GUJARAT TECHNOLOGICAL UNIVERSITY

Mechanical (CAD/CAM)

M.E. Semester: IV

Subject Name: **Rapid Prototyping and Tooling**

Sr. No.	Course Content
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-As Overview:** virtual prototyping and testing technology, Physical Prototyping and Rapid Manufacturing technologies and Synergic Integration Technologies
4.	**Virtual Protyping 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 facetsof DFX
5.	**Physical Prototyping and Rapid Manufacturing:** **Computer Numerical Control:** Comparison between NC and conventional machines, features of CNC Machine Tool and programming **Robotics:** classification, programming, sensors and applications **Computer Aided Process Plannig:**

	Methodology, evaluation, types,CAD/CAM Integration and CAPP Features **Rapid Prototyping:** dawn of slice age, benefits, applications, importantissues and popular RP process **Rapid Tooling:** Indirect rapid tooling process
6.	**Synergic Integration Concurrent Engineering:** Benefits, methodology, integration and transactions **Product Data Management:** Product data classifications, ProcessManagement and benefits **Computer Integrated Manufacturing:** Components, barriers to CIM. Implementation, case study, development and research
7.	**Rapid Prototyping and Rapid Tooling:** Methods, Stereolithography, Fused-deposition modeling, Selective laser sintering, Laminated-object manufacturing, Ballistic particle Manufacturing, Solid-base curing and Direct manufacturing and rapid tooling

List of Experiments:

1. Introduction to Rapid prototyping and Tooling.
2. Study of Layered Manufacturing (LM).
3. Study of Laminated Object Manufacturing (LOM).
4. Study of Selective Laser Sintering (SLS).
5. Study of Three Dimensional Printing (3DP).
6. Study of Fused Deposition Moulding (FDM).
7. Study of Shape Deposition Manufacturing (SDM).
8. Study of Stereolethography (SLA).
9. Study of Solid Ground Curing (SGC).
10. Study of Metal Rapid Prototyping.

Reference Book:

(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.