

DEPARTMENT OF PRODUCTION ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	M.Tech. MANUFACTURING TECHNOLOGY		
Course Title	RAPID MANUFACTURING		
Course Code	PR632	No. of Credits	3
Course Code of Pre-requisite subject(s)	-		
Session	July 2018	Section (if, applicable)	-
Name of Faculty	Dr. P. Senthil	Department	Production Engineering
Email	senthil@nitt.edu	Telephone No.	3513
Name of Course Coordinator(s)	-		
E-mail	-	Telephone No.	-
Course Type	<input type="checkbox"/> Core course <input checked="" type="checkbox"/> Elective course		
Syllabus (approved in BoS)			
<p>Introduction- Need for the compression in product development, History of RP systems, Survey of applications, Growth of RP industry, Classification of RP systems.</p> <p>Principle, process parameters, process details and applications of various RP processes - Stereo lithography systems, Laser Sintering, Fused Deposition Modeling, Laminated Object Manufacturing.</p> <p>Solid Ground Curing, Laser Engineered Net Shaping, 3D Printing, Laser Melting, Cladding.</p> <p>Rapid Tooling: Indirect rapid tooling Direct rapid tooling , soft tooling Vs hard tooling, Rapid Manufacturing Process Optimization- Factors influencing accuracy, data preparation errors, part building errors, errors in finishing, influence of part build orientation.</p> <p>Software for RP: STL files, overview of solid view, magics, mimics, magics communicator, etc., internet based softwares, collaboration tools.</p> <p>RP Technology selection, Decision Making, Life Cycle Assessment of RP processes, Sustainability issues.</p>			
COURSE OBJECTIVES			
<ul style="list-style-type: none"> • To understand the importance of time compression technologies • To do selection of appropriate technology for the application 			

<ul style="list-style-type: none"> To give exposure to RP software packages 	
COURSE OUTCOMES (CO)	
Course Outcomes	Aligned Programme Outcomes (PO)
1. Understand the importance of time compression technologies	PO 2, PO 4 and PO 6
2. Selection of appropriate technology for the application	
3. Exposure to RP software packages	

COURSE PLAN – PART II			
COURSE OVERVIEW			
<p>Rapid manufacturing is a group of techniques used to quickly fabricate prototypes, functional parts and end use components using three-dimensional computer aided design (CAD) data. Fabrication of the parts or assembly is usually done using 3D printing or "additive manufacturing" technology. This can also be used for making tools which will reduce overall time for manufacturing.</p> <p>This course enables students to understand various RP technologies and select suitable technology for different applications and to do life cycle assessment of RP processes</p>			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1	Introduction, Need for the compression in product development, History of RP systems	Chalk and Talk / PPT
2	Week 2	Survey of applications, Growth of RP industry, Classification of RP systems.	Chalk and Talk / PPT
3	Week 3	Principle, process parameters, process details and applications of Stereo lithography systems, Laser Sintering.	Chalk and Talk / PPT
4	Week 4	Fused Deposition Modeling, Laminated Object Manufacturing.	Chalk and Talk / PPT
5	Week 5	Solid Ground Curing, Laser Engineered Net Shaping	Chalk and Talk / PPT
6	Week 6	3D Printing, Laser Melting, Cladding	Chalk and Talk / PPT
Descriptive Assessment - 1			
7	Week 7	Rapid Tooling: Indirect rapid tooling	Chalk and Talk / PPT
8	Week 8	Direct rapid tooling , soft tooling Vs hard tooling	Chalk and Talk / PPT
9	Week 9	Rapid Manufacturing Process Optimization, Factors influencing accuracy, data preparation errors, part building errors, errors in finishing, influence of part build orientation.	Chalk and Talk / PPT

10	Week 10	Software for RP: STL files, overview of solid view, magics, mimics, magics communicator, etc., internet based softwares, collaboration tools.	Chalk and Talk / PPT	
Descriptive Assessment -2				
11	Week 11	RP Technology selection, Decision Making,	Chalk and Talk / PPT	
In Class Assessment				
12	Week 12	Life Cycle Assessment of RP processes, Sustainability issues	Chalk and Talk / PPT	
Assignment				
Compensation Assessment				
Final Assessment				
COURSE ASSESSMENT METHODS (shall range from 4 to 6)				
S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Descriptive Assessment – 1	End of 6 Weeks	1 Hr	20%
2	Descriptive Assessment – 2	End of 10 Weeks	1 Hr	20%
3	In class Assessment	End of 11 Weeks		10%
4	Assignment	End of 12 Weeks		10%
CPA	Compensation Assessment*	End of 12 Weeks	1 Hr	20%
5	Final Assessment *	End of semester	2 Hrs	40%
*mandatory; refer to guidelines on page 4				
COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)				
Course Exit survey will be collected at the end of the semester before the start of semester examination through online. Students can log in their MIS account to give the feedback. Mid-semester anonymous feedback shall be collected to improve the teaching-learning process. Apart from this, students can share feedback during class committee meetings.				
COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)				
<u>MODE OF CORRESPONDENCE (email/ phone etc)</u>				
The Course teacher is available for consultation in the department after class hours. Queries may also be emailed to the Course Coordinator directly at senthil@nitt.edu				
<u>COMPENSATION ASSESSMENT POLICY</u>				
If any student is not able to attend any of the descriptive assessments (1or 2) due to genuine reason, student is permitted to attend the compensation assessment with 20 % weightage.				

Minimum 40% mark is required for passing the course. Reassessment shall be conducted for failed / absented (in final assessment) in the beginning of next session. Failed (in final assessment) candidates shall get a maximum of E grade in the reassessment.



ATTENDANCE POLICY

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

FOR APPROVAL

Course Faculty  CC-Chairperson  HOD 