	ANNA UNIVERSITY MADRAS INSTITUTE OF TECHNOLOGY CAMPUS CHROMEPET, CHENNAI – 600 044 DEPARTMENT OF PRODUCTION TECHNOLOGY	Year: Jan 24 – May 24 Sem.: (6/8)

COURSE PLAN WITH METHOD OF EVALUATION / RUBRICS

Name of the Faculty and Designation	**Dr. E. Pavithra, Assistant Professor**		
Name of the programme	B.E.	Branch	Production Engineering
Regulation	R2019	No. of students	60
Subject Code & Name	**PR5601 METAL FORMING**		

Unit No.	Unit title	Course Outcomes	Time period	Material Reference
1.	**Introduction to UNIT – I**	CO1	1	1. Dieter G.E., "Mechanical Metallurgy", McGraw Hill, Co., S.I. 5th Edition, 2012. 2. Nagpal G.R. ,"Metal forming processes", Khanna Publishers, New Delhi, 2nd edition 2009.
2.	State of stress – Components of stress, symmetry of stress tensor		1	
3.	Principle stresses – Stress deviator		1	
4.	Von-Mises, Tresca yield criteria		1	
5.	Octahedral shear stress and shear strain theory		1	
6.	Flow stress determination		1	
7.	Temperature in metal forming – Hot, cold and warm working		1	
8.	Strain rate effects – metallurgical structures		1	
9.	Residual stresses – Spring back		1	
10.	**Introduction to UNIT – II**	CO2	1	
11.	Principle – classification		1	
12.	Equipment		1	
13.	Tooling		1	
14.	Processes parameters and calculation of forces during forging and rolling processes		1	
15.	Ring compression test		1	
16.	Post forming heat treatment		1	
17.	Defects causes and remedies – applications		1	
18.	Roll forming		1	

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19.	**Introduction to UNIT – III**	CO3	1	References: 1. Edward M. Mielink, "Metal working science engineering", McGraw Hill, Inc, 2007 2. Metal Hand book Vol 14, "Forming and Forging", Metal Park, Ohio, USA, 2006 3. Rao, P.N., "Manufacturing Technology", TMH Ltd., 3rd edition, 2014. 4. SeropeKalpakjian, Steven R Schmid, "Manufacturing Process for Engineering Materials", Pearson Education, 7th Edition, 2007. 5. Taylan Atlan and A. ErmanTekkaya ," Sheet Metal Forming Fundamentals", ASM International
20.	Classification of extrusion processes		1	
21.	Tool, equipment and principle of these processes		1	
22.	Influence of friction		1	
23.	Extrusion force calculation – defects, causes and remedies		1	
24.	Rod / Wire drawing – tool, equipment and principle – defects		1	
25.	Tube drawing and sinking processes		1	
26.	Mannessmann process of seamless pipe manufacturing		1	
27.	Tube bending		1	
28.	**Introduction to UNIT – IV**	CO4	1	
29.	Classification – conventional and High Energy Rate Forming processes		1	
30.	Presses – types and selection of presses		1	
31.	Formability studies		1	
32.	Formability Limit Diagram, Limiting Draw ratio		1	
33.	Processes: Deep drawing, spinning, stretch forming,		1	
34.	Plate bending, Rubber pad forming, bulging		1	
35.	Press brake forming – Explosive forming, electro hydraulic forming		1	
36.	Magnetic pulse forming and Super plastic forming		1	
37.	**Introduction to UNIT – V**	CO5	1	
38.	Metal Powder and fabrication procedures, Applications, Preparation of powders,		1	
39.	Compaction and sintering, Yield criteria and flow rules		1	
40.	Hot and cold pressing		1	
41.	Electro forming – fine blanking		1	
42.	Hydro forming		1	
43.	Peen forming – Laser Forming – Micro forming – Isothermal forging		1	

44.	High speed for forging and extrusion near net shape forming		1	, 1 st Edition, 2012.
45.	Ultra fine grained materials by severe plastic deformation CAD and CAM in forming.		1	

METHODS OF EVALUATION

1	Assessment – I	**50 (60 %)**
2	Assessment – II	**50 (60 %)**
3	Assignment - I	**40 (40%)**
4	Assignment - II	**40 (40%)**
5	Total Internal Assessment	**200 (40%)**
6	End Semester Examination	**100 (60%)**
7	Total	**100**

05/2/24
Dr. GP
Course Instructor

05/02/24
Prof. (i/c)
B.E., PT