NSCB Memorial Govt. Degree College
Hamirpur
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Department of Mathematics

Name of Teacher : Dr. SANJAY KUMAR KANGO
Designation : Associate Professor

B.Sc. (Mathematics) First Year
Course Code : MATH102TH
Name of the Course : Differential Equations

Course Learning Outcomes:

On successful completion of this course, the student will be able to

CO1 Recognise differential equations that can be solved by each of the three methods – direct integration, separation of variables and integrating factor method – and use the appropriate method to solve them.

CO2 Use an initial condition to find a particular solution of a differential equation, given a general solution.

CO3 Check a solution of a differential equation in explicit or implicit form, by substituting it into the differential equation.

CO4 Understand the terms 'exponential growth/decay', 'proportionate growth rate' and 'doubling/halving time' when applied to population models, and the terms 'exponential decay', 'decay constant' and 'half-life' when applied to radioactivity.

CO5 Solve problems involving exponential growth and decay.

CO6 To solve simultaneous and total differential equations, Lagrange's method.

CO7 To classify the second order partial differential equations: Parabolic, Elliptic and Hyperbolic

B.Sc. (Mathematics) Third Year

Course Code : MATH313TH

Name of the Course : Probability and Statistics

Course Learning Outcomes:

After the successful completion of this course, it is indented that a student will be able to:

CO1 Use the basic probability rules, including additive and multiplicative law by using the Concept of probability set function, random variable, the probability density function.

CO2 Distribution function and use these concept for calculating probabilities and drive the marginal/conditional distribution and their respective mean, variance and standard deviation.

CO3 Mathematical expectation, moments, moment generating function, characteristic function, discrete distributions: uniform.

CO4 Applications of Binomial distribution, Poisson distribution, continuous distribution, normal distribution and exponential distribution .

CO5 Problems on Joint cumulative distribution function and its properties.

CO6 Problems on joint probability density functions, marginal and conditional distributions.

CO7 Problems on expectation of function of two random variables, conditional expectations, independent random variables.

M.Sc. (Mathematics) First Semester

Course Code : M-105

Name of the Course : Fluid Dynamics

Course Learning Outcomes:

When the course is completed, the student will be able to

CO1 Define types of fluids, Lagrangian and Eulerian method of describing fluid motion. Motion of the fluid element: Translation, rotation and deformation Stream lines path lines and streak lines, Material derivative, Acceleration Components of fluid particle in Cartesian.

CO2 Tell about Cylindrical and Spherical polar coordinates (without proof). Vorticity vector, Vortex Lines, rotational and irrotational motion. Velocity, Potential boundary surface, Boundary condition. Irrotational Motion in two-dimensional.

CO3 Describe Stream function, Physical significance of stream function, Complex velocity potential, Sources, sinks, doublets, and their images in two dimensional.

CO4 Understand about Continuum hypothesis, Newton's Law of Viscosity, Some Cartesian Tensor Notations, Thermal Conductivity, Generalized Heat conduction.

CO5 Derive and analyse Equation of State, Equation of Continuity, Navier – Stokes (NS) Equations, Equation of Energy. Vorticity and Circulation (Kelvin's Circulation Theorem).

CO6 Know about Dynamical Similarity (Reynold's Law), Inspection Analysis- Dimensional Analysis, Buckingham – π - Theorem, and its Applications π –products and coefficients, Nondimensional parameters and their physical importance.

CO7 Derive Exact Solutions of the N S Equations, Steady Motion between parallel plates (a) Velocity distribution, (b) Temperature Distribution, Plane Couette flow, plane Poiseuille flow, generalized plane Couette flow. Flow in a circular pipe (Hagen-Poiseuille flow (a) velocity distribution (b) Temperature distribution and theory of very slow motion: Flow past a sphere (Stokes' and Oseen' flow).

M.Sc. (Mathematics) Fourth Semester

Course Code : M-405

Name of the Course : Magneto Fluid Dynamics

Course Learning Outcomes:

On successful completion of this course, the student will be able to

CO1 Derive the Fundamental equations, Maxwell's electromagnetic field equation and Magnetic induction equation.

CO2 Acquire knowledge about Magnetic Reynold's number. Alfven's Theorem and its consequences. Magnetic energy equation. Mechanical equations and effects. Magneto hydrostatic, Force Free magnetic fluids.

CO3 Understand about Steady States, Pressure balanced magneto hydrostatic configurations. Toroidal magnetic field. Steady laminar motion. General solution of a vector wave equation.

CO4 Know about Magneto hydrodynamic, Waves Alfven waves, Magneto hydrodynamic waves in compressible fluid. Reflection and refraction of Alfven waves. Dissipative effects.

CO5 Understand the Linear Pinch. Method of small Oscillations. Energy principle.

CO6 Drive and analyse Virial Theorem. Marginal stability – Bénard problem with a magnetic field.

CO7 Understand about turbulence, spectral analysis. Homogeneity and Isotropy. Kolmogorff's principle. Hydro magnetic turbulence. Inhibition of turbulence by a magnetic field