## ADMISSIONS/ EXAMINATIONS SCHEDULE (Session 2015-2016)

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<td>M.Phil. / Ph.D.</td>
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<td>Mathematics</td>
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### Qualification:

**M.Phil. Programme:**
- A candidate seeking admission to the M.Phil course must have at least 55% marks (50% in case of SC/ST) in the subject concerned at Master's level. The condition of marks in the Master’s Degree shall be relaxable upto 50% in the case of University appointed teachers.
- Number of seat 08 in each department.

**Ph.D. Programme:**
- At least 55% marks at the Master degree level (SC/ST/physically and visually handicapped candidates will be given a relaxation of 5% in the minimum percentage of marks).
- Candidates with UGC NET / UGC / CSIR (JRF) examinations / SLET / GATE /M.Phil. (According UGC regulation 2009) candidates are also exempted from the Entrance Test but they perform in the interview.
- Number of seat 02 in each department.
SYLLABUS FOR M.Phil. /Ph.D. ENTRANCE TEST

PHYSICS

Session 2015-2016

M.M: 100

Min. Marks required for admission in M. Phil Course: 40
Min. Marks required for admission in Ph.D. Course: 50

UNIT-1


Elements Complex analysis, Limit and continuity, Cauchy's Riemann equations, Complex integrations, Cauchy's theorem for simply and multiply connected regions, Cauchy's integral formula, Taylor and Laurents series, Poles and singularities, Cauchy's residue theorem and its application to evaluation of definite integrals.

UNIT-2

Electricity and Magnetism: Coulomb’s Law, Gauss’s law, Energy of a charge distribution, Laplace’s and Poisson’s equations, Conductors, Method of images, Field and Potential due to dipole. Polarization in a dielectric, vectors D, P and E, linear dielectrics, force on dielectrics. Line, surface and volume currents and current densities, electrical conductivity and Ohm’s law, equation of continuity, energy dissipation. Motion of charged particles in electric and magnetic fields. Biot-Savart and Ampere’s law, divergence and curl of B and the differential form of Ampere’s law, vector potential, Magnetic dipoles, magnetization in materials, H, B and M, Dia-, para- and ferromagnetism. Electromagnetic induction, motional e.m.f and Faraday’s law, inductance and energy in magnetic field, the displacement current, Maxwell’s equations., Ising Model, Anti Ferromagnetism , Two Sub Lattice Model, Ferrimagnetism, Ferrites.

UNIT-3


**UNIT-4**


**UNIT-5**


**UNIT-6**

Department of Mathematics, IEC University Baddi, Solan
SYLLABUS FOR M.Phil./ Ph.D. ENTRANCE TEST
MATHEMATICS
Session 2015-2016

M.M.: 100
Min. marks required for admission in M.Phil. Course: 40
Min. marks required for admission in Ph.D. Course: 50

UNIT-1


UNIT-2

REAL ANALYSIS: Numerical sequences, Convergent sequences, Cauchy sequences, Upper and lower limits. Series of real numbers, series of non-negative terms, the number ‘e’, tests of convergence, Multiplications of series, Re-arrangements, Double series, infinite products. Finite, countable and uncountable sets, The topology of the real line. Continuity, Uniform continuity,
Properties of continuous functions, Discontinuities, Monotonic functions, Differentiability, Mean value theorems, L’ Hospital rule, Taylor’s theorem, Maxima and minima, Functions of bounded variation, The Riemann-Stieltje’s 1 integral, Criterion for integrability, Properties of the integral, Classes of integrable functions, The integral as the limit of a sum, First and second mean value theorems, Integration and differentiation. Sequences and series of functions, Uniform convergence, Uniform convergence and continuity, Uniform convergence and integration, Uniform convergence and differentiation, Power series, The exponential and logarithmic functions, The trigonometric functions. Improper integrals and their convergence, Functions of several variables, Partial derivatives, Continuity and differentiability, The chain rule, Jacobians, The Implicit function theorem, Taylor’s theorem, The maxima and minima, Lagrange’s multipliers.

UNIT-3


UNIT-4

ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS: Linear Second Order Equations, Initial value problem, Existence and uniqueness by Picard’s theorem, Wronskian, Separation and comparison theorems, Poincare phase plane analysis, Method of variation of parameters. Power series solutions, Solution near ordinary and regular singular point, Convergence of the formal power series, applications to Legendre, Bessel, Hermite, Laguerre and hypergeometric differential equations with their properties. Partial differential equations, Cauchy problems and characteristics, Classification 2 of second order PDE’s, Reduction to canonical forms, Equations of mathematical physics and their solutions. Boundary value problems, Transforming Boundary value problem of PDE and ODE, Sturm - Liouville system, Eigen values and eigen functions, Simple properties, Fourier expansion in eigen functions, Parseval’s identity, Green’s function method.

UNIT-5

Connected sets on the real line, Path connectedness, Compact sets on the line, Limit point compactness, Local compactness, The countability axioms, The separation axioms, Urysohn’s lemma, Tietze’s extension theorem, Urysohn’s metrization theorem, Partitions of unity, Tychonoff’s theorem on the product of compact spaces. Local finiteness, Paracompactness, Normality of a paracompact space. The Fundamental group and the fundamental group of a circle, The fundamental group of the punctured plane, Essential and inessential maps, The fundamental theorem of algebra.

UNIT-6


UNIT-7


UNIT-8


UNIT-9

NUMERICAL ANALYSIS: A brief introduction to algebraic and transcendental equations and their roots; direct and iterative methods for determination of roots of these equations, initial approximations; bisection method, secant method, Regula-Falsi method, Newton-Raphson method for determination of roots of algebraic and transcendental equations. Brief introduction to systems of linear algebraic equations and their solutions, Eigen value problem and its solution;

UNIT-10