

**DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

<b>COURSE PLAN – PART I</b>			
<b>Name of the programme and specialization</b>	<b>M.Tech.</b>		
<b>Course Title</b>	<b>Additive Manufacturing</b>		
<b>Course Code</b>	<b>MT630</b>	<b>No. of Credits</b>	<b>3</b>
<b>Course Code of Pre-requisite subject(s)</b>	---		
<b>Session</b>	<b>July – Dec 2021</b>	<b>Section (if, applicable)</b>	<b><u>SPARC project course</u></b>
<b>Name of Faculty</b>	<b>Dr K.G.Prashanth</b>	<b>Department</b>	<b>Tallinn Univ, Estonia</b>
<b>Email</b>	<b>kgprashanth@gmail.com</b>	<b>Telephone No.</b>	<b>0431-2503466</b>
<b>Name of Course coordinator(s) (if, applicable)</b>	<b>Dr K Sivaprasad</b>		
<b>E-mail</b>	<b>ksp@nitt.edu</b>	<b>Telephone No.</b>	<b>0431-2503466</b>
<b>Course Type</b>	<input type="checkbox"/> <b>Core course</b>	<input checked="" type="checkbox"/> <b>Elective course</b>	
<b>Syllabus (approved in BoS)</b>			
<p>Overview –History –Need-Classification -Additive Manufacturing Technology in product development- Materials for Additive Manufacturing Technology –Tooling –Applications.</p> <p>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 –Softwares for Additive Manufacturing Technology: MIMICS, MAGICS.</p> <p>Classification –Liquid based system –Stereolithography Apparatus (SLA) -Principle, process, advantages and applications –Solid based system –Fused Deposition Modeling –Principle, process, advantages and applications, Laminated Object Manufacturing, Wire Arc Additive Manufacturing 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.</p> <p>Customized implants and prosthesis: Design and production. Bio-Additive Manufacturing-Computer Aided Tissue Engineering (CATE) –Case studies</p>			
<b>COURSE OBJECTIVES</b>			
<p>To know the principle methods, areas of usage, possibilities and limitations as well as environmental effects of the Additive Manufacturing technologies</p> <p>To be familiar with the characteristics of the different materials those are used in Additive Manufacturing.</p>			
<b>COURSE OUTCOMES (CO)</b>			
<b>Course Outcomes</b>	<b>Aligned Programme Outcomes (PO)</b>		
1. Upon completion of this course, the students can able to compare different method and discuss the effects of the Additive Manufacturing technologies and analyse the characteristics of the different materials in Additive Manufacturing.	[1,2,4]		
<b>COURSE PLAN – PART II</b>			
<b>COURSE OVERVIEW</b>			

It's a 3 credit elective course in which some tutorial problems are combined so as to understand the concept with more examples.

**COURSE TEACHING AND LEARNING ACTIVITIES**

<b>S.No.</b>	<b>Week/Contact Hours</b>	<b>Topic</b>	<b>Mode of Delivery</b>
1	1 <sup>st</sup> week	Overview –History –Need-Classification -Additive Manufacturing	Chalk & talk
2	2 <sup>nd</sup> week	Technology in product development	Chalk & talk
3	3 <sup>rd</sup> week	Materials for Additive Manufacturing Technology –Tooling –Applications	Chalk & talk
4	4 <sup>th</sup> week	Manufacturing Technology: CAD model preparation	Chalk & talk
5	5 <sup>th</sup> week	Part Orientation and support generation –Model Slicing –Tool path Generation	PPT
6	6 <sup>th</sup> week	Softwares for Additive Manufacturing Technology: MIMICS, MAGICS	PPT
7	7 <sup>th</sup> week	Classification –Liquid based system – Stereolithography Apparatus (SLA) - Principle, process, advantages and applications	PPT
8	8 <sup>th</sup> week	Solid based system –Fused Deposition Modeling –Principle, process, advantages and applications	PPT
9	9 <sup>th</sup> week	Laminated Object Manufacturing, Wire Arc Additive Manufacturing	PPT
10	10 <sup>th</sup> week	Selective Laser Sintering –Principles of SLS process –Process, advantages and applications,	PPT
11	11 <sup>th</sup> week	Three Dimensional Printing – Principle, process, advantages and applications	PPT
12	12 <sup>th</sup> week	Laser Engineered Net Shaping (LENS), Electron Beam Melting	PPT

13	13 <sup>th</sup> week	Customized implants and prosthesis: Design and production	PPT
14	14 <sup>th</sup> week	Bio-Additive Manufacturing-Computer Aided Tissue Engineering (CATE) – Case studies	PPT

**COURSE ASSESSMENT METHODS (shall range from 4 to 6)**

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assignment 1	5 <sup>th</sup> -8 <sup>th</sup> weeks	3 weeks	20
2	Written test	11 <sup>th</sup> week	1h	25
3	Assignment 2	13 <sup>th</sup> week	1h	25
	Compensation Assessment	14 <sup>th</sup> week	1h	25
4	Final Assessment	15 <sup>th</sup> week	2h	30

**\*mandatory; refer to guidelines on page 4**

**COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)**

Standard feedback as per institute norms.

**COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)**

**MODE OF CORRESPONDENCE (email/ phone etc)**

Email [kqprashanth@gmail.com](mailto:kqprashanth@gmail.com); [ksp@nitt.edu](mailto:ksp@nitt.edu)

**COMPENSATION ASSESSMENT POLICY**

**One compensation written test will be conducted for 20 marks only for written tests.**

**ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)**

- **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.

The above policy against academic dishonesty shall be applicable for all the programmes.

**ADDITIONAL INFORMATION**

**Only one compensation test would be conducted against missing one of the assessments from SI.No.1 to 4 only.**

**FOR APPROVAL**

**Course Faculty** \_\_\_\_\_ **CC-Chairperson** \_\_\_\_\_ **HOD** \_\_\_\_\_  
Chairman, Welding Engineering

**Guidelines:**

- a) The number of assessments for a course shall range from 4 to 6.
- b) **Every course shall have a final assessment on the entire syllabus with at least 30% weightage.**
- c) **One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.**
- d) **The passing minimum shall be as per the regulations.**

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	

35% or class average/2 whichever is greater.	Peak/3 or class average/2 whichever is lower	40%
---	---	-----

- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.**
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.**
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.