Gautam Buddha University, Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
M. Tech. in Manufacturing Engg.	Rapid Prototyping and Manufacturing	MEM 605	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
I	3	3-0-0	3 Hours

Unit – I

Introduction: Need for the compression in product development; History of RP systems; Survey of applications; Growth of RP industry; Classification of RP systems; Fused deposition modeling: Principle; Process parameters; Path generation; Applications. **(07 Hours)**

Unit – II

Selective Laser Sintering: Types of machines; Principles of operation; Process parameters; Data preparation for SLS; Applications. Tereolithography systems: Principle; Process parameters; Process details; Data preparation; Data files and machine details; Applications. **(07 Hours)**

Unit – III

Laminated Object Manufacturing: Principle of operation; LOM materials; Process details; Applications. Solid ground curing: Principle of operation; Machine details; Applications. Laser engineered net shaping (LENS): Net shaping development at Sandia National Lab. Concept modelers: Principle; Thermo jet printer; Sander's model market; 3-D printer; Genisys Xs printer; JP system 5; Object quadra system. **(08 Hours)**

Unit – IV

Rapid Tooling: Indirect rapid tooling - silicone rubber tooling; Aluminum filled epoxy tooling; Spray metal tooling; Cast Kirksite; 3D Keltool; etc.; Direct rapid tooling - direct AIM; Quick cast process; Copper polyamide; Rapid tool; DMILS; Prometal; Sand casting tooling; Laminate tooling; Soft tooling Vs hard tooling.

(08 Hours)

Unit – V

Vehicle Ride Characteristics: Human software for RP: STL files; Overview of solid view; Magics; Mimics; Magics communicator; etc.; Internet based softwares; Collaboration tools. Rapid manufacturing process optimization: Factors influencing accuracy; Data preparation errors; Part building errors; Errors in finishing; Influence of part build orientation.

(09 Hours)

Unit – VI

Allied Processes: Vacuum casting; Surface digitizing; Surface generation from point cloud; Surface modification; Data transfer to solid models. **(06 Hours)**

Recommended Books:

1. Rapid prototyping: Principles and Applications; C. K. Chua;K. F. Leong and C. S. Lim; World Scientific publications; Third Edition; 2010.
2. Rapid Manufacturing; D.T. Pham and S.S. Dimov; Springer; 2001
3. Wholers Report 2000 – Terry Wohlers; Wohlers Associates; 2000.
4. Rapid Prototyping & Manufacturing; Paul F.Jacobs; ASME Press; 1996.
5. Rapid Prototyping of Digital Systems; James O. Hamblen; Springer.
6. Rapid Prototyping of Digital Systems: A Tutorial Approach; Hamblen James O.; Kluwer Aca.
7. Rapid Prototyping: Principles and Applications; Kai Chua Chee; World Science.
8. Rapid System Prototyping With Fpgas: Accelerating The Design Process; R C. Cofer Newnes.