

DEPARTMENT OF PRODUCTION ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech – Production Engineering – Section A – V Semester		
Course Title	Tooling for Manufacturing		
Course Code	PRPC21	No. of Credits	04
Course Code of Pre-requisite subject(s)	Please Refer Curriculum		
Session	July 2018	Section (if, applicable)	B
Name of Faculty	Dr. V. Satheeshkumar	Department	Production Engineering
Email	satheeshv@nitt.edu	Telephone No.	0431-2503500
Name of Course Coordinator(s) (if, applicable)	-		
E-mail	-	Telephone No.	-
Course Type	<input checked="" type="checkbox"/> Core course <input type="checkbox"/> Elective course		
Syllabus (approved in BoS)			
<p>Design of cutting tools: Tool materials, design of single point cutting tool, form tool, drill, reamer, broach & plain milling cutter.</p> <p>Theory of metal cutting – design of tool holders for single point tools – Boring bars – selection of tools for machining applications – economics of machining.</p> <p>Design of fixtures: standard work holding devices – principles of location and clamping – clamping methods and elements – quick-acting clamps – design & sketching of milling fixtures for simple components – Turning, Grinding, Welding fixtures. Inspection of fixtures and design of gauges.</p> <p>Design of Drill jigs: Drill bushings – types of jigs: Plate, Leaf, Turn over & Box Jigs – design & sketching of drill jigs for machining simple components.</p> <p>Press tools: power presses – die cutting operations – centre of pressure – scrap strip lay out for blanking – press tonnage calculations – Progressive & Compound dies – die design for simple components. Drawing dies – blank development – estimation of drawing force – blank holders & blank holding pressure – design & sketching of drawing dies for simple components – Bending dies & Combination tools.</p>			

TEXT BOOKS:

1. A Bhattacharyya, Metal Cutting Theory and Practice, Central Book Agency Kolkata.

REFERENCES:

1. American Society of Tool and Manufacturing Engineers (ASTME), Fundamentals of Tool Design, Prentice Hall.
2. F W Wilson, Hand Book of Fixture Design, McGraw Hill publications.

COURSE OBJECTIVES

To study the various design considerations for tooling.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
1. Design single point cutting tool, form tool, drill etc.	PO2, PO3, PO4, and PO9
2. Understand how to conduct machining economically	PO1, PO5, PO6, PO7, and PO12
3. Design jigs, fixtures and press tools	PO2, PO3, PO4, and PO9

COURSE PLAN – PART II**COURSE OVERVIEW**

This course is to teach designing of various cutting tools, form tools, jigs, fixtures, and press tools.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1 – 3 hr	Design of cutting tools: Tool materials, design of single point cutting tool, form tool, drill, reamer, broach & plain milling cutter.	PPT/Chalk and Talk
2	Week 2 – 3 hr		PPT/Chalk and Talk
3	Week 3 – 3 hr		PPT/Chalk and Talk
4	Week 4 – 3 hr	Theory of metal cutting – design of tool holders for single point tools – Boring bars – selection of tools for	PPT/Chalk and Talk

5	Week 5 – 3 hr	machining applications – economics of machining.	PPT/Chalk and Talk
6	Week 6 – 3 hr		PPT/Chalk and Talk
Assignment - 1			
7	Week 7 – 3 hr	Design of fixtures: standard work holding devices – principles of location and clamping – clamping methods and elements – quick-acting clamps – design & sketching of milling fixtures for simple components – Turning, Grinding, Welding fixtures. Inspection of fixtures and design of gauges.	PPT/Chalk and Talk
8	Week 8 – 3 hr		PPT/Chalk and Talk
9	Week 9 – 3 hr		PPT/Chalk and Talk
Assignment - 2			
10	Week 10 – 3 hr	Design of Drill jigs: Drill bushings – types of jigs: Plate, Leaf, Turn over & Box Jigs – design & sketching of drill jigs for machining simple components.	PPT/Chalk and Talk
11	Week 11 – 3 hr		PPT/Chalk and Talk
12	Week 12 – 3 hr		PPT/Chalk and Talk
13	Week 13 – 3 hr	Press tools: power presses – die cutting operations – centre of pressure – scrap strip lay out for blanking – press tonnage calculations – Progressive & Compound dies – die design for simple components. Drawing dies – blank development – estimation of drawing force – blank holders & blank holding pressure – design & sketching of drawing dies for simple components – Bending dies & Combination tools.	PPT/Chalk and Talk
14	Week 14 – 3 hr		PPT/Chalk and Talk
15	Week 15 – 3 hr		PPT/Chalk and Talk
Assignment - 3			

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assignment 1	End of 6 Weeks	-	10%
2	Assignment 2	End of 9 Weeks	-	10%
3	Assignment 3	End of 15 Weeks	-	10%
4	Test 1	-	-	10%
5	Test 2	-	-	10%
6	Final Exam	-	-	50%
CPA	Compensation Assessment*			
7	Assignment	-	-	10%
8	Final Assessment *	-	-	-

***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 after a few classes in the beginning of the semester and at the end of the semester through online. Students can login their MIS account to give their feedback. Mid-semester feedback shall be collected to improve teaching-learning process. Also, students may give their feedback during class committee meeting.

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)**MODE OF CORRESPONDENCE (email/phone etc.)**

The mode of correspondence may be through mobile or email.

Mobile No.: +91-99526 48848

Email: satheeshv@nitt.edu

COMPENSATION ASSESSMENT POLICY

As per norms

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

Nil

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. Only genuine cases of absence shall be considered. Details of compensation assessment to be specified by faculty.
- d) The passing minimum shall be as per the regulations.

- 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.