

Govt.P.G. College Mahendergarh  
Haryana

**Lesson Plan**

**Subject: Mathematics.**  
**Semester: II B.sc (N.M) Number Theory and Trigonometry**  
**Subject code: 12BSM121**

<b>Week</b>	<b>Week</b>	<b>Section Name</b>	<b>Topics</b>
21/03/22 to 28/03/22	1.	Section A:	Divisibility, G.C.D.(greatest common divisors), L.C.M.(least common multiple) Primes.
29/03/22 To 04/04/22	2.	Section A: Cont.	Fundamental Theorem of Arithmetic. Linear Congruences, Fermat's theorem.
05/04/22 to 10/04/22	3.	Section A: Cont.	Wilson's theorem and its converse. Linear Diophantine equations in two variables.
11/04/22 to 17/04/22	4.	Section B:	Complete residue system and reduced residue system modulo m. Euler's $\phi$ function Euler's generalization of Fermat's theorem.
18/04/22 to 24/04/22	5	Section B: Cont.	Chinese Remainder Theorem. Quadratic residues. Legendre symbols. Lemma of Gauss; Gauss reciprocity law.
25/04/22 to 30/04/22	6.	Section B: Cont.	Greatest integer function $[x]$ . The number of Divisors and the sum of divisors of a natural number n (The functions $d(n)$ and $\sigma(n)$ ). Moebius function and Moebius inversion formula.
01/05/22 to 07/05/22.	7.	Section C	De Moivre's Theorem and its Applications.
08/05/22 to 14/05/22	8.	Section C: Cont.	Expansion of trigonometrically functions.
15/05/22 to 21/05/22	9.	Section C : Cont.	Direct circular and hyperbolic functions and their properties.
22/05/22 to 28/05/22	10.	Section D	Inverse circular and hyperbolic functions and their properties.
29/05/22 to 02/06/ 22	11	Section D: Cont	Logarithm of a complex quantity.

02/06/22 to 08/06/22	12	Section D: Cont	Gregory's series. Summation of Trigonometry series.

**Books Recommended :**

1. S.L. Loney : Plane Trigonometry Part – II, Macmillan and Company, London.
2. R.S. Verma and K.S. Sukla : Text Book on Trigonometry, Pothishala Pvt. Ltd. Allahabad.
3. Ivan Ninen and H.S. Zuckerman. An Introduction to the Theory of Numbers.

Followed by  
Dr. Sandeep Kumari  
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**Lesson Plan**

**Subject: Mathematics.**  
**Semester: II B.sc (N.M) Ordinary Differential Equations**  
**Subject code: 12BSM122**

<b>No. Of Week</b>	<b>Section Name</b>	<b>Topics</b>
<b>Week</b>	Section A:	Geometrical meaning of a differential equation. Exact differential equations, integrating factors.
21/03/22 to 28/03/22	Section A: Cont.	First order higher degree equations solvable for x,y,p Lagrange's equations.
29/03/22 To 04/04/22	Section A: Cont.	Clairaut's equations. Equation reducible to Clairaut's form. Singular solutions.
05/04/22 to 10/04/22	Section B:	Orthogonal trajectories: in Cartesian coordinates and polar coordinates.
11/04/22 to 17/04/22	Section B: Cont.	Self orthogonal family of curves.. Linear differential equations with constant coefficients.
18/04/22 to 24/04/22	Section B: Cont.	Homogeneous linear ordinary differential equations. Equations reducible to homogeneous linear ordinary differential
25/04/22 to 30/04/22	Section C	Linear differential equations of second order: Reduction to normal form.
01/05/22 to 07/05/22.	Section C: Cont.	Transformation of the equation by changing the dependent variable/ the independent variable.
08/05/22 to 14/05/22	Section C : Cont.	Solution by operators of non-homogeneous linear differential equations. Reduction of order of a differential equation. Method of variations of parameters. Method of undetermined coefficients.

15/05/22 to 21/05/22	Section D	Ordinary simultaneous differential equations. Solution of simultaneous differential equations involving operators $x (d/dx)$ or $t (d/dt)$ etc.
22/05/22 to 28/05/22	Section D: Cont	Simultaneous equation of the form $dx/P = dy/Q = dz/R$ . Total differential equations. Condition for $Pdx + Qdy + Rdz = 0$ to be exact.
29/05/22 to 02/06/ 22	Section D: Cont	General method of solving $Pdx + Qdy + Rdz = 0$ by taking one variable constant. Method of auxiliary equations.

### Books Recommended:

1. D.A. Murray: Introductory Course in Differential Equations. Orient Longman (India). 1967
2. A.R.Forsyth: A Treatise on Differential Equations, Machmillan and Co. Ltd. London
3. E.A. Codington: Introduction to Differential Equations.
4. S.L.Ross: Differential Equations, John Wiley & Sons
5. B.Rai & D.P. Chaudhary: Ordinary Differential Equations; Narosa, Publishing House Pvt. Ltd.

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**Lesson Plan**

**Subject: Mathematics.**  
**Semester: VI B.sc (N.M) Real and Complex Analysis**  
**Subject code: 12BSM361**

<b>Week</b>	<b>Section Name</b>	<b>Topics</b>
21/03/22 to 28/03/22	Section A:	Jacobians, Beta and Gama functions.
29/03/22 To 04/04/22	Section A: Cont.	Double and Triple integrals, Dirichlets integrals.
05/04/22 to 10/04/22	Section A: Cont.	Change of order of integration in double integrals.
11/04/22 to 17/04/22	Section B:	Fourier's series: Fourier expansion of piecewise monotonic functions.
18/04/22 to 24/04/22	Section B: Cont.	Properties of Fourier Coefficients, Dirichlet's conditions, Parseval's identity for Fourier series.
25/04/22 to 30/04/22	Section B: Cont.	Fourier series for even and odd functions, Half range series, Change of Intervals.
01/05/22 to 07/05/22.	Section C	Extended Complex Plane, Stereographic projection of complex numbers.
08/05/22 to 14/05/22	Section C: Cont.	Continuity and differentiability of complex functions, Analytic functions.
15/05/22 to 21/05/22	Section C : Cont.	Cauchy-Riemann equations. Harmonic functions.
22/05/22 to 28/05/22	Section D	Mappings by elementary functions: Translation, rotation.
29/05/22 to 02/06/ 22	Section D: Cont	Magnification and Inversion. Conformal Mappings, Mobius transformations. Fixed pints.
02/06/22 to	Section D: Cont	Cross ratio, Inverse Points and critical mappings.

08/06/22		
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### **Books Recommended:**

1. T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi, 1985
2. R.R. Goldberg : Real analysis, Oxford & IBH publishing Co., New Delhi, 1970
3. D. Somasundaram and B. Choudhary : A First Course in Mathematical, Analysis, Narosa Publishing House, New Delhi, 1997
4. Shanti Narayan : A Course of Mathematical Analysis, S. Chand & Co., New Delhi
5. R.V. Churchill & J.W. Brown: Complex Variables and Applications, 5<sup>th</sup> Edition, McGraw-Hill, New York, 1990
6. Shanti Narayan : Theory of Functions of a Complex Variable, S. Chand & Co., New Delhi.

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**Lesson Plan**

**Subject: Mathematics.**  
**Semester: IV     B.sc (N.M) Sequences and Series**  
**Subject code: 12BSM241**

<b>Week</b>	<b>Section Name</b>	<b>Topics</b>
21/03/22 to 28/03/22	Section A:	Boundedness of the set of real numbers; least upper bound, greatest lower bound of a set, Neighborhoods.
29/03/22 To 04/04/22	Section A: Cont.	Interior points, isolated points, limit points, open sets, closed set, interior of a set, closure of a set in real numbers and their properties.
05/04/22 to 10/04/22	Section A: Cont.	Bolzano-Weierstrass theorem, Open covers, Compact sets and Heine-Borel Theorem.
11/04/22 to 17/04/22	Section B:	Sequence: Real Sequences and their convergence, Theorem on limits of sequence, Bounded and monotonic sequences.
18/04/22 to 24/04/22	Section B: Cont.	Cauchy's sequence, Cauchy general principle of convergence, Subsequences, Sub sequential limits. Infinite series: Convergence and divergence of Infinite Series.
25/04/22 to 30/04/22	Section B: Cont.	Comparison Tests of positive terms Infinite series, Cauchy's general principle of Convergence of series, Convergence and divergence of geometric series, Hyper Harmonic series or p-series.
01/05/22 to 07/05/22.	Section C	Infinite series: D-Alembert's ratio test, Raabe's test, Logarithmic test.
08/05/22 to 14/05/22	Section C: Cont.	De Morgan and Bertrand's test, Cauchy's Nth root test, Gauss Test.
15/05/22 to 21/05/22	Section C : Cont.	Cauchy's integral test, Cauchy's condensation test.

22/05/22 to 28/05/22	Section D	Alternating series, Leibnitz's test, absolute and conditional convergence, Arbitrary series: Abel's lemma, Abel's test, Dirichlet's test, Insertion and removal of parenthesis.
29/05/22 to 02/06/ 22	Section D: Cont	Re-arrangement of terms in a series, Dirichlet's theorem, Riemann's Re-arrangement theorem.
02/06/22 to 08/06/22	Section D: Cont	Pringsheim's theorem (statement only), Multiplication of series, Cauchy product of series, (definitions and examples only) Convergence and absolute convergence of infinite products.

### **Books Recommended:**

1. R.R. Goldberg : Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi, 1970
2. S.C. Malik : Mathematical Analysis, Wiley Eastern Ltd., Allahabad.
3. Shanti Narayan : A Course in Mathematical Analysis, S.Chand and company, New Delhi
4. Murray, R. Spiegel : Theory and Problems of Advanced Calculus, Schaum Publishing co., New York
5. T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi, 1985
6. Earl D. Rainville, Infinite Series, The Macmillan Co., New York

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