DEPARTMENT OF PRODUCTION ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Course Title	Process Modelling, Design and Rapid Manufacturing Lab		
Course Code	PR610	No. of Credits	2
Course Code of Pre-requisite subject(s)	PR666		
Session	Jan. 2018	Section (if, applicable)	
Name of Faculty	Dr V Senthilkumar & Dr S Vinodh	Department	Production Engg
Email	vskumar@nitt.edu, vinodh@nitt.edu	Telephone No.	04312503519, 0431-2503520
Name of Course Coordinator(s) (if, applicable)			
E-mail		Telephone No.	
Course Type	☒ Lab course	☐ Elective course	

COURSE OBJECTIVES

1. This lab course aims at enabling the students to perform modelling and simulation of manufacturing processes
2. This lab course provides insights to students to execute product development phases and develop environmentally friendlier products

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
1. Knowledge to perform modelling and simulation of manufacturing processes	1,2,3,5,9
2. Competence to execute product development phases	1,2,3,5,9
3. Developing environmentally friendlier products	1,2,3,5,9

COURSE PLAN – PART II

COURSE OVERVIEW

This lab course deals with modelling and simulation of manufacturing processes using FEA, execution of various product development phases, prototype development using 3D Printer and analysis of tolerances.

1. Rapid Manufacturing Lab
2. Process Modelling, Design Lab

COURSE TEACHING AND LEARNING ACTIVITIES

Sl. No.	Week/ Contact Hours	Lab.	Topic	Mode of Delivery
1	Week 1	1	Basic Exercise on CAD	Exercise
		2	Study of arithmetic operations, matrix, mathematical expressions and plotting using MATLAB	
2	Week 2	1	Development of mechanical assembly using CAD	Exercise
		2	Simulation of metal cutting process using Forming package	
3	Week 3	1	Development of mechanical assembly using CAD	Exercise
		2	Simulation of Heat transfer on straight bar using FEA package	
4	Week 4	1	Stress analysis of cantilever beam using CAE	Exercise
		2	Simulation of orthogonal machining using FEA package	
5	Week 5	1	Thermal and Structural Analysis using CAE	Exercise
		2	Simulation of stress distribution on beam structure using FEA package	
6	Week 6	1	Product Development project– Concept design and Evaluation	Exercise
		2	Simulation of rolling using FEA package	
7	Week 7	1	Product Development project – Modelling and Analysis	Exercise
		2	Simulation of Forging using FEA package	
8	Week 8	1	Rapid Prototyping technology selection using AHP	Exercise
		2	Simulation of stress distribution on plate with hole using FEA package	
9	Week 9	1	Development of prototypes using 3D Printer	Exercise

		2	Stress analysis on 2-D truss element using FEA package	
10	Week 10	1	Sustainable Product Development - Life Cycle Assessment using GaBi LCA module	Exercise
		2	Stress analysis on 3-D bracket structure using FEA package	
11	Week 11	1	End Semester Laboratory Examination	
		2	End Semester Laboratory Examination	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	% Weightage
1	Internal Assessment	60
2	Final Assessment *	40

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

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

At the end of the semester students will give feedback online (MIS) as well feedback will be gathered during class committee meetings. Also, mid semester feedback will be obtained through questionnaire.

COURSE POLICY (preferred mode of correspondence with students, policy on attendance, compensation assessment, , academic honesty and plagiarism etc.)

MODE OF CORRESPONDENCE (email/ phone etc)

Students need to interact with faculty during lab hours and over email

ATTENDANCE

1. Attendance will be taken by the faculty in all the contact hours. All the students are expected to attend all the contact hours.

2. Every student should maintain minimum 75% attendance in these contact hours.

3. Any student, who fails to maintain 75% attendance need to score more than 50% marks in the assessments 1 to 4 (in total) for attending the final assessment. Students fail to satisfy this criteria will have to REDO the lab course

4. However students fail to maintain 50% attendance will have to REDO the lab course.

ASSESSMENT

1. Attending all classes are Mandatory for students

2. Relative grading will be used for awarding grades

ACADEMIC HONESTY & PLAGIARISM

1. All the students are expected to be genuine during the course work. Taking of information by means of copying simulations, assignments, looking or attempting to look at another student's paper or bringing and using material in any form (paper, mobile phone etc.,) for copying during any assessments is considered dishonest.

2. Tendering of information such as giving one's program, simulation work, assignments to another student to use or copy is also considered dishonest.

3. Preventing or hampering other students from pursuing their academic activities is also considered as academic dishonesty.

4. Any evidence of such academic dishonesty will result in the loss of marks on that assessment. Additionally, the names of those students so penalized will be reported to the class committee chairperson and HoD of the concerned department.

ADDITIONAL INFORMATION

FOR APPROVAL

1. 11/1/18
2. 11.1.2018

Course Faculty _____ **CC-Chairperson** _____ **HOD** _____