ellipse and Hyperbola.
 - CO-2. To learn about hyperboloid, hyperbolic paraboloids, canonical forms and quadrics.
 - CO-3. Solve simultaneous linear differential equations.
 - CO-4. Find Condition of integrability.
 - CO-5. Introduce them with PDE and to solve PDE by Lagrange's method and by Charpit's method.
 - CO-6. Understand Duality Theory and Relation between the objective values of dual and primal.
 - CO-7. Learn Transportation and Assignment problems.
 - CO-8. Learn several methods for solving Rectangular games.
 - CO-9. Know Laws of motion and Principles of conservation of energy.
 - CO-10. Understand loss of K.E. in a direct impact and Oblique impact of two elastic spheres.
 - CO-11. Find motion of a particle under inverse square law, in plane and in resisting medium.
 - CO-12. Understand Motion of a rough curve.

Course planner

Month	Course Topic	Teacher	No. of Classes	Remarks*
July				Theoretical-00 Tutorial-00
August				Theoretical-00 Tutorial-00
Sept	Differential Equation II	BS	03	Theoretical-02 Tutorial-01
Oct	Analytical Dynamics of a Particle	SM	06	Theoretical-08 Tutorial-04
	Differential Equation II	BS	06	
Nov	Analytical Dynamics of a Particle	SM	07	Theoretical-11 Tutorial-05
	Linear Programming and Game Theory	BS	09	
Dec	Analytical Geometry of Two & Three dimensions II	PD	13	Theoretical-25 Tutorial-08
	Analytical Dynamics of a Particle	SM	12	
	Linear Programming and Game Theory	BS	08	
Jan	Analytical Geometry of Two & Three dimensions II	PD	05	Theoretical-10 Tutorial-05
	Analytical Dynamics of a Particle	SM	08	
	Linear Programming and Game Theory	BS	02	
Feb	Analytical Geometry of Two & Three dimensions II	PD	13	Theoretical-19 Tutorial-06
	Analytical Dynamics of a Particle	SM	06	
	Linear Programming and Game Theory	BS	06	
Mar	Analytical Geometry of Two & Three dimensions II	PD	17	Theoretical-29 Tutorial-05
	Analytical Dynamics of a Particle	SM	10	
	Linear Programming and Game Theory	BS	07	
Apr	Final Examination			
May				
Jun				

	Assessment: Test Examination		Total: 138	Theoretical-104 Tutorial-34
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Books:

- J. G. Chakravorty And P. R. Ghosh , Advanced Analytical Geometry, U. N. Dhur & Sons Pvt. Ltd.
- S. L. Loney, Dynamics of a Particle and Rigid bodies.
- J. G. Chakravorty And P. R. Ghosh, Advanced Analytical Dynamics, U. N. Dhur & Sons Pvt. Ltd.
- Ganguly & Saha, Analytical Dynamics, New Central Book Agency
- Ghosh & Maity, An Introduction to Differential Equations, New Central Book Agency.
- P. M. Karak, Linear Programming, New Central Book Agency.
- Dutta & Jana, Linear Programming, U. N. Dhur & Sons Pvt. Ltd.

Lesson Plan for Course: B.Sc. (H) Class-3rd Year Code: MTMA Paper-V Marks: 100

- Course Name: Real Analysis II, Metric Space, Complex Analysis.
- Course coordinator: Biswajit Sarkar
- Course Outcomes:
 - CO-1. Understand fundamental idea of metric spaces including Cantor's theorem.
 - CO-2. Learn about Continuity, Uniform continuity, Compactness, Homeomorphism of metric space.
 - CO-3. Realize Banach Fixed point Theorem and its application to ordinary differential equation.
 - CO-4. Learn Cauchy-Riemann equation and differentiability of complex valued function.
 - CO-5. To become familiar with different types of complex valued functions and differences between complex and real valued functions.
 - CO-6. Evaluate Contour integrals and learn about Cauchy integral formula.
 - CO-7. Evaluate Laurent series expansion of complex valued function.

Course planner

Month	Course Topic	Teacher	No. of Classes	Remarks*
July	Real Analysis II	PD	15	Theoretical-12 Tutorial-03
August	Real Analysis II	PD	21	Theoretical-18 Tutorial-03
Sept	Real Analysis II	PD	18	Theoretical-15 Tutorial-03
Oct				Theoretical-00 Tutorial-00
Nov	Complex Analysis	SM	06	Theoretical-04 Tutorial-02
Dec	Complex Analysis	SM	06	Theoretical-14 Tutorial-05
	Metric Space V	BS	13	
Jan				Theoretical-00 Tutorial-00
Feb				Theoretical-00 Tutorial-00
Mar Apr May Jun	Final Examination			
	Assessment: Test Examination		Total: 79	Theoretical-63 Tutorial-16

Books:

- A.K. Choudhury & P. Mondal, Mathematical Analysis- Real, Complex and Metric Spaces, New Central Book Agency.
- V. Karunakaran, Real Analysis, Pearson.
- Arumugam, Complex Analysis, Scitech Publications (India) Pvt Ltd.
- P. K. Jain, Metric Spaces, Narosa.

Lesson Plan for Course: B.Sc. (H) Class-3rd Year Code: MTMA Paper-VI Marks: 100

- Course Name: Probability & Statistics, Numerical Analysis & Computer Programming
- Course coordinator: Pintu Debnath
- Course Outcomes:
 - CO-1. Understand the basic concepts of classical probability.
 - CO-2. Learn probability distribution and density function and their properties with example.
 - CO-3. Understand central limit theorem which shows that the empirical frequencies of so many natural populations exhibit normal distribution.
 - CO-4. Learn algorithms of a programme.
 - CO-5. Find out Relative error and Round off error.
 - CO-6. To find root of a algebraic an transcendental equation through several techniques.
 - CO-7. To solve system of linear equations using Gaussian Elimination, Gauss Jordan methods, and LU Decomposition.
 - CO-8. Learn various types of interpolation methods such as Lagrange and Newton's methods.
 - CO-9. Learn numerical differentiation based on finite differences.
 - CO-10. Learn numerical integration by Newton Cotes formula, Trapezoidal rule and Weddle's rule.
 - CO-11. Find solution of ODEs at a given point by Euler's method.
 - CO-12. Learn about several high-level programming languages.
 - CO-13. Able to construct flowchart.
 - CO-14. Learn about various commands of computer programming.
 - CO-15. To write and run computer programme.

Course planner

Month	Course Topic	Teacher	No. of Classes	Remarks*
July	Probability	SM	15	Theoretical-24 Tutorial-03
	Statistics	BS	12	
August	Probability	SM	22	Theoretical-42 Tutorial-10
	Computer Programming		05	
	Statistics Numerical Analysis	BS	15 10	
Sept	Computer Programming	SM	25	Theoretical-34 Tutorial-06
	Numerical Analysis	BS	15	
Oct	Computer Programming	SM	08	Theoretical-06 Tutorial-02
Nov				Theoretical-00 Tutorial-00
Dec				Theoretical-00 Tutorial-00
Jan				Theoretical-00 Tutorial-00
Feb				Theoretical-00 Tutorial-00
Mar Apr May Jun	Final Examination			
	Assessment: Test Examination		Total: 127	Theoretical-106 Tutorial-21

Books:

- W. Feller, An introduction to probability theory and its applications (Vol-1)
- S. K. De, S. Sen and Banerjee, Mathematical Probability (U. N. Dhur & Sons Pvt. Ltd.)
- S. K. De and S. Sen, Mathematical Statistics (U. N. Dhur & Sons Pvt. Ltd.)
- C. Xavier, FORTRAN 77 and numerical methods (Wiley Eastern limited).
- Yashvant Kanetkar, Let us C (BPB Publications).
- Carl Erik Froberg, Introduction to Numerical Analysis (Addison Wesley Publishing).
- S. A. Molla, An Introduction to Numerical Analysis (Central Book Agency).

Lesson Plan for Course: B.Sc. (H) Class-3rd Year Code: MTMA Paper-VII Marks: 100

- Course Name: Vector Analysis II, Analytical Statics, Rigid Dynamics, Hydrostatics
- Course coordinator: Pintu Debnath
- Course Outcomes:
 - CO-1. Calculate line integrals as integrals of vectors and some of its applications.
 - CO-2. Verify Green's theorem, Stokes' theorem and Divergence theorem and their applications.
 - CO-3. To find the positions of equilibrium of a particle lying on a plane curve and rough surface.
 - CO-4. Determine Center of Gravity of Rigid Body.
 - CO-5. Deduce conditions of equilibrium of a particle under coplanar forces by principle of virtual work.
 - CO-6. To determine the condition of stability of equilibrium of a perfectly rough heavy body and a system of forces acting on a body.
 - CO-7. Understand D'Alembert's equations of motion.
 - CO-8. Understand the principle of conservation of energy.
 - CO-9. Understand the motion of a rigid body moving in two dimensions under finite and impulsive forces.
 - CO-10. Learn about the depth of the centre of pressure of a plane area.
 - CO-11. Find equilibrium conditions of fluids in given fields of force.
 - CO-12. To calculate the condition of stability of the equilibrium of floating bodies.
 - CO-13. Find relation between pressure and density and temperature.

Course planner

Month	Course Topic	Teacher	No. of Classes	Remarks*
July				Theoretical-00 Tutorial-00
August				Theoretical-00 Tutorial-00
Sept				Theoretical-00 Tutorial-00
Oct				Theoretical-00 Tutorial-00
Nov				Theoretical-00 Tutorial-00
Dec	Vector Analysis II	SM	10	Theoretical-15 Tutorial-05
	Hydrostatics	SM	10	
Jan	Analytical Statics	PD	06	Theoretical-13 Tutorial-07
	Hydrostatics	SM	10	
	Rigid Dynamics	BS	04	
Feb	Analytical Statics	PD	19	Theoretical-40 Tutorial-08
	Hydrostatics	SM	10	
	Rigid Dynamics	BS	15	
Mar	Final Examination			
Apr				
May				
Jun				
	Assessment: Test Examination		Total: 84	Theoretical-64 Tutorial-20

Books:

- S. L. Loney, Analytical Statics.
- M. C. Ghosh, Analytical Statics.
- S. L. Loney, Dynamics of a Particle and Rigid bodies.
- A. S. Ramsay, Hydrostatics.

Lesson Plan for Course: B.Sc. (H) Class-3rd Year Code: MTMA Paper-VIIIA Marks: 50

- Course Name: Algebra III, Differential Equation III, Tensor Algebra and Calculus
- Course coordinator: Sudip Mondal
- Course Outcomes:
 - CO-1. Understand Boolean algebra and functions, logic gates, switching circuits and their applications.
 - CO-2. To conceptualize the context free grammars and pushdown automata, Turing machines, Undesirability.
 - CO-3. To apply Laplace Transformations in ordinary differential equations.
 - CO-4. Find Power Series solution of ordinary differential equations.
 - CO-5. To realize tensor as generalized concept of a vector in a Euclidean space.
 - CO-6. To conceptualize of products of tensors, Christoffel symbols and their laws of transformations.

Course planner

Month	Course Topic	Teacher	No. of Classes	Remarks*
July				Theoretical-00 Tutorial-00
August				Theoretical-00 Tutorial-00
Sept				Theoretical-00 Tutorial-00
Oct				Theoretical-00 Tutorial-00
Nov	Algebra III (Modern) VIIIA	PD	13	Theoretical-10 Tutorial-03
Dec	Algebra III (Boolean) VIIIA	PD	15	Theoretical-21 Tutorial-08
	Tensor Algebra and Calculus VIIIA	PD	07	
	Differential Equation III VIIIA	BS	07	
Jan	Differential Equation III VIIIA	BS	05	Theoretical-03 Tutorial-02
Feb	Algebra III (Linear) VIIIA	SM	12	Theoretical-10 Tutorial-02
Mar	Final Examination			
Apr				
May				
Jun				
	Assessment: Test Examination		Total: 59	Theoretical-44 Tutorial-15

Books:

- S.K. Mapa, Modern Algebra, Sarat Book
- David Widder, Advanced Calculus (Prentice Hall)
- B. Sen, Elementary Treatise on Laplace Transform (World Press).
- Vector Analysis and Tensor Calculus (Schaum Series) – Spiegel.

Lesson Plan for Course: B.Sc. (H) Class-3rd Year Code: MTMA Paper-VIIIIB Marks: 50

- Course Name: Numerical Methods
- Course coordinator: Pintu Debnath
- Course Outcomes:
 - CO-1. To calculate function value by using Newton's forward & backward interpolation.
 - CO-2. To determine numerical integration by using Trapezoidal and Weddle's rule.
 - CO-3. To solve non-linear equations through several methods.
 - CO-4. To find numerical solution of a system of linear equations.
 - CO-5. To able to calculate Sample characteristics, Correlation coefficient, and regression lines.
 - CO-6. To write C-programming for Simpson's 1/3 rule, Newton-Raphson and Runge-Kutta methods.

Course planner

Month	Course Topic	Teacher	No. of Classes	Remarks*
July				Theoretical-00 Tutorial-00
August				Theoretical-00 Tutorial-00
Sept	Statistics	PD	10	Theoretical-11 Tutorial-07
	Numerical Analysis	BS	08	
Oct	Statistics	PD	12	Theoretical-20 Tutorial-08
	Computer Programming	SM	06	
	Numerical Analysis	BS	10	
Nov	Computer Programming	SM	06	Theoretical-16 Tutorial-00
	Numerical Analysis	BS	10	
Dec				Theoretical-00 Tutorial-00
Jan				Theoretical-00 Tutorial-00
Feb				Theoretical-00 Tutorial-00
Mar	Final Examination			
Apr				
May				
Jun				
	Assessment: Test Examination		Total: 62	Theoretical-47 Tutorial-15

Books:

- S. A. Molla, An Introduction to Numerical Analysis (Central Book Agency).
- C. Xavier, FORTRAN 77 and numerical methods (Wiley Eastern limited).
- Yashvant Kanetkar, Let us C (BPB Publications).
- S. K. De and S. Sen, Mathematical Statistics (U. N. Dhur & Sons Pvt. Ltd.)