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| Institute/School Name | Chitkara University Institute of Engineering and Technology | | |
| Department Name | Department of Applied Sciences | | |
| Programme Name | Bachelor of Engineering (B.E.), Computer Science & Engineering | | |
| Course Name | Differential Equations and Transformations | Course Name | Differential Equations and Transformations |
| Course Code | 24APS2101 | Course Code | 24APS2101 |
| L-T-P(Per Week) | 4-0-0 | L-T-P (Per Week) | 4-0-0 |
| Pre-requisite | NA | | |

1. **Syllabus of the Course:**

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| **SUBJECT: Differential Equations and Transformations** | | **Subject Code:**  **24APS2101** |
| **Content** | **No. of**  **Sessions** | **Weightage (%)** |
| **Fourier series and transforms:** Introduction, Fourier series on arbitrary intervals, half-range cosine and sine series, Fourier transform with properties: Fourier transform linearity property, Fourier transform of derivative, shifting and scaling, convolution, Fourier cosine and sine transforms and properties: Fourier cosine and sine transform, linearity, shifting and scaling, Fourier cosine and sine transforms of derivatives, Parseval’s identity. | **10** | **18%** |
| **Ordinary differential equations:** Differential equations of first order and first degree, linear and Bernoulli equations, exact differential equations, equation solvable for p, y and x, Clairaut’s equation, applications to orthogonal trajectories, second and higher order ordinary linear differential equations with constant coefficients: complimentary function, particular integrals (standard types), differential operator method, variation of parameters, method of undetermined coefficients, Cauchy-Euler differential equation, simultaneous linear differential equations (two variables) with constant coefficients, application to RLC circuit. | **16** | **29%** |
| **Laplace transform:** Laplace transform, linearity and shifting property, inverse transforms properties, transforms of derivatives and integrals, unit step function, Dirac’s delta function, applications to differential equations. | **9** | **16%** |
| **Partial differential equations (PDE): F**ormation of partial differential equations, equation of first order, Lagrange’s linear equation, Charpit’s method, standard types of first order non-linear partial differential equations, solutions of second order linear partial differential equations in two variables with constant coefficients by finding complementary function and particular integral, classification of PDE of second order – parabolic, elliptic and hyperbolic equations, solution by separation of variables, solution of one-dimensional wave equation, solution of two-dimensional Laplace equation using Fourier series. | **11** | **20%** |
| **Functions of complex variables:** limit, continuity, derivative of complex functions, analytic function, Cauchy-Riemann equations, harmonic functions, conformal mapping, complex integration, Cauchy’s theorem, Cauchy integral formula, Taylors and Laurent’s expansion. | **10** | **17%** |