

5th Semester	RME5D005	Rapid Manufacturing Process	L-T-P 3-0-0	3 Credits
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MODULE – I**(14 HOURS)**

Product Development: Classification of manufacturing processes, Different manufacturing systems, Introduction to rapid Prototyping (RP), Need of RP in context to batch production, FMS and CIM and its application. Product prototyping – solid modeling and prototype representation, reverse engineering, prototyping and manufacturing using CNC machining. Basic principles of RP steps in RP, Process chain in RP in integrated CAD-CAM environment, Advantages of RP

MODULE – II**(14 HOURS)**

Rapid Manufacturing Process Optimization: factors influencing accuracy. Data preparation errors, Part building errors, Error in finishing, influence of build orientation. Classification of different RP techniques based on raw materials, layering technique (2D or 3D) and energy sources. Process technology and comparative study of stereo lithography (SL) with photopolymerisation, SL with liquid thermal polymerization, solid foil polymerization, selective laser sintering, selective powder binding, Ballistic particle manufacturing – both 2D and 3D, Fused deposition modeling, Shape melting

MODULE – III**(16 HOURS)**

Laminated object manufacturing solid ground curing, Repetitive masking and deposition. Beam interference solidification, Holographic interference solidification special topic on RP using metallic alloys, Programming in RP modelling, Slicing, Internal Hatching, Surface skin films, support structure. Software for RP: STL files, Overview of Solid view, magics, imics, magic communicator, etc. Internet based software, Collaboration tools.

Books :

- [1] Rapid Prototyping and Engineering Applications, Frank W. Liou, CRC Press
- [2] Introduction to Rapid Prototyping, Amitav Ghosh, North West Publication, New Delhi.
- [3] Rapid Manufacturing, Flham D.T & Dinjoy S.S Verlog London 2001. \
- [4] Rapid Prototyping Materials, Gurumurthi, IISc Bangalore.
- [5] Rapid Automated, Lament wood. Indus press New York
- [6] Stereo Lithography and other RP & M Technologies, Paul F. Jacobs: SME, NY 1996

NPTEL MOOCs:

Course Name: Rapid Manufacturing
 Course Link: <https://nptel.ac.in/courses/112/102/112102284/>
 Course Instructor: Prof. J Ramkumar, Prof Amardeep Singh, IIT Kanpur