

**DEPARTMENT OF PRODUCTION ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

<b>COURSE PLAN- PART I</b>			
<b>Course Title</b>	<b>UNCONVENTIONAL MACHINING PROCESSES</b>		
<b>Course Code</b>	<b>PRMI12</b>	<b>No. of Credits</b>	<b>03</b>
<b>Course Code of Pre-requisite subject(s)</b>	-		
<b>Session</b>	<b>July. 2018</b>	<b>Section (if, applicable)</b>	-
<b>Name of Faculty</b>	<b>Dr. V. Anandkrishnan</b>	<b>Department</b>	<b>Production Engg.</b>
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<b>Name of Course Coordinator(s) (if, applicable)</b>	-		
<b>E-mail</b>		<b>Telephone No.</b>	
<b>Course Type</b>	<input type="checkbox"/> Core course	<input type="checkbox"/> Elective course	<input checked="" type="checkbox"/> Minor Course
<b>Syllabus (approved in BoS)</b>			
<p>Unconventional machining Process – Need – classification – Brief overview.</p> <p>Abrasive Jet Machining – Water Jet Machining – Abrasive Water Jet Machining – Ultrasonic Machining.(AJM, WJM, AWJM and USM). Working Principles – equipment used – Process parameters – MRR- Applications.</p> <p>Electric Discharge Machining (EDM)- working Principle-equipment-Process Parameters-Surface Finish and MRR- electrode / Tool -Tool Wear – Dielectric – Flushing –Wire cut EDM – Applications.</p> <p>Chemical machining and Electro-Chemical machining (CHM and ECM)-Etchants – Maskant - techniques of applying maskants - Process Parameters – Surface finish and MRR-Applications. Principles of ECM- equipment-Surface Roughness and MRR Electrical circuit-Process Parameters-ECG and ECH - Applications.</p> <p>Laser Beam machining and drilling (LBM), plasma Arc machining (PAM) and Electron Beam Machining (EBM). Principles – Equipment –Types - Beam control techniques – Applications.</p>			
<b>COURSE OBJECTIVES</b>			
<ul style="list-style-type: none"> <li>➤ To understand several non-traditional machining process in micro and precision manufacturing field.</li> <li>➤ To select suitable machining process for materials considering their merits and demerits.</li> </ul>			
<b>COURSE OUTCOMES (CO)</b>			
<b>Course Outcomes</b>	<b>Aligned Programme Outcomes (PO)</b>		
1. Understand the contribution of non-traditional machining process in micro and precision manufacturing field.	1,2,3,6,7		
2. Select suitable machining process for suitable materials	1,3,5,11		
3. Summarizes the merits and demerits of the non-traditional manufacturing process	1,2		

## COURSE PLAN – PART II

### COURSE OVERVIEW

This course will provide knowledge about several non-traditional and advanced machining processes, machining parameters and application in micro and precision manufacturing field.

### COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1	Week 1	Introduction - Classification	PPT, Chalk Board
2		Process economy – Needs	
3		Mechanical machining - Types	
4	Week 2	Abrasive Jet Machining (AJM) Operating principle, Working	
5		Abrasive Jet Machining (AJM) Process parameters – MRR- Applications	
6		Water Jet Machining (WJM) Operating principle - Working	
7	Week 3	Water Jet Machining (WJM) Process parameters – MRR- Applications	
8		Abrasive Water Jet Machining (WJM) Operating principle - Working	
9		Abrasive Water Jet Machining (WJM) Process parameters – MRR- Applications	
10	Week 4	Ultrasonic machining (USM) Operating principle - Working	
11		Ultrasonic machining (USM) Process parameters – MRR- Applications	
		Cycle Test 1	
12		Electric discharge machining- Introduction-working principle	
13	Week 5	Electric discharge machining- equipment-construction, Various Process Parameters	
14		Effects of process parameters on Surface Finish, MRR, Tool -Tool Wear	
15		Dielectric – Flushing and Applications	
16	Week 6	Wire Electric discharge machining-Introduction- working principle	
17		Wire Electric discharge machining-equipment- construction, Various Process Parameters	
18		Effects of process parameters on Surface Finish, MRR, Tool -Tool Wear	
19	Week 7	Dielectric – Flushing and Applications	
20		Chemical machining - Etchants – Maskant - techniques of applying maskants	
21		Chemical machining- Process Parameters – Surface finish and MRR-Applications	



22	Week 8	Principles of ECM- equipment-Surface Roughness and MRR	PPT, Chalk Board
23		Electro-Chemical machining- Etchants – Maskant -techniques of applying maskants	
24		Electro-Chemical machining- Process Parameters – Surface finish and MRR- Applications	
25	Week 9	Principles of ECM- equipment-Surface Roughness and MRR	
26		ECH – Principle, working, equipment	
27		ECG– Principle, working, equipment	
		Cycle Test 2	
28	Week 10	Laser Beam machining - Principles – Equipment	
29		Laser Beam machining- Types - Beam control techniques – Applications.	
30		Laser Beam drilling- Principles – Equipment	
31	Week 11	Laser Beam drilling - Types - Beam control techniques – Applications.	
32		Plasma Arc machining- Principles – Equipment	
33		Plasma Arc machining Types - Beam control techniques – Applications.	
34	Week 12	Electron Beam Machining- Principles – Equipment	
35		Electron Beam Machining- Types - Beam control techniques – Applications.	
		Final Semester Examination	

#### COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	Cycle Test 1	Week 4	1 hour	20 marks
2.	Cycle Test 2	Week 9	1 hour	20 marks
3.	Assignments 1&2	Week 4 & 9	1 week	10 marks
4.	Re-Test	Week 12	1 hour	20 marks
4.	Final Examination	Week 12	3 hours	50 marks
		Total		100 marks

**COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)**

1. Class committee meetings
2. Feedback through MIS

**COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)**

**Attendance:**

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

**Assessment:**

1. Attending all the assessments are **MANDATORY** for every student.
2. One Compensation Assessment (CPA) will be conducted for those students who are being physically absent due to valid reasons for any of the assessment and it covers the entire contents of the course.
3. At any case, CPA will not be considered as an improvement test.

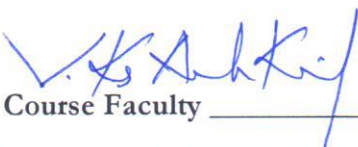
**Academic Honesty & Plagiarism:**


1. Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
2. Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
3. 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.
4. The above policy against academic dishonesty shall be applicable for all the programmes.


**ADDITIONAL COURSE INFORMATION**

Contact the Course Teacher : Dr.V.Anandkrishnan  
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Timings: Office Hours  
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**FOR SENATE'S CONSIDERATION**

  
Course Faculty \_\_\_\_\_

  
CC-Chairperson \_\_\_\_\_

  
HOD \_\_\_\_\_