**LESSON PLAN**

Name of Assistant Professor:

Class: B.Sc. Non medical. -2nd sem

Subject: Mathematics (Number Theory And Trigonometry)

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| Week | Topic/Chapter/Activity |
| Week 1 | Divisibility, G.C.D (Greatest common Divisors),L.C.M. |
| Week 2 | Primes, Fundamental theorem of Arithmetic, Linear Congruence. |
| Week 3 | Fermat’s theorem, Wilson’s theorem and its converseLinear Diophantine equation in two variables |
| Week 4 | Complete Residue System and Reduced Residue System modulo *m.* Euler ɸ function, Euler’s Generalization of Fermat’s theorem |
| Week 5 | Chinese Remainder Theorem, Quadratic Residues, Legendre Symbols, Lemma of Gauss; Gauss Reciprocity Law |
| Week 6 | Greatest integer function [$x]$, The number of divisors and the sum of divisors of a natural number $n$. Moebius Function and Moebius Inversion Formula. |
| Week 7 | De- Moivre’s theorem and its applications |
| Week 8 | Expansion of trigonometrical functions |
| Week 9 | Direct circular and Hyperbolic functions and their properties. |
| Week 10 | Inverse circular and hyperbolic functions and their properties. |
| Week 11 | Logarithm of a complex quantity. |
| Week 12 | Gregory’s series , Summation of Trigonometric series. |

**LESSON PLAN**

Name of Assistant Professor:

Class: B.Sc. Non medical. -2nd sem

Subject: Mathematics (Ordinary Differential Equations)

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| Week | Topic/Chapter/Activity |
| Week 1 | Geometrical meaning of a differential equation. Exact differential equations, |
| Week 2 | integrating factors. First order higher degree equations solvable for x,y,p Lagrange’s equations. |
| Week 3 | Clairaut’s equations, Equation reducible to Clairaut’s form. Singular solutions. |
| Week 4 | Orthogonal trajectories: in Cartesian coordinates and polar coordinates. Self orthogonal family of curves. |
| Week 5 | Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations. |
| Week 6 | Equations reducible to homogeneous. |
| Week 7 | Linear differential equations of second order: Reduction to normal form. Transformation of the equation by changing the dependent variable/ the independent variable. |
| Week 8 | Solution by operators of non-homogeneous linear differential equations.  |
| Week 9 | Reduction of order of a differential equation. Method of variations of parameters. Method of undetermined coefficients |
| Week 10 | Ordinary simultaneous differential equations. Solution of simultaneous differential equations involving operators x (d/dx) or t (d/dt) etc. |
| Week 11 | Simultaneous equation of the form dx/P = dy/Q = dz/R. Total differential equations. Condition for Pdx + Qdy +Rdz = 0 to be exact. |
| Week 12 | General method of solving Pdx + Qdy + Rdz = 0 by taking one variable constant. Method of auxiliary equations. |

**LESSON PLAN**

Name of Assistant Professor:

Class: B.Sc. Non medical. -2nd sem

# Subject: Mathematics (Vector Calculus)

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| Week | Topic/Chapter/Activity |
| Week 1 | Scalar and vector product of three vectors, product of four vectors. |
| Week 2 | Reciprocal vectors. Vector differentiation.  |
| Week 3 | Scalar Valued point functions, vector valued point functions, derivative along a curve, directional derivatives. |
| Week 4 | Gradient of a scalar point function, geometrical interpretation of grad ****** , character of gradient as a point function |
| Week 5 | Divergence and curl of vector point function, characters of Div *f* and Curl *f* as point function, examples |
| Week 6 | Gradient, divergence and curl of sums and product and their related vector identities. Laplacian operator. |
| Week 7 | Orthogonal curvilinear coordinates Conditions for orthogonality fundamental triad of mutually orthogonal unit vectors. |
| Week 8 | Gradient, Divergence, Curl and Laplacian operators in terms of orthogonal curvilinear coordinates. |
| Week 9 | Cylindrical co-ordinates and Spherical co-ordinates. |
| Week 10 | Vector integration; Line integral, Surface integral |
| Week 11 | Volume integral. Theorems of Gauss,  |
| Week 12 | Green & Stokes and problems based on these theorms. |

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 **LESSON PLAN**

Name of Assistant Professor:

Class: B.Sc. Non medical. -4th sem

# Subject: Mathematics (Special Function and Integral Transforms)

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| Week | Topic/Chapter/Activity |
| Week 1 | Series Solution of differential equations Power series method, Definition of Beta and Gamma functions |
| Week 2 | Bessel equation and its solution, Bessel functions and their properties- Convergence. |
| Week 3 | Recurrence relations and Generating functions, Orthogonality of Bessel functions |
| Week 4 | Legendre and Hermite differential equations and their solutions. Legendre and Hermite’s function and their properties. |
| Week 5 | Recurrence relations and generating functions. Orthogonality of Legendre and Hermite’s polynomials. |
| Week 6 | Rodrigues’ Formula for Legendre and Hermite polynomials, Laplace Integral Representation of Legendre polynomial. |
| Week 7 | Laplace Transforms: Existence theorem for Laplace Transform, Linearity of the Laplace transforms. |
| Week 8 | Laplace transforms of derivatives and integrals, Differentiation and Integration of Laplace transforms, Convolution theorem. |
| Week 9 | Inverse Laplace transforms, Convolution theorem, Inverse Laplace transforms of derivatives and integrals, Solution of ordinary derivatives and integrals using Laplace transforms. |
| Week 10 | Fourier transforms: Linearity property, Shifting, Modulation, Convolution theorem. |
| Week 11 | Fourier transforms of derivatives, Relation between Fourier transforms and Laplace transforms. |
| Week 12 | Praseval’s identity for Fourier transforms, Solution of differential equations using Fourier transforms. |

 **LESSON PLAN**

Name of Assistant Professor:

Class: B.Sc. Non medical. -4th sem

# Subject: Mathematics (Sequences and Series)

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| Week | Topic/Chapter/Activity |
| Week 1 | Boundedness of the set of real numbers; least upper bound, greatest lower bound of a set, neighborhoods, interior points, isolated points, limit points. |
| Week 2 | open sets, closed set, interior of a set, closure of a set in real numbers and their properties. Bolzano-Weiestrass theorem. |
| Week 3 | Open covers, Compact sets and Heine-Borel Theorem. |
| Week 4 | Sequence: Real Sequences and their convergence, Theorem on limits of sequence, Bounded and monotonic sequences, Cauchy’s sequence, Cauchy general principle of convergence,  |
| Week 5 | Subsequences, Subsequential limits.Infinite series: Convergence and divergence of Infinite Series.Comparison Tests of positive terms Infinite series,  |
| Week 6 | Cauchy’s general principle of Convergence of series, Convergence and divergence of geometric series, Hyper Harmonic series or p-series. |
| Week 7 | Infinite series: D-Alembert’s ratio test, Raabe’s test, Logarithmic test. |
| Week 8 | de Morgan and Bertrand’s test, Cauchy’s Nth root test, Gauss Test,  |
| Week 9 | Cauchy’s integral test, Cauchy’s condensation test. |
| Week 10 | Alternating series, Leibnitz’s test, absolute and conditional convergence, Arbitrary series: abel’s lemma, Abel’s test, Dirichlet’s test. |
| Week 11 | Insertion and removal of parenthesis, re-arrangement of terms in a series, Dirichlet’s theorem, Riemann’s Re-arrangement theorem. |
| Week 12 | Pringsheim’s theorem (statement only), Multiplication of series, Cauchy product of series, (definitions and examples only) Convergence and absolute convergence of infinite products. |

 **LESSON PLAN**

Name of Assistant Professor:

Class: B.Sc. Non medical. -4th sem

Subject: Mathematics (**Programming in C and Numerical Methods**)

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| Week | Topic/Chapter/Activity |
| Week 1 | Programmer’s model of a computer, Algorithms. |
| Week 2 | Flow charts ,Data types,  |
| Week 3 | Operators and expressions, Input / outputs functions. |
| Week 4 | Decisions control structure: Decision statements, Logical and conditional statements, |
| Week 5 | Implementation of Loops, Switch Statement & Case control structures. |
| Week 6 | Functions, Preprocessors and Arrays. |
| Week 7 | Strings: Character Data Type, Standard String handling Functions, Arithmetic Operations on Characters. Structures: Definition, using Structures, use of Structures in Arrays and Arrays in Structures. |
| Week 8 | Pointers: Pointers Data type, Pointers and Arrays, Pointers and Functions.Solution of Algebraic and Transcendental equations: Bisection method |
| Week 9 | Regula-Falsi method, Secant method, Newton-Raphson’s method. Newton’s iterative method for finding pth root of a number, Order of convergence of above methods. |
| Week 10 | Simultaneous linear algebraic equations: Gauss-elimination method, Gauss-Jordan method, Triangularization method (LU decomposition method). |
| Week 11 | Crout’s method, Cholesky Decomposition method. Iterative method,  |
| Week 12 | Jacobi’s method, Gauss-Seidal’s method, Relaxation method. |

 **LESSON PLAN**

Name of Assistant Professor:

Class: B.Sc. Non medical. – 6th sem

# Subject: Mathematics (Real and Complex Analysis)

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| Week | Topic/Chapter/Activity |
| Week 1 | Jacobians, Beta and Gama functions |
| Week 2 | Double and Triple integrals, |
| Week 3 | Dirichlets integrals, change of order of integration in double integrals |
| Week 4 | Fourier’s series: Fourier expansion of piecewise monotonic functions, Properties of Fourier Co-efficient,  |
| Week 5 | Dirichlet’s conditions, Parseval’s identity for Fourier series. |
| Week 6 | Fourier series for even and odd functions, Half range series, Change of Intervals. |
| Week 7 | Extended Complex Plane, Stereographic projection of complex numbers, continuity and differentiability of complex functions. |
| Week 8 | Analytic functions. Problems biased on it |
| Week 9 | Cauchy-Riemann equations. Harmonic functions. |
| Week 10 | Mappings by elementary functions: Translation, rotation, Magnification and Inversion.  |
| Week 11 | Conformal Mappings, Mobius transformations |
| Week 12 | Fixed pints, Cross ratio, Inverse Points and critical mappings. |

 **LESSON PLAN**

Name of Assistant Professor:

Class: B.Sc. Non medical. -6th sem

# Subject: Mathematics (Linear Algebra)

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| Week | Topic/Chapter/Activity |
| Week 1 | Vector spaces, subspaces, Sum and Direct sum of subspaces, Linear span. |
| Week 2 |  Linearly Independent and dependent subsets of a vector space. Finitely generated vector space, Existence theorem for basis of a finitely generated vector space. |
| Week 3 | Finite dimensional vector spaces, Invariance of the number of elements of bases sets, Dimensions, Quotient space and its dimension. |
| Week 4 | Homomorphism and isomorphism of vector spaces, Linear transformations and linear forms on vector spaces, Vector space of all the linear transformations Dual Spaces,  |
| Week 5 | Linear forms on vector spaces, Vector space of all the linear transformations Dual Spaces, |
| Week 6 | Bidual spaces, annihilator of subspaces of finite dimensional vector spaces, Null Space, Range space of a linear transformation, Rank and Nullity Theorem |
| Week 7 | Algebra of Liner Transformation, Minimal Polynomial of a linear transformation,  |
| Week 8 | Singular and non-singular linear transformations, Matrix of a linear Transformation. |
| Week 9 | Change of basis, Eigen values and Eigen vectors of linear transformations. |
| Week 10 | Inner product spaces, Cauchy-Schwarz inequality, Orthogonal vectors, Orthogonal complements,  |
| Week 11 | Orthogonal sets and Basis, Bessel’s inequality for finite dimensional vector spaces, Gram- Schmidt |
| Week 12 | Orthogonalization process, Adjoint of a linear transformation and its properties, Unitary linear transformations. |

 **LESSON PLAN**

Name of Assistant Professor:

Class: B.Sc. Non medical. – 6th sem

Subject: Mathematics (**Dynamics**)

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| Week | Topic/Chapter/Activity |
| Week 1 | Velocity and acceleration along radial, transverse. |
| Week 2 | Tangential and normal directions. Relative velocity and acceleration. |
| Week 3 | Simple harmonic motion. Elastic strings. |
| Week 4 | Mass, Momentum and Force.  |
| Week 5 | Newton’s laws of motion |
| Week 6 | Work, Power and Energy. Definitions of Conservative forces and Impulsive forces |
| Week 7 | Motion on smooth and rough plane curves.  |
| Week 8 | Projectile motion of a particle in a plane. |
| Week 9 | Vector angular velocity. |
| Week 10 | General motion of a rigid body. Central Orbits. |
| Week 11 | Kepler laws of motion. Motion of a particle in three dimensions. |
| Week 12 | Acceleration in terms of different co-ordinate systems. |