Course Code	Course Name	Credits
MTSBL301	**Skill Based Lab: CAD – Modeling**	**02**

Prerequisites: Engineering Drawing

Objectives:

1. To impart the 3D modeling skills for development of 3D models of basic engineering components.
2. To introduce Product data exchange among CAD systems.
3. To familiarize with production drawings with important features like GD &T, surface finish, heat treatments etc.

Outcomes: Learner will be able to…

1. Illustrate basic understanding of types of CAD model creation.
2. Visualize and prepare 2D modeling of a given object using modelling software.
3. Build solid model of a given object using 3D modeling software.
4. Visualize and develop the surface model of a given object using modelling software.
5. Generate assembly models of given objects using assembly tools of a modelling software
6. Perform product data exchange among CAD systems.

Sr. No.	Exercises	Hrs.
1	**CAD Introduction** CAD models Creation, Types and uses of models from different perspectives. Parametric modeling.	**2**
2	**2D Modeling** Geometric modeling of an Engineering component, demonstrating skills in sketching commands of creation (line, arc, circle etc.) modification (Trim, move, rotate etc.) and viewing using (Pan, Zoom, Rotate etc.)	**8**
3	**Solid Modeling** 3D Geometric modeling of an Engineering component, demonstrating modeling skills using commands like Extrude, Revolve, Sweep, Blend, Loft etc.	**14**
4	**Surface Modeling** Extrude, Sweep, Trim etc and Mesh of curves, free form surfaces etc. Feature manipulation using Copy, Edit, Pattern, Suppress, History operations etc.	**10**
5	**Assembly** Constraints, Exploded views, interference check. Drafting (Layouts, Standard & Sectional Views, Detailing & Plotting).	**10**
6	**Data Exchange** CAD data exchange formats Like IGES, PDES, PARASOLID, DXF and STL along with their comparison and applicability.	**4**

Assessment:

Term work

Using the above knowledge and skills acquired through six modules students should complete Minimum six assignments/Experiments from the given sets of assignments **(Two from each set)** using standard CAD modeler like PTC Creo/CATIA/ Solid work/UG /any other suitable software.

Set 1: Beginner Level:

3D modeling of basic Engineering components likes Nuts, Bolts, Keys, cotter, Screws, Springs etc.

Set 2: Intermediate Level:

3D modeling of basic Machine components like Clapper block, Single tool post, Lathe and Milling tail stock,Shaper tool head slide, jigs and fixtures Cotter, Knuckle joint, Couplings: simple, muff, flanged Protected flange coupling, Oldham's coupling, Universal coupling,element of engine system and Miscellaneous parts.

Set 3: Advance Level:

1) Generation of any Assembly model (minimum five child parts) along with Production drawing for any of the system by creating 3D modeling with assembly constraints, Interference check, Exploded view, GD&T, Bill of material.

2) Reverse Engineering of a physical model: disassembling of any physical model having not less than five parts, measure the required dimensions of each component, sketch the minimum views required for each component, convert these sketches into 3-D model and create an assembly drawing with actual dimensions

The distribution of marks for Term work shall be as follows:

1. Printouts/Plots : 20 marks
2. Attendance : 05 marks

End Semester Practical/Oral examination:

To be conducted by pair of Internal and External Examiner

1. Practical examination duration is two hours, based on Advance level of the Term work.
   Oral examination should also be conducted to check the knowledge of CAD Modelling Tools.
2. The distribution of marks for practical examination shall be as follows:
   a. Practical Exam ….15 marks
   b. Oral Exam ……10 marks
3. Evaluation of practical examination to be done based on the printout of students work
4. Students work along with evaluation report to be preserved till the next examination

References:

1. Machine Drawing by N.D. Bhatt.
2. A textbook of Machine Drawing byLaxminarayan and M.L.Mathur, Jain brothers Delhi
3. Machine Drawing by Kamat and Rao
4. Machine Drawing by M.B.Shah
5. A text book of Machine Drawing by R.B.Gupta, Satyaprakashan, Tech. Publication
6. Machine Drawing by K.I. Narayana, P. Kannaiah, K.Venkata Reddy
7. Machine Drawing by Sidheshwar and Kanheya
8. Autodesk Inventor 2011 for Engineers and Designers by ShamTickoo and SurinderRaina, Dreamtech Press