DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E VI Semester (2018-19)
ADDITIVE MANUFACTURING (3D Printing) (Open Elective-VI)

Instruction: 2 Hours / week	SEE Marks:70	Course Code : OE420ME
Credits: 2	CIE Marks:30	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The objectives of this course are to: 1. Understand the fundamentals of various Additive Manufacturing Technologies for application to various industrial needs. 2. Able to convert part file into STL format. 3. Able to understand the method of manufacturing of liquid based, powder based and solid based techniques. 4. Understand the manufacturing procedure of a prototype using FDM technique.	After completion of the course, the student will be able to 1. Understand the fundamentals of Additive Manufacturing Technologies for engineering applications. 2. Understand the methodology to manufacture the products using SLA and SGC technologies and study their applications , advantages and case studies 3. Understand the methodology to manufacture the products using LOM and FDM technologies and study their applications , advantages and case studies 4. Understand the methodology to manufacture the products using SLS and 3D Printing technologies and study their applications , advantages and case studies

Unit-I
Introduction, Prototyping fundamentals, Historical development, Advantages of AMT, Commonly used terms, process chain, 3D modelling, Data Conversion, and transmission, Checking and preparing, Building, Post processing, RP data formats, Classification of AMT process, Applications to various fields

Unit-II
Liquid based systems: Stereo lithography apparatus (SLA): Models and specifications, process,working principle, photopolymers, photo polymerization, layering technology, laser and laser scanning, applications,advantages and disadvantages, case studies. Solid ground curing (SGC): Models and specifications, process, working ,principle, applications, advantages and disadvantages, case studies.

UNIT III
Solid based systems: Laminated object manufacturing(LOM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies.Fused Deposition Modeling (FDM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies, practical demonstration

Unit-IV
Powder Based Systems: Selective laser sintering (SLS): Models and specifications, process, working principle, applications, advantages and disadvantages, case studies. Three dimensional printing (3DP): Models and specification, process, working principle, applications, advantages and disadvantages, case studies.

Learning Resources:
1. Chua C.K., Leong K.F. and LIM C.S Rapid prototyping: Principles an Applications, World Scientific publications, 3rdEd., 2010
2. D.T. Pham and S.S. Dimov, "Rapid Manufacturing", Springer, 2001
3. Terry Wohlers, " Wholers Report 2000", Wohlers Associates, 2000
4. Paul F. Jacobs, " Rapid Prototyping and Manufacturing"–, ASME Press, 1996
5. Ian Gibson, Davin Rosen, Brent Stucker "Additive Manufacturing Technologies, Springer, 2nd Ed, 2014.