UPTU 2018 Syllabus PAPER – 8 (APTITUDE TEST FOR B.SC. GRADUATE IN ENGINEERING)

- **Linear Algebra:** Matrix Algebra, Systems of linear equations, Eigen values and eigenvectors.
- **Calculus:** Mean value theorems, Theorems of integral calculus, Evaluation of definite and improper integrals, Partial Derivatives, Maxima and minima, multiple integrals, Fourier series. Vector identities, Directional derivatives, Line, Surface and Volume integrals, Stokes, Gauss and Green's theorems.
- **Differential equations:** First order equation (linear and nonlinear), Higher order linear differential equations with constant coefficients, Method of variation of parameters, Cauchy's and Euler's equations, Initial and boundary value problems, Linear partial differential equations with constant coefficients of 2nd order and their classifications and variable separable method.
- **Complex variables:** Analytic functions, Cauchy's integral theorem and integral formula, Taylor's and Laurent' series, Residue theorem, solution integrals.
- **Probability and Statistics:** Sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Discrete and continuous distributions, Poisson, Normal and Binomial distribution, Correlation and regression analysis.
- **Fourier Series:** Periodic functions, Trigonometric series, Fourier series of period 2, Euler's formulae, Functions having an arbitrary period, Change of an interval, Even and odd functions, Half range sine and cosine series.
- **Transform Theory:** Laplace transform, Laplace transform of derivatives and integrals, Inverse Laplace transform, Laplace transform of periodic functions, Convolution theorem, Application to solve simple linear and simultaneous differential equations.
- **Fourier integral:** Fourier complex transform, Fourier sine and cosine transforms and applications to simple heat transfer equations. Z – transform and its application to solving differential equations.