

| COURSE CODE | COURSE TITLE | L | T | P | C |
|--------------------|--------------------------|----------|----------|----------|----------|
| 1154AE115 | RAPID PROTOTYPING | 2 | 0 | 0 | 2 |

COURSE CATEGORY:

University elective

PREAMBLE:

Creating an understanding of RP history, its development and applications. To expose the students to different types of Rapid prototyping processes, materials used in RP systems and reverse engineering.

PREREQUISITE:

- Nil

LINKS TO OTHER COURSES:

- Nil

COURSE EDUCATIONAL OBJECTIVES:

To develop the basic knowledge of the students in manufacturing technology by the means of rapid prototyping and also provide knowledge on different types of Rapid Prototyping systems and its applications in various fields

COURSE OUTCOMES:

Upon the successful completion of the course, students will be able to

| CO Nos. | Course Outcomes | Level of learning domain (Based on revised Bloom's) |
|----------------|---|--|
| CO1 | Describe the fundamentals for rapid prototyping process | K2 |
| ➤ CO2 | Classify the rapid prototyping process | K2 |
| ➤ CO3 | Prepare the elements for powder based rapid prototyping | K2 |
| ➤ CO4 | Choose materials for each prototyping process | K2 |
| ➤ CO5 | Use slicing software and slice CAD models | K2 |

COURSE CONTENTS:

UNIT I: INTRODUCTION

L 6

History – Development of RP Systems-Reverse Engineering, Rapid Tooling, Rapid Manufacturing- Principle – Fundamental – File format.

UNIT II: LIQUID BASED AND SOLID BASED RAPID PROTOTYPING SYSTEM L 6

Classification – Liquid based system – Stereolithography Apparatus (SLA), details of SL process, products, Advantages, Limitations, Applications and Uses. Solid based system – Fused Deposition Modelling, principle, process, products, advantages, applications and uses.

UNIT III: POWDER BASED RAPID PROTOTYPING SYSTEMS

L 6

Selective Laser Sintering – principles of SLS process - Laser sintering materials, products, advantages, limitations, applications and uses.

UNIT IV: MATERIALS FOR RAPID PROTOTYPING SYSTEMS

L 6

Nature of material – type of material – polymers, metals, ceramics and composites- liquid based materials, solid based materials, powder based materials.

UNIT V: INTRODUCTION TO SLICING SOFTWARE AND NEW TECHNOLOGIES

Introduction to slicing software, measuring device-CAD model creation.

TEXT BOOKS

- Rafiq I. Noorani, Rapid Prototyping, “Principles and Applications”, Wiley & Sons, 2006.
- Chua C.K, Leong K.F and Lim C.S, “Rapid Prototyping: Principles and Applications”, Second Edition, World Scientific, 2003.

REFERENCES:

- N.Hopkinson, R.J.M, Hauge, P M, Dickens, “Rapid Manufacturing – An Industrial revolution for the digital age”, Wiley, 2006
- Ian Gibson, “Advanced Manufacturing Technology for Medical applications: Reverse Engineering, Software conversion and Rapid Prototyping”, Wiley, 2006
- Paul F.Jacobs, “Rapid Prototyping and Manufacturing : Fundamentals of Stereolithography”, McGraw Hill 1993.
- Pham. D.T., and Dimov. S.S., “Rapid Manufacturing”, Springer Verlag 2001.