INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

PRODUCTION TECHNOLOGY LABORATORY								
III Semester: ME								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
AMEE10	**Core**	0	0	2	1	40	60	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 36**				**Total Classes:36**		
Prerequisite: Engineering Workshop								

I. COURSE OVERVIEW:

This laboratory is intended to enhance the learning experience of the students with new tools, equipment, and techniques for creating physical objects and mechanisms with a variety of materials. Skills learned in the course enable analogous learning about the design process in manufacturing used in various industrial applications and empowers the students to apply modern concepts of manufacturing technologies.

II. COURSES OBJECTIVES:

The students will try to learn

I. The Importance of manufacturing sciences in the day-to-day life, and study the basic manufacturing processes and tools used.
II. The knowledge in thermal, metallurgical aspects during casting and welding for defect free manufacturing components.
III. The design features that make each of this manufacturing process both harder, easier, assess design and manufacturing features on real products.

III. COURSE OUTCOMES:

At the end of the course students should be able to:

CO1 Identify the design steps involved in making a casting for automotive components.
CO2 Demonstrate practical usage of Gas welding and Arc welding techniques for making Lap and Butt joints.
CO3 Make use of different types of welding techniques for Industrial Applications.
CO4 Analyze various defects during gas welding, arc welding process and their causes and remedies.
CO5 Demonstrate working principle of various sheet metal forming process such as Hydraulic press, deep drawing and bending operation.
CO6 Demonstrate the various process in making of plastic components for engineering / domestic applications.

IV. COURSE CONTENT:

EXCERCISE-1: PRINCIPLES OF PATTERN DESIGN AND MAKING
To design and prepare a wooden pattern for the given casting with consideration of suitable allowances

EXCERCISE-2: CASTING USING GREEN SAND MOULDING PROCESSES
Preparation of an aluminium casting for the given split pattern using green sand moulding processes

EXCERCISE-3: ARC WELDING
Preparation of LAP JOINT using Arc Welding Process

EXCERCISE-4: SPOT WELDING
Preparation of Lap Joint on the given work pieces using spot welding equipment

EXCERCISE-5: TUNGSTEN INERT GAS (TIG) WELDING
Preparation of V – Butt Joint Using TIG Welding

EXCERCISE-6: SAND PROPERTIES TESTING
Determination of the Grain size and Permeability of the Moulding Sand

EXCERCISE-7: INTRODUCTION TO CASTING FOR A SOLID PATTERN
Preparation of a Casting for the given Solid Pattern using Green Sand Moulding Processes

EXCERCISE-8: SIMPLE DIE
Preparation of V-groove operation

EXCERCISE-9: PROGRESSIVE DIE
To perform blanking and piercing operations and determine the punching force and blanking force theoretically

EXCERCISE-10: COMPOUND DIE
To study a Compound tool and perform blanking and piercing operations

EXCERCISE-11: INJECTION MOULDING
Perform injection moulding operation for given plastic raw material

EXCERCISE-12: INTRODUCTION TO BRAZING
Preparation of joint using two sheets by brazing process

EXCERCISE-13: INTRODUCTION TO HAND PRESS
Prepare a required shape and size of material using Hand press

EXCERCISE-14: INTRODUCTION TO HYDRAULIC PRES
Prepare a required shape and size of material using Hydraulic Press

V. TEXT BOOKS:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and NirjharRoy S.K., Elements of Workshop Technology, Media promoters and publishers private limited, Mumbai, 2020.
2. Kalpakjian S, Steven S. Schmid, Manufacturing Engineering and Technology, Pearson Education India Edition, 7th Edition, 2019.

VI. REFERENCE BOOKS:

1. Gowri P. Hariharan, A. Suresh Babu, Manufacturing Technology – I, Pearson Education, 2018.
2. Roy A. Lindberg, Processes and Materials of Manufacture, Prentice Hall India, 4th Edition, 2017.
3. P.N., Manufacturing Technology, Vol. I and Vol. II, Tata McGraw-Hill House, 2017.
4. Rupinder Singh, J. Paulo Davim, Additive Manufacturing: Applications and Innovations, CRC Press, 2nd Edition, August, 2021.

5. Jeyaprakash Natarajan, Muralimohan Cheepu, Che-Hua Yang, Advances in Additive Manufacturing Processes, Bentham Books, 4th Edition, September, 2021.

VII. ELECTRONICS RESOURCES:

1. https://elearn.nptel.ac.in/shop/iit-workshops/ongoing/additive-manufacturing-technologies forpracticing-engineers/.
2. https://akanksha.iare.ac.in/index?route=course/details&course_id=94.

VIII. MATERIALS ONLINE:

1. Course Outline Description
2. Laboratory Manual
3. Laboratory Exercises