PE210: SOLID MODELING AND RAPID PROTOTYPING
CREDITS = 4 (L=0, T=0, P=4)

Course Objective:

The course aims to provide a student an opportunity to prepare 2D/3D parts/models and implement them to produce them using rapid prototyping methods and computer-aid tools.

Teaching and Assessment Scheme:

Teaching Scheme			Credits	Assessment Scheme				
L	T	P	C	Theory		Practical		Total Marks
				ESE	CE	ESE	CE	
0	0	4	4	0	0	60	40	100

Course Contents:

Unit No.	Topics	Teaching Hours
1	**Introduction:** Introduction to CAD software. Understanding software GUI. Feature Based Modelling, Features and primitives, Feature entities, 3D sketching, Feature representation, Creating features, Parametrics, Relations and constraints, Feature manipulations	14
2	**Geometric and Mass Properties:** Properties, calculate length of contours and curves, calculate areas, and calculate centroids, Calculate inertia properties, Mass Properties, Properties Evaluation.	08
3	**Assembly Modelling:** Differences between part and assembly modelling, mating conditions, Bottom-up assembly modelling approach, Top-down assembly modelling approach, WCS and mate methods to assemble parts, managing assemblies, Working with subassemblies, Assembly analysis	14

Unit No.	Topics	Teaching Hours
4	**Rapid Prototyping:** Fundamentals of Rapid Prototyping, Advantages & Applications of RP, Rapid Prototyping Process Chain, Types of Rapid Prototyping Systems, Fundamentals of various RPT technologies	10
5	**Integration of Rapid Prototyping & CAD:** Definition, evolution, CAD for RPT. Product design and rapid product development, Rapid Prototyping Data Formats, Creation of STL or SLA file from a 3D solid model. Introduction of a RP Software.	10
	TOTAL	**56**

Reference Books:

1. Sham Tickoo, *"PTC Creo Parametric 3.0 for Designers*", CAD/CIM Technologies (2015).
2. Gaurav Verma, "*Creo Parametric 3.0 Black Book"*, CreatSpace Independent Publishing Platform (2014).
3. N D Bhatt, *"Engineering Drawing",* Fifty Third Edition, Charotar Publishing House Pvt. Ltd. (2014).
4. Serope Kalpakjian, *"Manufacturing Engineering and Technology"*, Seventh Edition, Pearson (2013).
5. C. K. Chua,*"Rapid Prototying: Principles and Applications"*, Third Edition, World Scientific Publishing Co Pvt. Ltd. (2008)
6. M. Adithan, *"Rapid Prototying*", First Edition, Atlantic Publishers & Distributors Pvt. Ltd. (2015)

Course Outcomes (COs):

At the end of this course students will be able to…..

1. Create the 2D & 3D parts/models by using feature-based CAD software.
2. Calculate geometric & mass properties of modeled component.
3. Perform assembly-modeling and analysis of the same.
4. Understand the concept of rapid-prototyping & create model using rapid-prototyping machine.
5. Integrate the rapid prototyping data formats to CAD software.