RAPID PROTOTYPING

Subject Code: 13ME2102 **L P C**
4 0 3

Course Outcomes :

At the end of the course, the student will be able to

CO1: Describe product development, conceptual design and classify rapid prototyping systems; explain stereo lithography process and applications

CO2: Explain direct metal laser sintering, LOM and fusion deposition modeling processes

CO3: Demonstrate solid ground curing principle and process

CO4: Discuss LENS, BPM processes; point out the application of RP system in medical field define virtual prototyping and identify simulation components

UNIT – I

Introduction: Need for time compression in product development, Product development – conceptual design – development – detail design – prototype – tooling. Classification of RP systems, Stereo lithography systems – Principle – process parameters – process details – machine details, Applications.

UNIT – II

Direct Metal Laser Sintering (DMLS) system – Principle – process parameters – process details – machine details, Applications. Fusion Deposition Modeling – Principle – process parameters – process details – machine details, Applications. Laminated Object Manufacturing – Principle – process parameters – process details – machine details, Applications.

UNIT -III

Solid Ground Curing – Principle – process parameters – process details – machine details, Applications. 3-Dimensional printers – Principle – process parameters – process details – machine details, Applications, and other concept modelers like thermo jet printers, Sander‘s model maker, JP system 5, Object Quadra system

UNIT – IV

Laser Engineering Net Shaping (LENS), Ballistic Particle Manufacturing (BPM) – Principle. Introduction to rapid tooling – direct and indirect method, software for RP – STL files, Magics, Mimics. Application of Rapid prototyping in Medical field.

UNIT- V

Introduction to Virtual prototyping- End to end prototyping-simulation-components of virtual prototyping- effects- economics of virtual prototyping.

TEXT BOOKS:

1. Chua C.K., Leong K.F. and Lim C.S., "*Rapid Prototyping: Principles and Applications*", 3e, World scientific publications, 2010.
2. Paul F Jacobs, "*Rapid Prototyping and manufacturing–Fundamentals of streolithography*", Society of Manufacturing Engineering Dearborn, USA 1992

REFERENCES:

1. Pham,D.T. and Dimov.S.S., "*Rapid manufacturing*" , Springer, London, 2001.
2. Joe Cecil, "*Virtual Enginering*" , Momentum Press, 2010.