

SHEET METAL PROCESSING–EI 2
Semester I (Production Engineering) SUB CODE: MEPR107-B
Teaching Scheme (Credits and Hours)

Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
3	0	2	5	4	3	70	30	20	30	150

LEARNING OBJECTIVES:

The objective of this course is

- To learn various concepts related to machining
- To have practical purview of various production techniques

LESSON PLANNING

SR.NO	CHAPTER NO	DATE/WEEK	%WEIGTAGE
1	1	1 st 2 nd 3 rd	20
2	2	4 th 5 th 6 th	20
3	3,4	7 th 8 th 9 th	20
4	5,6	10 th 11 th 12 th	20
5	7,8	13 th 14 th 15 th	20

Total hours (Theory): 45, Total hours (Practical): 30, Total hours: 75

DETAILED SYLLABUS

Chap . No.	Topic
1	Introduction to sheet metal: forming lines, sheet- tool-machine tool as a system, properties and grades of sheet metal available, their applications, manufacturing and testing procedure
2	Products manufacturable using sheet metals, formability, analytical prediction of forming limits, strain path, strain distribution, product design for sheet metal forming
3	Separating processes: Separating processes like shearing, fine blanking, plasma cutting and bending, laser cutting and bending.
4	bending and springback calculations, bend sequencing, drawing of sheets, draw ratio, LDR, process analysis, process analysis of axysymmetric deep drawn parts
5	Super plastic forming: Super plastic forming and diffusion bonding processes, sheet joining processes, deformation and weld contours
6	TWB forming, warm forming, sheet and tube hydro forming, roll forming
7	Presses: Different types of presses, press structures, drives, safety devices, part handling, multiple point blank holding, press brakes, counter pressure bending devices, transfer presses
8	Process modeling and analysis, scope of CAD/CAM in sheet metal forming, numerical analysis of forming processes.

LIST OF PRACTICALS

Sr. No.	Practical Content
1	BENDING SPRING BACK CALCULATION IN BENDING PROCESS OF VARIOUS MATERIALS
2	PREDICTION OF FORMABILITY LIMITS FOR DUCTILE MATERIALS
3	PROCESS ANALYSIS OF AXYSYMMETRIC DEEP DRAWN PARTS
4	PRODUCT DESIGN FOR SHEET METAL FORMING
5	NUMERICAL ANALYSIS OF FORMING PROCESSES
6	PROCESS MODELING OF SHEET METAL PROCESS USING CAD
7	TESTING OF SHEET METAL FOR VARIOUS DEFECTS
8	ANALYSIS OF WELD CONTOURS IN SUPER PLASTIC FORMING PROCESS
9	EVALUATE THE EFFECT OF DEEP DRAWING PARAMETERS ON ITS EFFICIENCY
10	CASE STUDY ON LASER CUTTING; TWB FORMING

INSTRUCTIONAL METHOD AND PEDAGOGY (Continuous Internal Assessment (CIA) Scheme)

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all units while conducting teaching & examination.
- Attendance is compulsory in lectures and Tutorial.
- Viva Voce will be conducted at the end of the semester of 30 Marks.
- One internal exam of 30 marks is conducted as a part of Mid semester evaluation.

STUDENTS LEARNING OUTCOMES:

At the end of the course

The students will gain an experience in the sheet process implementation.

References:

1. American Soc. For Metals, Metals Handbook, 10th Edition, Vol 15, on Metal Forming, ASM, Metals Park, Ohio, 1989.
2. David, A., Smith (Editor), Die Design Handbook, SME publications, Michigan, 1990.
3. Lange, K., Handbook of Metal Forming McGraw Hill, 1985.
4. Eary, D. F., and Reed, E. A., Techniques of Pressworking Sheet metal and Engineering,
5. Willium F. Hosfford and Robert Caddell, Metal forming: Mechanics and Metallurgy,
6. SME: Tool and Manufacturing Engineers Handbook, vol.2.
7. Rowe G.W., "Principles of Industrial Metalworking Processes", Edward Arnold publication.
8. Sadhu Singh, "Theory of Plasticity and Metal forming Processes", Khanna publishers.
9. Ivana Suchy, "Handbook of Die Design", 2nd Edition McGraw-Hill.