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| **Name of The Course** | **Engineering Graphics and Introduction to Digital Fabrication** | | | | |
| **Course Code** | **BME01T1001** | | | | |
| **Prerequisite** |  | | | | |
| **Corequisite** |  | | | | |
| **Antirequisite** |  | | | | |
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**COURSE OBJECTIVES**

To establish the usage of basics of engineering graphics in product design.

2. To introduce the concept of product design.

3. To introduce graphics software and apply graphics software for devloping product model.

**COURSE OUTCOMES**

On completion of this course, the students will be able to

**CO1:** Sketch orthographic projection of points, lines and planes.

**CO2:**Draw orthographic projection of two-dimensional planes and surfaces.

**CO3:**Draw orthographic views from pictorial drawings.

**CO4:**Develop a solid model using solid works

**CO5:** Define and demonstrate the use of techniques for processing of CAD models for rapid prototyping

**CATALOG DESCRIPTION**

With fast changing technologies and sophistication in industry, the students need to learn product design and apply the concept of graphics in product design. In this course the students will understand the concept of design, the principles, morphology and process of design and understand the realm of engineering graphics. Next they will learn about orthographic and isometric projection of solids, free-hand sketching, model solids using solid works software and finally performing 3 D printing.

**TEXT BOOKS**

1. K C John (2009), Engineering Graphics for Degree, Prentice Hall of India. ISBN: 978-8-120-33788-3.
2. [P N Rao](http://www.flipkart.com/author/p-n-rao) (2010), CAD/CAM Principles and Applications, 3rd Edition, Tata McGraw-Hill Education, ISBN: 978-0-070-68193-4.
3. Chee Kai Chua, Kah Fai Leong(2016), 3D Printing And Additive Manufacturing: Principles And Applications, WSPC
4. Ben Redwood, FilemonSchöffer& Brian Garret(2017), The 3D Printing Handbook: Technologies, design and applications, 3D Hubs B.V

**REFERENCE BOOKS**

1. Course material uploaded on LMS

**COURSE CONTENT**

**UNIT I Projection of Points, Lines And Plane Surface  8 hours**

Orthographic projection - First angle projection - projection of points and Projection of straight lines inclined to one principal plane –Projection of planes inclined to one principal plane.

**Unit II: Projection of Solids 8 hours**

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.

**Unit III: Conversion of Pictorial drawings into Orthographic views 8 hours**

Representation of Three Dimensional objects – Layout of views- Sketching of multiple views from pictorial view of object.

**Unit IV: Solid Modeling 8 hours**

Modeling of simple solids in Polyhedra, Regular and Irregular polyhedra, solids of revolution.

3D Modelling on Solidworks– To prepare part model using 2 D drawing and with basic extrusion andrevolve commands.

**Unit V: Exercises on 3D Printing 8 hours**

Introduction to 3 D printing, Slicing / Pre-processing, Fused deposition modelling technique, design and print 3D models like stepped shaft model and flange coupling model.

**RELATIONSHIP BETWEEN THE COURSE OUTCOMES (COs) AND PROGRAM OUTCOMES (POs) / PROGRAM SPECIFIC OUTCOMES (PSOs)**

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| **CO** | **STATEMENT** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO 12** | **PSO1** | **PSO2** |
| CO1 | Sketch orthographic projection of points, lines and planes. | 3 |  | 2 |  |  |  |  |  |  | 2 |  |  |  |  |
| CO2 | Draw orthographic projection of two-dimensional planes and surfaces. | 3 |  | 2 |  |  |  |  |  |  | 2 |  |  |  |  |
| CO3 | Draw orthographic views from pictorial drawings. | 3 |  | 2 |  |  |  |  |  |  | 2 |  |  |  |  |
| CO4 | Develop a solid model using solid works | 3 |  | 2 | 1 | 2 |  |  |  |  | 2 |  |  |  |  |
| CO5 | Define and demonstrate the use of techniques for processing of CAD models forrapid prototyping | 3 |  | 2 | 1 | 2 |  |  |  |  | 2 |  |  |  |  |

1=addressed to small extent

2= addressed significantly

3=major part of course

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigationsof complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | PSO1 | PSO2 |
|  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|  | Engineering Graphics | 3 |  | 2 | 1 | 2 |  |  |  |  | 2 |  |  |  |  |