Faculty of Engineering & Technology, SRM University, Kattankulathur-603203
School of Engineering
Department of Mechanical Engineering
COURSE PLAN

Course Code: ME1128 Academic Year: 2014-2015
Course Title: NON TRADITIONAL MACHINING TECHNIQUES
Year/ Sem: II year/ IV semester (Even)

Section	Class Room No.	Details of Faculty member			
		Name	Room No.	E-mail id	Student contact time
MECH-II		Mrs S.Shakthivel	H315	shakthivel.s@ktr.srmuniv.ac.in	12:25 - 1:30P.M

Direct Assessment Details

Name of Assessment	Marks	Topics	Tentative Date	Duration(min)
Cycle Test –I	10	Basics of Non Traditional machining Techniques, Ultra Sonic Machining (USM),Abrasive Jet Machining (AJM), Water Jet Machining (WJM),	9th February	100
Surprise Test	05	Mechanical Energy, Electrical Energy, Thermo Electrical Energy, Thermal Energy Techniques	Last week of February	20
Cycle Test-II	10	Abrasive Water jet machining, Electro Chemical Machining (ECM), Electro Chemical Grinding (ECG), Electro Chemical Honing.	9th March	100
Model Examination	20	Whole Syllabus	15th April	180
End Semester Examination	50	Whole Syllabus	May	180
Attendance	05	N/A		

		L	T	P	C
ME0028	Non Traditional Machining Techniques	3	0	0	3
	Prerequisite :Manufacturing Technology				

Program Outcomes	Program Educational Objectives			
	1. Apply/ improve their knowledge in basic sciences for excelling in various disciplines of Mechanical Engineering with the emphasis on Design, Thermal and Manufacturing	2. Enhance professional practice to meet the global standards with ethical and social responsibility	3. Solve industrial, social, and environmental problems with modern engineering tools	4. Develop skills to work in teams, think intellectually and pursue life-long learning
a)ability to apply knowledge of mathematics, science, and engineering	X			
(e) an ability to identify, formulate,and solve engineering problems	X		X	
Course designed by	Department of Mechanical Engineering			

1	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x				x						
2.	Mapping of Instructional objective with student outcome	1,2				1,2						
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)	
											X	
3	Broad area(for profession courses only i.e'under P'category)	Manufacturing			Design			Thermal			General	
		x										
4.	Course coordinator	Mr. S.Shakthivel										

Instructional Objectives

1.Basic concepts of non traditional machining techniques
2.Factors influencing the processes and their applications

UNIT I - BASICS OF NON TRADITIONAL MACHINING TECHNIQUES **(9 hours)**

Need for non - traditional machining - Classification on the basis of energy sources – Consideration in process selection, materials, applications.

UNIT II - MECHANICAL ENERGY TECHNIQUES **(9 hours)**

Ultra Sonic Machining - Elements of the process, mechanism of metal removal, process parameters, economic considerations, Benefits and Applications - Advantages and limitations, recent developments Abrasive Jet Machining, Water Jet Machining and abrasive water jet machining: Basic principles, equipments, process variables, mechanism of material removal, applications and limitations.

UNIT III - ELECTRICAL ENERGY TECHNIQUES **(9 hours)**

Electro Chemical process: Fundamentals of Electro chemical machining, electro chemical grinding, electro chemical honing and deburring process, metal removal rate in ECM, Tool design, surface finish and accuracy, economic aspects of ECM simple problems for estimation of metal removal rate, applications and limitations, recent developments.

UNIT IV - THERMO ELECTRICAL ENERGY TECHNIQUES **(9 hours)**

General principles of Electrical discharge machining, Electrical discharge grinding and wire cut EDM process-power circuits for EDM, metal removal rate in EDM, process parameters, selection of tool electrode and dielectric fluids, surface finish and machining accuracy, characteristics of spark eroded surface and machine tool selection, recent developments.

UNIT V - THERMAL ENERGY TECHNIQUES **(9 hours)**

Electron beam machining, Plasma Arc Machining and laser beam machining - Operating principles - Equipment and sub systems - Parameters influencing metal removal - Benefits - Applications - Advantages and limitations, recent developments.

TOTAL : 45

TEXT BOOKS

1. Vijay K Jain, "*Advanced machining processes*", Allied publishers, 2005.
2. Mishra.P.K, "*Non-Conventional Machining*", The Institution of Engineers (India), Text Book Series, New Delhi, 1997.
3. Bennedict.G.F, "*Non Tradtional Machining Techniques*", Marcel Decker, NewYork, 1990.

REFERENCES

1. Sharma.P.C, "*A Text book of Production Engineering*", New Delhi, 1995.
2. Pandey and Sha, "*Modern Manufacturing Process*", Prentice Hall, New Jersey.

SESSION PLAN

Session No.	TITLE / DETAILS OF CHAPTER	REFERENCES
	BASICS OF NON TRADITIONAL MACHINING TECHNIQUES	
1	Program Educational Objectives, Instructional Objectives and Students Outcome and Syllabus	
2	Introduction Non Traditional machining methods	T-2, ch – 1 & R-2, ch – 1
3	Need for Non Traditional machining methods	
4	Classification on the basis of energy sources	T-2, ch – 1 & R-2, ch – 1
5	Consideration in process selection,	T-2, ch – 1 & R-2, ch – 1
6	Materials of Non Traditional Machining Techniques	T-2, ch – 1 & R-2, ch – 1
7	Applications of Non Traditional Machining Techniques	T-2, ch – 1 & R-2, ch – 1
	MECHANICAL ENERGY TECHNIQUES	
8	**Ultra Sonic Machining (USM)** : Elements of process – Equipment and sub systems	T-2, ch – 3 & R-2, ch – 2
9	Mechanism of metal removal and Process parameters	T-2, ch – 3 & R-2, ch – 2
10	Benefits and Applications – Advantages and Limitations	T-2, ch – 3 & R-2, ch – 2
11	**Abrasive Jet Machining (AJM)** : Elements of process – Equipment	T-2, ch – 2 & R-2, ch – 2
12	Mechanism of metal removal and Process parameters	T-2, ch – 2 & R-2, ch – 2
13	**Water Jet Machining (WJM)** : Operating principles – Equipment	T-2, ch – 2 & R-2, ch – 2
14	**Abrasive water jet machining :** Operating principles – Equipment	T-2, ch – 4 & R-2, ch – 2
15	Parameters influencing metal removal	T-2, ch – 4 & R-2, ch – 2
16	Benefits – Applications of WJM	T-2, ch – 4 & R-2, ch – 2
17	Advantages and Limitations of AWJM	T-2, ch – 4 & R-2, ch – 2
	ELECTRICAL ENERGY TECHNIQUES	
18	**Electro Chemical Machining (ECM) :** Operating principles – Equipment and sub systems	T-2, ch – 6 & R-2, ch – 3
19	Metal removal rate in ECM -Tool design	T-2, ch – 6 & R-2, ch – 3
20	Simple problems for estimation of metal removal rate	T-2, ch – 6 & R-2, ch – 3
21	Benefits and Applications	T-2, ch – 6 & R-2, ch – 3
22	**Electro Chemical Grinding (ECG) :** Operating principles – Equipment and sub systems	R-2, ch – 3
23	Metal removal rate -Tool design	R-2, ch – 3
24	Simple problems for estimation of metal removal rate	R-2, ch – 3
25	Benefits – Applications	R-2, ch – 3
26	– Recent developments of Electric Energy Techniques	R-2, ch – 3

	THERMO ELECTRICAL ENERGY TECHNIQUES	
27	**Electrical Discharge Machining (EDM) : General** principles – Equipment and sub systems	T-2, ch – 8 & R-2, ch – 4
28	Power circuits and Metal removal rate in EDM	T-2, ch – 8 & R-2, ch – 4
29	Process parameters, selection of tool electrode and dielectric fluids .	T-2, ch – 8 & R-2, ch – 4
30	Characteristics of spark eroded surface and machine tool selection	T-2, ch – 8 & R-2, ch – 4
31	**Electrical Discharge Grinding (EDG) :** Operating principles – Equipment and sub systems	T-2, ch – 8 & R-2, ch – 4
32	Process parameters-Surface finish and machining accuracy	T-2, ch – 8 & R-2, ch – 4
33	**Wire Cut Electrical Discharge Machining (WCEDM) :** Operating principles	T-2, ch – 8 & R-2, ch – 4
34	Equipment and sub systems	
35	Process parameters	T-2, ch – 8 & R-2, ch – 4
36	Machine tool selection, recent developments.	T-2, ch – 8 & R-2, ch – 4
	THERMAL ENERGY TECHNIQUES	
37	**Electron Beam Machining (EBM) :** Operating principles – Equipment and sub systems	T-2, ch – 10 & R-2, ch – 4
38	Parameters influencing metal removal	T-2, ch – 10 & R-2, ch – 4
39	Benefits – Applications – Advantages and Limitations	T-2, ch – 10 & R-2, ch – 4
40	**Plasma ARC Machining (PAM) :** Operating principles – Equipment and sub systems	T-2, ch – 11 & R-2, ch – 4
41	Parameters influencing metal removal	T-2, ch – 11 & R-2, ch – 4
42	Benefits – Applications – Advantages and Limitations	T-2, ch – 11 & R-2, ch – 4
43	**Laser BEAM Machining (LBM) :** Operating principles – Equipment and sub systems	T-2, ch – 9 & R-2, ch – 4
44	Parameters influencing metal removal	T-2, ch – 9 & R-2, ch – 4
45	Benefits – Applications – Advantages and Limitations	T-2, ch – 9 & R-2, ch – 4

1/12/14

Course Coordinator

HOD/Mech Engg

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DEPARTMENT OF MECHANICAL ENGINEERING
01 DEC 2014
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