

3D PRINTING**PROFESSIONAL ELECTIVE - VI**

VIII Semester:								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
A5AE58	PCC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
COURSE OBJECTIVES								
The purpose of this subject is to provide the students with the theoretical background and engineering applications.								
<ol style="list-style-type: none"> To know the principle methods, areas of usage, possibilities and limitations as well as environmental effects of the Additive Manufacturing technologies To be familiar with the characteristics of major materials used in Additive Manufacturing. 								
UNIT-I	INTRODUCTION							
Overview – Need-Classification -Additive Manufacturing Technology in product development-Materials for Additive Manufacturing Technology – Tooling – Applications.								
UNIT-II	CAD AND REVERSE ENGINEERING							
Basic Concept – Digitization techniques – Model Reconstruction – Data Processing for Additive Manufacturing Technology: CAD model preparation – Part Orientation and support generation – Model slicing –Tool path generation – Software for Additive Manufacturing Technology: MIMICS, MAGICS.								
UNIT-III	LIQUID BASED AND SOLID BASED ADDITIVE MANUFACTURING SYSTEMS							
Classification – Liquid based system – Stereolithography Apparatus (SLA)- Principle, process, advantages and applications – Solid based system –Fused Deposition Modelling – Principle, process, advantages and applications, Laminated Object Manufacturing								
UNIT-IV	POWDER BASED ADDITIVE MANUFACTURING SYSTEMS							
Selective Laser Sintering – Principles of SLS process – Process, advantages and applications - Three Dimensional Printing – Principle, process, advantages and applications- Laser Engineered Net Shaping (LENS), Electron Beam Melting.								
UNIT-V	TOOLING							
Classification of Soft tooling, Production tooling, Bridge tooling, direct and indirect tooling, Fabrication processes, Applications, Case studies on automotive, aerospace and electronics industries								

Text Books:

1. Chua C.K., Leong K.F., and Lim C.S., "Rapid prototyping: Principles and applications", Third Edition, World Scientific Publishers, 2010.
2. Gebhardt A., "Rapid prototyping", Hanser Gardener Publications, 2003.

Reference Books:

1. Liou L.W. and Liou F.W., "Rapid Prototyping and Engineering applications : A tool box for prototype development", CRC Press, 2007.
2. Kamrani A.K. and Nasr E.A., "Rapid Prototyping: Theory and practice", Springer, 2006.
3. Hilton P.D. and Jacobs P.F., "Rapid Tooling: Technologies and Industrial Applications", CRC press, 2000.

COURSE OUTCOMES:

At the end of the course the students are able to:

1. Analyze the characteristics of major materials used in Additive Manufacturing.
2. Compare various digitization techniques
3. Compare major methods of additive manufacturing
4. Discuss the effects of the Additive Manufacturing technologies
5. Compare major tools used in additive manufacturing techniques.