

2012-13

**VVP SIDDHARTHA INSTITUTE OF TECHNOLOGY
(COURSE STRUCTURE FOR AUTONOMOUS SCHEME)**

I Year M. Tech. (Machine Design) M.E.

**T P C
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MEMD1T5C - RAPID PROTOTYPING

(Elective I)

Unit – I

Introduction: Prototype fundamentals – Definition, types of prototype, roles of prototype; historical development, development of RP in the primary areas – input, method, materials and applications; advantages of rapid prototyping, categorization of rapid prototyping systems – liquid based, solid based, powder based.

Unit – II

Fundamentals Process Chain: Fundamental of automated processes, process chain – 3D modeling, data conversion and transmission, checking and preparing, building, post processing.

Unit – III

Liquid-Based Rapid Prototyping: 3D systems Stereolithography Apparatus (SLA)- Company, products, process, principle – photo polymers, photo polymerization, layering technology, laser and laser scanning; strength and weaknesses of the SLA, Applications. Example: INCS Prototyping and Manufacturing Services Make Japan a Model for the World Market.

Unit – IV

Cubital's Solid ground curing (SGC)-company, products, Advantages and disadvantages, Process, Principle, Applications. Rapid Freeze Prototyping, Micro Fabrication,

Unit - V

Solid-Based Rapid Prototyping: Stratays's Fusion Deposition Modeling (FDM)- Company, Products: FDM MC Machines, Dimension Series, Process, Principle, Strengths and Weaknesses, Applications, Example- Toyota Uses FDM for Design and Testing. Cubic Technologies Laminated Object Manufacturing - Company, Products, Process: Pre-Processing, Building, Post-Processing, System Structure, Materials; Principle, Strengths and Weaknesses, Applications. Example: National Aeronautical and Space Administration (NASA) and Boeing Rocketdyne Use LOM to Create Hot Gas Manifold for Space Shuttle Main Engine.

Unit - VI

3D Systems Multi-jet Modeling System (MJM)-company, products, process, principles, Advantages and disadvantages, Applications. The shape deposition Manufacturing Process, Introduction, process, Advantages and disadvantages

Unit - VII

Powder-Based Rapid Prototyping: 3D Systems Selective Laser Sintering (SLS)- Company, Products, Process - The SLS Process, Materials, Principle - Sinter Bonding, Strengths and Weaknesses, Applications. Example: Los-Angeles-Based TEST A Architecture/Design Utilizes SLS for Large-Scale Models of Carbon Tower Prototype 20

Unit – VIII

OPTOMECH's Laser engineered NET Shaping (LENS)-Company, products, Principle, Advantages and disadvantages, Applications and examples.

Text books

1. Rapid Prototyping Principles and Applications, 3rd Edition: Chee Kai Chua, Kah Fai Leong, World Scientific Publishing Co. Pte. Ltd.
2. Rapid Manufacturing An Industrial Revolution for the Digital Age, N. Hopkinson, R.J.M. Hague and P.M. Dickens Loughborough University, UK

