**Lesson Plan**

**Subject : Computer Aided Design**

Lesson plan Duration : 15 Weeks

Work load (lecture/Practical) per week (in hours): Lectures:3 hours, Practical : 2 hours.

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| **Lecture No** | **Theory** | **Practical** |
| **Practical Day** | **Topic** |
| 1 | Introduction |  1 | To study the 2-D drawing orthographic view, front view, top view and side view |
| 2 | Basic steps in FEM formulation |  |  |
| 3 | Applicability of the method, variational, functional , |  |  |
| 4 | Ritz Method. |  |  |
| 5 | Imposition of boundary conditions, |  |  |
| 6 | Solution of the equations. |  |  |
| 7 | 1-D Elements: Basis functions and shape functions, convergence criteria |  |  |
| 8 | h and p approximations, natural coordinates |  2 | Introduction to Solid Works and working with sketch mode. |
| 9 | Numerical integration |  |  |
| 10 | Computer implementation: pre-processor, processor, post-processor. |  |  |
| 11 | Introduction to the different methods of FEA; |  |  |
| 12 | Alternate formulation |  |  |
| 13 | Weighted Residual Method |  |  |
| 14 | Galerkin Method |  |  |
| 15 | Problems with C1 Continuity: beam bending |  |  |
| 16 | Connectivity and assembly of C1 continuity elements |  |  |
| 17 | Introduction to 2-DElements (Triangles and Quadrilaterals)and Shape Functions: |  |  |
| 18 | Natural Coordinates |  3 | To study the wireframe, surface and solid modelling. |
| 19 | Numerical Integration |  |  |
| 20 | Elemental Equations |  |  |
| 21 | Connectivity and Assembly |  4 | Working with the tools like Pattern, Copy, Rotate, Move and Mirror etc |
| 22 | Imposition of Boundary Conditions |  |  |
| 23 | Axisymmetric (Heat Conduction) problem |  |  |
| 24 | Plane strain and plane stress solid mechanics problems |  |  |
| 25 | Parametric, iso-parametric and super-parametric elements |  5 | Working with creating 3D features (Extrude & Revolve). |
| 26 | Elements with C1 continuity |  |  |
| 27 | Introduction to Free vibration problems and FDM |  |  |
| 28 | Formulation of eigenvalue problems |  |  |
| 29 | FEM formulation |  6 | Working with the tools like Hole, Round, and Chamfer etc. |
| 30 | Time-dependent problems |  |  |
| 31 | Combination of Galerkin FEM and FDM (Finite Difference Method) |  |  |
| 32 | Convergence and stability of FD Scheme. |  7 | Create the part drawing of product 1 using any 3D software |
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|  |  |  8 | Draw the part drawing of product 2 using any 3D software. |