



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad -500 043

MECHANICAL ENGINEERING

COURSE DESCRIPTOR

Course Title	MANUFACTURING PROCESS LABORATORY			
Course Code	AMEB06			
Programme	B.Tech			
Semester	III			
Course Type	Core			
Regulation	IARE - R18			
Course Structure	Lectures	Tutorials	Practical	Credits
	-	-	2	1
Course Coordinator	Mr. G. Aravind Reddy, Assistant Professor			
Course Faculty	Mr. C.Labesh Kumar, Assistant Professor			

I. COURSE OVERVIEW:

The aim of this course is to conduct experiments chiefly encompasses Metal casting, Welding, Press working and processing of Plastics. It inculcates knowledge and skill to the students starting from preparing a wooden pattern to completion of a casting which also comprises different Sand testing techniques. Also, students can understand broadly Welding and press working skills employed in Industries. One of the most outstanding features of plastics is the ease with which they can be processed. Production Technology lab also throws light on processing of plastics by Blow and Injection molding machines.

II. COURSE PRE-REQUISITES:

Level	Course Code	Semester	Prerequisites	Credits
UG	AMEB01	II	Workshop Manufacturing Practices Laboratory	1.5

III. MARKSDISTRIBUTION

Subject	SEE Examination	CIA Examination	Total Marks
Manufacturing Process Laboratory	70 Marks	30 Marks	100

Semester End Examination (SEE):

The SEE is conducted for 70 marks of 3 hours duration. The syllabus for the lab courses is divided into fourteen weeks. From 1st to 7th week casting and welding based experiments will be carried out. From 8th to 14th week Lab view based experiments will be carried out. Among the 14 experiments, one compulsory question without any choice will be given for SEE.

Continuous Internal Examination (CIE):

The CIE exam is conducted for 30 marks for internal evaluation (20 marks for day-to-day work, and 10 marks for internal tests). There shall be one internal test for 10 marks in the Semester.

III. DELIVERY/INSTRUCTIONAL METHODOLOGIES:

X	CHALK & TALK	X	LCD / PPT	X	OPEN ENDED EXPERIMENTS
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IV. ASSESSMENT METHODOLOGIES–DIRECT:

√	CIE EXAMS	√	SEE EXAMS	√	LABORATORY PRACTICES
√	STUDENT VIVA				

V. ASSESSMENT METHODOLOGIES–INDIRECT:

√	ASSESSMENT OF COURSEOUTCOMES (BY FEEDBACK, ONCE)	√	STUDENT FEEDBACK ON FACULTY (TWICE)
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VI. COURSE OBJECTIVES:

The course should enable the students to:

- I.** Understand practical orientation of manufacturing processes.
- II.** Knowledge on different kinds of production processes and practices available for shaping or molding several daily used parts for industries.
- III.** Prepare assembly drawings, sectional views and bill of materials for selection of equipments for various manufacturing processes will be understood.

VII. COURSELEARNING OUTCOMES:

Students, who complete the course, will have demonstrated the ability to do the following:

CLO Code	CLO's	At the end of the course, the student will have the ability to:	PO's Mapped	Strength of Mapping
AMEB06.01	CLO 1	Understand the Pattern design and making, casting drawing.	PO1	1
AMEB06.02	CLO 2	Utilize and determination of Sand properties testing for strengths and permeability	PO 1	1
AMEB06.03	CLO 3	Demonstrate practical understanding moulding and melting and casting	PO 1	1
AMEB06.04	CLO 4	Demonstrate practical understanding of ARCwelding lap and butt joint	PO 1	1
AMEB06.05	CLO 5	Demonstrate practical understanding of Spot welding, TIG welding	PO 2	2
AMEB06.06	CLO 6	Demonstrate practical understanding ofPlasmawelding and brazing (water plasma device).	PO 2	2
AMEB06.07	CLO 7	Understand Blanking and piercing, operationand study of simple, compound and progressive press tool.	PO 2	2
AMEB06.08	CLO 8	Demonstrate practical understanding of Hydraulic press, deep drawing and extrusion operation.	PO 3	3
AMEB06.09	CLO 9	Understand the Bending and other operation	PO 3	3
AMEB06.10	CLO 10	Demonstrate practical understanding Injectionmoulding process	PO 4	3
AMEB06.11	CLO 11	Demonstrate practical understanding Blow moulding process	PO 3	3
AMEB06.12	CLO 12	Demonstrate practical understanding MIG welding exercises and Riveting of plates.	PO 4	3

3 = High; 2 = Medium; 1 = Low

VIII. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes		Level	Proficiency Assessed by
PO1	Engineering Knowledge: Capability to apply the knowledge of mathematics, science and engineering in the field of mechanical engineering.	3	Exercise, Discussion and Seminars
PO2	Problem Analysis: An ability to analyze complex engineering problems to arrive at relevant conclusion using knowledge of mathematics, science and engineering.	3	Exercise and Discussion
PO3	Design/development of solutions: Competence to design a system, component or process to meet societal needs within realistic constraints.	2	Exercise, Discussion and Seminars
PO4	Conduct investigations of complex problems: To design and conduct research oriented experiments as well as to analyze and implement data using research methodologies.	3	Lab Experiments
PO5	Modern tool usage: An ability to formulate solve complex engineering problem using modern engineering and Information technology tools.	2	Seminars

3 = High; 2 = Medium; 1 = Low

IX. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes		Level	Proficiency assessed by
PSO1	Professional Skills: To produce engineering professional capable of synthesizing and analyzing mechanical systems including allied engineering streams.	0	-
PSO2	Problem solving skills: An ability to adopt and integrate current technologies in the design and manufacturing domain to enhance the employability.	0	-
PSO3	Successful career and Entrepreneurship: To build the nation, by imparting technological inputs and managerial skills to become technocrats.	2	Lab Experiments

3 = High; 2 = Medium; 1 = Low

X. SYLLABUS:

LIST OF EXERCISES	
Week-1	PATTERN MAKING
Pattern design and making, casting drawing.	
Week-2	SAND PROPERTIES TESTING
Sand properties testing for strengths and permeability.	
Week-3	METAL CASTING
Moulding, melting and casting	
Week-4	ARC WELDING
ARC welding lap and butt joint.	
Week-5	SPOT WELDING

Spot welding, TIG welding.	
Week-6	PLASMA WELDING AND BRAZING
Plasma welding and brazing (water plasma device).	
Week-7	APPLICATION OF SIMPLE AND COMPOUND DIE
Blanking and piercing,	
Week-8	APPLICATION OF PROGRESSIVE DIE
Hydraulic press: Operation and study of simple, compound and progressive press tool	
Week-9	MECHANICAL PRESS WORKING
Bending and other operation	
Week-10	PROCESSING OF PLASTICS
Injection moulding.	
Week-11	PROCESSING OF PLASTICS
Blow moulding	
Week-12	BEYOND SYLLABUS
Riveting of a plates	
Week-13	EXAMINATIONS

Reference Books:

<ol style="list-style-type: none"> 1. R. K. Jain, "Production Technology", Khanna Publishers, 18th Edition, 2013. 2. T. V. RamanaRao, "Metal Casting", New Age, 1st Edition, 2010. 3. Philips Rosenthal, "Principles of Metal Castings", TMH, 2nd Edition, 2001. 4. B. S.Raghuwamshi, "A Course in Workshop Technology", DhanpatRai& Sons, 2014. 5. Kalpakjin S, "Manufacturing Engineering and Technology", Pearson Education, 7th edition,2014. 6. HMT, "Production Technology", McGraw-Hill Education, 1st Edition, 20
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Web References:

https://www.iare.ac.in/

XI. COURSE PLAN:

The course plan is meant as a guideline. There may probably be changes.

Exp. No.	Experiment	Program outcomes attained	Program specific outcomes attained	Reference
1	Pattern design and making, casting drawing	PO1, PO4	-	T1,T2
2	Sand properties testing for strengths and permeability	PO1, PO4	-	T1,T2
3	Moulding, melting and casting.	PO1, PO3	-	T1,T2
4	ARC welding lap and butt joint	PO2, PO3	-	T1,T2
5	Spot welding, TIG welding.	PO1, PO3	-	T1,T2
6	Plasma welding and brazing (water plasmadevice).	PO1, PO3	-	T1,T2

7	Blanking and piercing, operation and study of simple, compound and progressive press tool.	PO2, PO3	-	T1,T2
8	Hydraulic press: deep drawing and extrusion operation.	PO1, PO2	-	T1,T2
9	Bending and other operation.	PO1, PO2	-	T1,T2
10	Injection moulding.	PO2, PO3	PSO 3	T1,T2
11	Blow moulding.	PO1, PO2	-	T1,T2
14	MIG welding exercises and Riveting of a plates	PO1, PO4	-	T1,T2

XII. GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:

S. No	Description	Proposed Actions	Relevance With POs	Relevance With PSOs
1	To improve standards and analyze the concepts.	Class room teaching, Video Lecture	PO 1, PO 4	PSO 1

XIII. MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Objectives	Program Outcomes												Program Specific Outcomes		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
I	3	2	-	-	-	-	-	-	-	-	-	-	-	-	3
II	2	3	2	-	-	-	-	-	-	-	-	-	-	-	3
III	2	2	3	2	-	-	-	-	-	-	-	-	-	-	2

XIV. MAPPING COURSE LEARNING OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Learning Outcomes	Program Outcomes												Program Specific Outcomes		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
AMEB06.01	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
AMEB06.02	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
AMEB06.03	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
AMEB06.04	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
AMEB06.05	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-
AMEB06.06	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
AMEB06.07	-	-	2	2	-	-	-	-	-	-	-	-	-	-	-
AMEB06.08	-	3	-	2	-	-	-	-	-	-	-	-	-	-	-
AMEB06.09	-	3	-	-	-	-	-	-	-	-	-	-	-	-	3
AMEB06.10	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
AMEB06.11	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-

AMEB06.12	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
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XV. DESIGN BASED PROBLEMS (DP) / OPEN ENDED PROBLEM:

1. Explore the application of shaping or molding and welding methods
2. Develop the components or assembly of components in manufacturing techniques.
3. To illustrate new designs by using various manufacturing equipment's in daily used parts for industries

Prepared by:

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