DEPARTMENT OF PRODUCTION ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN– PART I			
Name of the programme and specialization	**M. Tech – Manufacturing Technology**		
Course Title	**Advanced Machining Technology**		
Course Code	**PR601**	**No. of Credits**	**03**
Course Code of Pre-requisite subject(s)	**NIL**		
Session	**July 2020**	**Section (if, applicable)**	**-**
Name of Faculty	**Dr. V. Anandakrishnan**	**Department**	**Production**
Email	**krishna@nitt.edu**	**Telephone No.**	**0431-2503521**
Name of Course Coordinator(s) (if, applicable)	**NA**		
E-mail		**Telephone No.**	
Course Type	☑ **Core course**	☐ **Elective course**	

Syllabus (approved in BoS)

Metal Cutting Technology: Introduction to metal cutting - tool nomenclature and cutting forces - thermal aspects of machining - tool materials - tool life and tool wear - traditional and nontraditional machining.

Mechanical Processes: Ultrasonic Machining - Water Jet Machining - Abrasive Jet Machining - Abrasive Water Jet Machining - Ice Jet Machining - Magnetic Abrasive Finishing – working principle, merits, demerits and applications.

Chemical and Electrochemical Processes: Chemical Milling - Photochemical Milling - Electropolishing - Electrochemical Machining - Electrochemical Drilling - Shaped Tube Electrolytic Machining – working principle, merits, demerits and applications.

Thermal Processes: Electric Discharge Machining - Laser Beam Machining - Electron Beam Machining - Plasma Beam Machining - Ion Beam Machining – working principle, merits, demerits and applications.

Hybrid Processes: Electrochemical Grinding, Honing, Superfinishing and Buffing - Ultrasonic Assisted ECM - Electroerosion Dissolution Machining - Abrasive Electrodischarge Machining - EDM with Ultrasonic Assistance - Laser Assisted Machining – working principle, merits, demerits and applications.

COURSE OBJECTIVES
➢ To impart the knowledge of working principle of advanced machining processes ➢ To teach the influence of parameters on the performance of advanced machining processes ➢ To educate the merits, demerits and applications of advanced machining processes

MAPPING OF COs with POs	
Course Outcomes	**Programme Outcomes (PO)**
1. Able to describe the working principle of advanced machining processes	**1,2,3,4,5,6**
2. Able to explain the effect of various process parameters on the performance of advanced machining processes	**1,2,3,4,5,7,11**
3. Able to summarise the merits, demerits and applications of advanced machining processes	**1,2,3,6,7,8,11**
4. Able to identify the suitable advanced machining processes based on the applications.	**1,2,3,5,6,7,11**

COURSE PLAN – PART II

COURSE OVERVIEW

The course delivers the knowlegde in the fundamentals of traditional, non-traditional and advanced machining technologies in the way of identifying the parametric influence in line with the industrial production needs.

COURSE TEACHING AND LEARNING ACTIVITIES

S. No.	Week/Contact Hours	Topic	Mode of Delivery
1.	Week 1	Introduction to metal cutting	Lecture - C&T/ PPT, Video Lecture - C&T/ PPT, Video
2.	Week 1	Tool nomenclature and cutting forces	
3.	Week 1	Thermal aspects of machining	
4.	Week 1	Tool materials	
5.	Week 2	Tool life and wear	
6.	Week 2	Traditional and nontraditional machining	
7.	Week 2	Ultrasonic Machining	
8.	Week 2	Water Jet Machining	
9.	Week 3	Abrasive Jet Machining	
10.	Week 3	Abrasive Water Jet Machining	
11.	Week 3	Ice Jet Machining	
12.	Week 3	Magnetic Abrasive Finishing	
13.	Week 4	**Cycle test 1**	
14.	Week 4	Basics of Chemical and Electrochemical Processes	
15.	Week 4	Chemical Milling	

S. No.	Week/Contact Hours	Topic	Mode of Delivery
16.	Week 4	Photochemical Milling	Lecture - C&T/ PPT, Video
17.	Week 5	Electropolishing	
18.	Week 5	Electrochemical Machining	
19.	Week 5	Electrochemical Drilling	
20.	Week 5	Shaped Tube Electrolytic Machining	
21.	Week 6	Basics of Thermal Processes	
22.	Week 6	Electric Discharge Machining – Die sinking	
23.	Week 6	Electric Discharge Machining – wire electric	
24.	Week 6	Laser Beam Machining	
25.	Week 7	Electron Beam Machining	
26.	Week 7	Plasma Beam Machining	
27.	Week 7	Ion Beam Machining	
28.	Week 7	**Cycle test 2**	
29.	Week 8	Basics of Hybrid Processes	
30.	Week 8	Electrochemical Grinding	
31.	Week 8	Electrochemical Honing	
32.	Week 8	Electrochemical Superfinishing	
33.	Week 9	Electrochemical Buffing	
34.	Week 9	Ultrasonic Assisted ECM	
35.	Week 9	Electroerosion Dissolution Machining	
36.	Week 9	Abrasive Electrodischarge Machining	
37.	Week 10	EDM with Ultrasonic Assistance	
38.	Week 10	Laser Assisted Machining	
39.	Week 10	**End Semester Examination**	

COURSE ASSESSMENT METHODS

S. No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	Cycle Test 1	Week 4	1 hour	20
2.	Assignments 1	Week 4	1 week	15
3	Cycle Test 2	Week 7	1 hour	20
4.	Assignments 2	Week 7	1 week	15
CPA	*Compensation Assessment**	*Week 10*	*1 hour*	*20*
5.	Final Examination - Theory	Week 10	2 hours	30
			Total	100

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

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

l. Class committee meetings
2. Feedback through MIS

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

Mode of Correspondence (email/ phone etc)

krishna@nitt.edu
0431-2503521

Attendance

As per NITT norms.

Compensation 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 INFORMATION

Contact the Course Teacher : Dr. V. Anandakrishnan
Room No.: MTB304 / 2nd Floor / Manufacturing Technology Building
Timings: Office Hours
Email ID: krishna@nitt.edu
Telephone No.: 0431-250-3521

FOR APPROVAL

Course Faculty	**CC-Chairperson**	**HOD**
Dr. V. ANANDAKRISHNAN	Dr. V. SENTHILKUMAR	Dr. R.JEYAPAUL