**Lesson Plan**

**Subject :** Higher Engineering Mathematics

**Lesson plan Duration: 15 Weeks**

Work load (lecture/Practical) per week (in hours): Lectures:3 hours

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| **Lecture No** | **Theory** |
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| 1 | Laplace Transform, Laplace Transform of Elementary Functions |
| 2 | Basic properties of Laplace Transform |
| 3 | Laplace transform of periodic functions |
| 4 | Laplace transform of periodic functions |
| 5 | finding inverse Laplace transform by different methods |
| 6 | Numerical Problems basded on inverse Laplace transform |
| 7 | Convolution theorem |
| 8 | Numerical Problems basded on Convolution theorem |
| 9 | solving ODEs by Laplace Transform method |
| 10 | Numerical Problems basded on ODE |
| 11 | Unit Step function/ Heavy side function |
| 12 | Formation of Partial Differential Equations |
| 13 | Solutions of first order linear and non-linear PDEs |
| 14 | Numerical Problems basded on first order linear and non-linear PDEs |
| 15 | Numerical Problems basded on first order linear and non-linear PDEs |
| 16 | Charpit’s method |
| 17 | Numerical Problems basded on Charpit’s method |
| 18 | Solution to homogenous linear partial differential equations  (with constant coefficients) by complimentary function and particular integral method |
| 19 | Solution to homogenous linear partial differential equations  (with constant coefficients) by complimentary function and particular integral method |
| 20 | Bisection method |
| 21 | Newton-Raphson method |
| 22 | Convergence on Newton-Raphson method |
| 23 | Regula-Falsi method |
| 24 | Finite differences, |
| 25 | Relation between operators |
| 26 | Interpolation using Newton’s forward formula |
| 27 | Interpolation backward difference formula |
| 28 | Interpolation with unequal intervals: Newton’s divided difference |
| 29 | Interpolation with unequal intervals: Lagrange’s formula |
| 30 | Revision on Newton’s divided difference and Lagrange’s formula |
| 31 | Numerical Differentiation using Newton’s forward formula |
| 32 | Numerical Differentiation using Newton's backward difference formula |
| 33 | Trapezoidal rule |
| 34 | Simpson’s 1/3rd rules |
| 35 | Simpson’s 3/8 rules |
| 36 | Ordinary differential equations using Taylor’s series |
| 37 | , Ordinary differential equations using Euler's methods |
| 38 | Ordinary differential equations using modified  Euler’s methods |
| 39 | Ordinary differential equations using Runge-Kutta method of  fourth order for solving first and second order equations |