



Nadar Saraswathi College of Engineering and Technology,
Vadapudupatti, Theni - 625 531
 (Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)

Format No	NAC/ILP-0742
Rev. No.	03
Date	29-11-2019
Total Pages	05

Course Plan (Theory)

For the Academic Year 20 - (Odd/Even Semester)

Staff Name	Mr. J.Eswaran	Dept. / Designation	AP/MECH	Strength	34
Course/Branch	B.E/ MECH	Year / Semester	II/ IV	Credit	03
Course Code/ Subject Code/Choice	M403 / ME8451 / PC	Subject Name	Manufacturing Technology -II		

- I. Objective (5)** : The student should be made to :
- OB1: Understand the concepts and basic mechanics of metal cutting.
 - OB2: Know about the machineries by doing operations in centre lathe and Capstan & turret lathe.
 - OB3: Know about the machineries by doing operations in shaping, milling & Gear cutting machines
 - OB4: Understand the processing techniques of grinding and broaching.
 - OB5: Understand the fundamentals of CNC programming for machining process.

- II. Pre requisites** :
- Student should know about the basic knowledge in machineries like Centre lathe and its operations, Grinding machine and its operations.
 - Also know about the fundamentals of CNC Machines.

- III. Guidelines (Paper's Nature)** :
- Manufacturing process

- IV. Course Out Come (5)** : At the end of this course, the students will be able to

COs	Outcomes	Bloom's Taxonomy	BTS
M403.1	Explain the mechanism of material removal processes.	Understand & Analysis	2
M403.2	Describe the constructional and operational features of centre lathe and other special purpose lathes.	Understand	2
M403.3	Describe the constructional and operational features of shaper, planner, milling, drilling, sawing and broaching machines.	Understand & Analysis	2
M403.4	Explain the types of grinding and other super finishing processes apart from gear manufacturing processes.	Remember	2
M403.5	Summarize numerical control of machine tools and write a part program.	Understand & Apply	2

V. CO - PO, PSO Mapping: (3- > Strong, 2- > Moderate, 1 - >Low)

CO-PO,PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
M403.1	2	2											1	
M403.2	2		2										1	
M403.3	2		2										1	
M403.4	2												1	
M403.5	2	2	2										2	

VI. Books to be Referred :

- T1: Hajra Choudhury, "Elements of Workshop Technology", Vol.II., Media Promoters.
- T2: Rao, P.N "Manufacturing Technology - Metal Cutting and Machine Tools", Tata McGraw-Hill.

New Delhi, 2003.

R1. Richard R Kibbe, John E. Neely, Roland O. Merges and Warren J. White "Machine Tool Practices", Prentice Hall of India, 1998

R2. HMT, "Production Technology", Tata McGraw Hill, 1998.

R3. Geoffrey Boothroyd, "Fundamentals of Metal Machining and Machine Tools", Mc Graw Hill, 1984

R4. Roy. A. Lindberg, "Process and Materials of Manufacture," Fourth edition, PHI/Pearson Education 2006.

VII. E-Learning Resources :

EL1: https://www.youtube.com/watch?v=100_g17WT3w

EL2: <http://www.nptelvideos.in/2012/12/manufacturing-processes-ii.html>

EL3: <https://www.youtube.com/watch?v=4VPbMk9ZUgU>

EL4 : https://www.youtube.com/results?search_query=manufacturing+technology+2

EL5 : https://www.youtube.com/results?search_query=gear+manufacturing+process

VIII. Method of Evaluation (Considered for CO Assessment) :

CO Assessment Direct									CO Eval Ext
CO Evaluation Internal :									
Int 1,2/ Mod 1,2	Unit / CAT	Case Study	Assign.,	Seminar	Quiz	GD	RP	Project/Lab	University
Yes	Yes	Yes	Yes	Yes	No	No	NA	NA	Yes
CO Assessment Indirect									University
Course Exit Survey									

IX. Attainment Levels & Calculation :

Target Competence Threshold (Level)	50%	Internal 50 Marks and Above	Others 50% Marks	University Equivalent to [B / E] or Higher
Benchmark & Attainment Level	70% Students Got More Than Target Competence Level			3
	60% Students Got More Than Target Competence Level			2
	50% Students Got More Than Target Competence Level			1
	If Students Below 50% of Target			0

CO Attainment Calculations	Attainment Scores in Scale of 3	
	Direct Attainment of COs	= 0.8 * CO attainment (University) + 0.2 * CO attainment (Internal Overall)
Overall Attainment of CO	= 0.9 * CO attainment (Direct) + 0.1 * CO attainment (In-Direct)	
PO Individual Attainment Calculations	= Overall Attainment of CO *(Average of CO-PO Mapping Score of Individual POs / 3)	
PSO Individual Attainment Calculations	= Overall Attainment of CO *(Average of CO-PSO Mapping Score of Individual PSOs / 3)	

X. Lesson Plan:

S. No.	Topic	CO	BTL	Content Delivery Mode *	Reference Book no. & Page no.	No. of Periods Required	Cumulative Periods
UNIT I- THEORY OF METAL CUTTING							
1	Mechanics of chip formation	M403.1	L2	BB	T1 38	1	1
2	Single point cutting tool	M403.1	L2	BB	T1 37	1	2
3	Forces in machining	M403.1	L3	BB	T1 47	1	3
4	Types of chip	M403.1	L2	BB	T1 51	1	4

5	Cutting tools and its Nomenclature	M403.1	L2	BB	T1 53	1	5
6	Orthogonal metal cutting	M403.1	L4	BB	T2 11	1	6
7	Thermal aspects	M403.1	L4	BB	T1 60	1	7
8	Cutting tool materials, tool wear, tool life, surface finish, cutting fluids and Machinability.	M403.1	L2	BB	T1 62-79	2	9
UNIT-II- TURNING MACHINES							
9	Centre lathe, constructional features, specification, operations	M403.2	L2	BB	T2 97, 113-117	2	11
10	Taper turning methods, Thread cutting methods	M403.2	L4	BB	T2 117-125	2	13
11	Special attachments, Machining time and Power estimation	M403.2	L1	BB/PPT	T2 126-133	1	14
12	Capstan and turret lathes, tool layout	M403.2	L2	PPT/DM	T2 141-150	1	15
13	Automatic lathes: semi automatic – single spindle	M403.2	L2	BB/PPT	T2 151	1	16
14	Swiss type, automatic screw type with multi spindle	M403.2	L2	BB/PPT	T2 153	2	18
UNIT-III- SHAPER, MILLING AND GEAR CUTTING MACHINES							
15	Shaper - Types of operations. Drilling, reaming, boring, Tapping.	M403.3	L2	BB/PPT	T2 164,217, 231-237	2	20
16	Milling operations-types of milling cutter	M403.3	L2	BB/PPT	T2 176-191	2	22
17	Gear cutting forming and generation principle	M403.3	L3	BB/PPT	T1 481	2	24
18	Construction of gear milling , hobbing and gear shaping processes	M403.3	L2	BB/PPT	T1 465,484	2	26
19	Finishing of gears.	M403.3	L2	BB/PPT	T1 486	1	27
UNIT-IV- ABRASIVE PROCESS AND BROACHING							
20	Abrasive processes: grinding wheel, specifications and selection	M403.4	L2	PPT/VIDEO	T2 242	2	29
21	Types of grinding process – cylindrical grinding, surface grinding	M403.4	L2	PPT	T2 257	2	31
22	Centreless grinding and internal grinding	M403.4	L2	PPT	T2 255	2	33
23	Typical applications – concepts of surface integrity	M403.4	L1	PPT	T2 270	1	34
24	Broaching machines: broach construction, push, pull, surface and continuous broaching machines	M403.4	L2	PPT	T2 280-285	2	36
UNIT-V- CNC MACHINING							
25	Numerical Control (NC) machine tools	M403.5	L1	PPT	T2 420	1	37
26	CNC types, constructional details, special features	M403.5	L2	PPT	T2 420	2	39

27	Machining centre, part programming fundamentals CNC	403.5	L1	PPT	T2 427	2	41
28	Manual part programming	M403.5	L3	PPT	T2 432	2	43
29	Micromachining and Wafer machining	M403.5	L2	PPT	T1 724	2	45

* BB - Blackboard, VD - Videos, GD - Group Discussion, RP - Role Play, SEM - Seminar, DM-Demo/Lab, WS- Web Search, MPJ - Mini Project., AS-Assignment, TUT- Tutorial, CO - Course Outcome, BTL- Blooms Taxonomy Level.

XI. Content Beyond Syllabus:

Course Code & Title	Syllabus of content beyond syllabus	Total Number of contact hours				Contributing COS	Contributing POs & PSOs
		Lecture (L)	Tutorial (T)	Practical (P)	Total Hours		
M403 & Special Machines	Shaper, Milling, Abrasive Process			4	4	M403.3	PO 1, 3, 5, PSO 1

XII. Lesson Schedule (Planned with Timetable):

No.	Unit No / Description	Duration (Date)		Total No of Periods	Course Outcome	Remarks (if any Deviation)
		From	To			
1.	Unit - 1/ Theory of Metal Cutting			9		
2.	Unit - 2 / Turning Machines			9		
3.	Unit - 3 / Shaper, Milling and Gear cutting Machines.			9		
4.	Unit - 4 / Abrasive Process & Broaching			9		
5.	Unit - 5 / CNC Machining			9		

XIII. Unit Test / CAT Test:

No.	Date	UNIT / CAT Portion	No.	Date	UNIT / CAT Portion
1		UNIT - I	4		UNIT - IV
2		UNIT - II	5		UNIT - V
3		UNIT - III			

XIV. Internal / Model Test:

No.	Tentative Date	Portion	Total	Appear	Pass	%
1		INTERNAL - I / UNIT - I & II				
2		INTERNAL - II / UNIT - III & IV				
3		MODEL EXAM / UNIT - I-V				

XV. Assignments:

Unit No.	Topic	Suggestion*	Group / Individual	Course Outcome	Announced Date	Submitted Date
1	Cutting tools and its Nomenclature	Books	Individual	M403.1		
3	Milling machine and its operations	Books	Individual	M403.3		
5	Micromachining and Wafer machining	Books	Individual	M403.5		

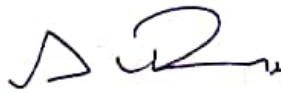
* Suggestion: Books / Journals / Magazines / Web Resources


XVI. Tutorial:


Unit No.	Topic * (Questions /Problem /Exercises)	Course Outcome	Question Count	Discussed Date	Completed Date
1.	Diagram of Lathe	M403.2	1		
2.	CNC Programming	M403.5	1		

*Attach Proof of Tutorial Sheets Separate in given Format.


Staff In Charge


Head of the Department




Principal