

**DEPARTMENT OF PRODUCTION ENGINEERING**

**NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

COURSE PLAN – PART I			
Course Title	FORMING TECHNOLOGY		
Course Code	PRPC17	No. of Credits	03
Course Code of Pre-requisite subject(s)			
Session	Jan.2018	Section (if, applicable)	A
Name of Faculty	Dr.V.SENTHILKUMAR	Department	Production Engg.
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Name of Course Coordinator(s) (if, applicable)			
E-mail		Telephone No.	
Course Type	<input checked="" type="checkbox"/> Core course	<input type="checkbox"/> Elective course	
<b>Syllabus (approved in BoS)</b>			
<p>Yield criteria for ductile metals - Flow theories – strain hardening - recrystallization</p> <p>Fundamentals of metal forming- Effect of temperatures, speed and metallurgical microstructure on forming processes - Mechanics of Metal Forming</p> <p>Forging Processes Forging Equipment, Forging defects - Types of Rolling mill - process variables – defects</p> <p>Types of extrusion - Process variables - Wire drawing - Drawing and Deep drawing – Sheet metal working</p> <p>High energy rate forming processes.</p>			
<b>COURSE OBJECTIVES</b>			
<ul style="list-style-type: none"> <li>To apply basics of metal forming processes to shape the products to their desired without any defects</li> <li>To develop an understanding of metal working technologies to produce works of art and sculpture using metals as the primary medium.</li> </ul>			

COURSE OUTCOMES (CO)													
Course Outcomes	Aligned Programme Outcomes (PO)												
	1	2	3	4	5	6	7	8	9	10	11	12	
1. Understand the properties of ductile materials	x	x		x				x				x	x
2. Understand the effect of temperature, speed on metal forming process.	x	x	x				x	x					x
3. Understand the principle procedure and applications of Bulk Metal Forming and Sheet Metal Forming.	x	x	x		x			x	x				x
4.													
5.													

COURSE PLAN – PART II			
COURSE OVERVIEW			
<p>This is an introductory course on sheet metal forming processes. The main focus is on mechanics and microstructure of metal forming, which involves the presses, the dies the sheet steel material and parameters used to fabricate a forged part. Basics of drawing, extrusion and high energy forming processes will then be addressed.</p>			
COURSE TEACHING AND LEARNING ACTIVITIES			
Sl. No.	Week/Contact Hours	Topic	Mode of Delivery
1	1/1	Introduction to Metal Forming	C&T
2	2/1	Yield criteria for ductile metals	C&T
3	2/1	Flow theories	C&T
4	3/2	Strain hardening in metal forming	C&T
5	3/1	Recrystallization in metal forming	C&T
6	4/1	Fundamentals of metal forming	C&T
7	5/1	Effect of temperatures	C&T
8	5/1	Effect of speed	C&T
9	6/2	Effect of metallurgical microstructure	C&T
10	6/2	Effect of friction and lubrication	C&T

11	7/1	Mechanics of Metal Forming	C&T
12	7/1	Forging Processes – types and operations	C&T
13	8/1	Forging Equipment	C&T, PPT
14	8/2	Forging defects and problems	C&T, PPT
15	9/1	Types of Rolling mill	C&T, PPT
16	9/1	process variables in rolling	C&T, PPT
17	10/1	defects in rolling	C&T, PPT
18	10/1	Types of extrusion	C&T, PPT
19	11/1	Extrusion Process variables	C&T, PPT
20	11/1	Extrusion equipment, lubrication	C&T, PPT
21	11/1	Sheet metal forming – equipment and toolings	C&T, PPT
22	12/1	Stretch forming	C&T, PPT
23	12/1	Deep drawing	C&T, PPT
24	12/1	Blanking, Punching, fine blanking	C&T, PPT
25	12/1	Bending	C&T, PPT
26	13/1	Wire drawing & Rod Drawing	C&T, PPT
27	13/1	Explosive Forming	C&T, PPT
28	13/1	Electro-hydraulic forming	C&T, PPT
29	14/1	Electromagnetic forming	C&T, PPT
30	14/1	High velocity forming	C&T, PPT
31	14/1	Recent trends in forming	C&T, PPT
32	14/1	Review	PPT
	14 weeks & 40 Hours		

<b>COURSE ASSESSMENT METHODS (shall range from 4 to 6)</b>				
<b>S.No.</b>	<b>Mode of Assessment</b>	<b>Week/Date</b>	<b>Duration</b>	<b>% Weightage</b>
1	Cycle Test 1	4 <sup>th</sup> Week	60 Minutes	20
2	Assignment I	5 <sup>th</sup> Week		5
3	Cycle Test 2	9 <sup>th</sup> Week	60 Minutes	20
4	Assignment II	12 <sup>th</sup> Week		5
CPA	Compensation Assessment*	--	60 Minutes	Refer course policy
5	Final Assessment * Descriptive type examination	--	180 Minutes	50
Total Assessment				100

\*mandatory; refer to guidelines on page 4

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

- Feedback from the students during class committee meetings
- Anonymous feedback 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)**

1. All the students are advised to check their NITT WEBMAIL regularly. All the correspondence (schedule of classes/ schedule of assessment/ course material/ any other information regarding this course) will be done through their webmail only.
2. Queries (if required) to the course teacher shall only be emailed to the email id specified by the teacher.

**ATTENDANCE**

1. Attendance will be taken by the faculty in all the contact hours. Every student should maintain minimum 75 % physical attendance in these contact hours along with assessment criteria to attend the end semester examination.

2. Any student, who fails to maintain 75% attendance need to appear for the compensation assessment (CPA). Student who scores more than 60 % marks in the CPA along with assessment criteria will be eligible for attending the end semester examination.
3. Those students who have attendance lag and also missed any of the continuous assessments (CAs) can appear for CPA to get eligibility for writing the end semester examination as quoted in Pt. 2. Their scores in the CPA WILL NOT be taken into account for computing marks for CA.
4. Students not having 75% minimum attendance at the end of the semester and also fail in CPA (scoring less than 60%) will have to RE DO the course.

#### **COMPENSATION ASSESSMENT**

1. Attending all the assessments is MANDATORY for every student.
2. If any student is not able to attend any of the continuous assessments (CAs: Cycle test) due to genuine reason, student is permitted to attend the compensation assessment (CPA) with 20 % weightage. (This is not valid for students who have attendance lag also. Refer Pt. 3 under Attendance)
3. At any case, CPA will not be considered as an improvement test.
4. Students are expected to score minimum 30% of the maximum mark of the class in the CAs to attend the end semester examination in addition to the attendance requirement. Otherwise the student is permitted to attend CPA and is expected to score more than 60% marks to get eligibility to appear for end semester examination. However, the score in CPA WILL NOT be considered for computing marks for CA. Student who fails to score 60% in CPA will take up additional assignments to get eligibility for writing End Semester examination.
5. Finally, every student is expected to score minimum 40% of the maximum mark of the class in the total assessment (1, 2, 3, 4 and 5) to pass the course. Otherwise the student would be declared fail and 'F' grade will be awarded. Further he can take up only FORMATIVE ASSESSMENT.

#### **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 study material in any form for copying during any assessments is considered dishonest.
2. Tendering of information such as giving one's program, simulation work,

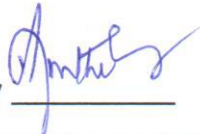
assignments to another student to use or copy is also considered dishonest.

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.
5. Students who honestly producing ORIGINAL and OUTSTANDING WORK will be REWARDED.

#### ADDITIONAL INFORMATION

The faculty is available for consultation at times as per the intimation given by the faculty.

#### FOR APPROVAL

Course Faculty 

CC-Chairperson 

HOD 

#### 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. This is not applicable for project work/industrial lectures/internship.**
- d) The policy for attendance for the course should be clearly specified.
- e) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.