RAPID PROTOTYPING & TOOLING SYSTEM-EL 1
Semester III (Production Engineering) SUB CODE: MEMPR302-C
Teaching Scheme (Credits and Hours)

Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
					Hrs	Marks	Marks	Marks	Marks	
Hrs	Hrs	Hrs	Hrs							
3	0	2	5	4	3	70	30	20	30	150

LEARNING OBJECTIVES:
The objective of this course is
    To learn various concepts related to rapid prototyping.

LESSON PLANNING

SR.NO	CHAPTER NO	DATE/WEEK	%WEIGTAGE
1	1,2,3	1st 2nd 3rd	20
2	4	4th 5th 6th	20
3	5,6	7th 8th 9th	20
4	7	10th 11th 12th	20
5	8	13th 14th 15th	20

Total hours (Theory): 45, Total hours (Practical):30, Total hours: 75

DETAILED SYLLABUS

Chap. No.	Topic
1	**Product Development Cycle:**
2	**Influence of Innovations on Product Development:** Impact on economy, export competitiveness, design as a strategy to win international market and Innovation process
3	**Rapid Product Development:** An Overview virtual prototyping and testing technology, Physical Prototyping and Rapid Manufacturing technologies and Synergic Integration Technologies
4	**Virtual Prototyping and Testing:** Geometric modeling: Types of Geometric models and Solid Models Reverse engineering: Acquiring Point Data, Constructing 3D model and Applications. Virtual augmented reality: Requirement of devices and technologies and applications Computer Aided Engineering: Application of FEA in Engineering, the concept of discritization, steps in FEA and automatic mesh generation. Design for X: Design for manufacture and design for assembly and other Facets of DFX
5	**Physical Prototyping and Rapid Manufacturing Computer Numerical Control:** Comparison between NC and conventional machines, features of CNC Machine Tool and programming
6	**Computer Aided Process Planning:** Methodology, evaluation, types, CAD/CAM Integration and CAPP Features **Rapid Prototyping:** dawn of slice age, benefits, applications, important issues and popular RP process **Rapid Tooling:** Indirect rapid tooling process

7	**Synergic Integration** **Concurrent Engineering:** Benefits, methodology, integration and transactions **Product Data Management:** Product data classifications, Process Management and benefits **Computer Integrated Manufacturing:** Components, barriers to CIM. Implementation, case study, development and research
8	**Rapid Prototyping and Rapid Tooling:** Methods, Stereo lithography, Fused-deposition modeling, Selective laser sintering, Laminated-object manufacturing, Ballistic particle manufacturing, Solid base curing and Direct manufacturing and rapid tooling

LIST OF PRACTICALS

Sr. No.	Practical Content
1	ANALYSIS OF PRODUCT DEVELOPMENT CYCLE IN TERMS OF SUSTAINABILTY IN THE MARKET
2	PART CODING USING COMPUTER AIDED PROCESS PLANNING FOR A GIVEN PRODUCT
3	ANALYSIS OF A PRODUCT FOR DATA AQUIRING BASED ON REVERSE ENGINEERING
4	ANALYSIS OF A PRODUCT FOR 3D MODELLING FOR REVERSE ENGINEERING
5	ANALYSIS OF A PRODUCT BASED ON DFM
6	ANALYSIS OF A PRODUCT BASED ON DFA
7	ANALYSIS OF A PRODUCT BASED ON CONCURRENT ENGINEERING
8	IMPLEMENTATION OF COMPUTER INTEGRATED MANUFACTURING FOR INDUSTRIAL AUTOMATION
9	PROGRAMMING OF CNC MACHINES USING G & M CODES
10	CASE STUDY ON CAD/CAM INTERFACING

INSTRUCTIONAL METHOD AND PEDAGOGY (Continuous Internal Assessment (CIA) Scheme)
- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all units while conducting teaching & examination.
- Attendance is compulsory in lectures and Tutorial.
- Viva Voce will be conducted at the end of the semester of 30 Marks.
- One internal exam of 30 marks is conducted as a part of Mid semester evaluation.

 STUDENTS LEARNING OUTCOMES:
At the end of the course
The students will gain an experience in the implementation of RPT for newer product development.
References Books:
1. Rapid Product Development- Synergic integration of time-compression technologies
K. P. Karunakaran, V. P. Bapat, Sreenath Babu Akula P. D. Solanki Gaurav Gupta, V.R. Prasanth, Saket Anand, Arnab Sarkar and S. Venkatkrishnan
2. Manufacturing Processes for Engineering Materials -Serope Kalpakjion and Steven R. Schmid- Pearson Education.