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

COURSE CONTENT

MANUFACTURING PROCESSES LABORATORY								
III Semester: ME								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
AMED10	**Core**	-	-	2	1	40	60	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes:45**				**Total Classes:45**		
Prerequisite: Manufacturing Practice								

I. COURSE OVERVIEW:
Manufacturing Processes 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:

CO 1 Identify the design steps involved in making a casting for automotive components.
CO 2 Demonstrate practical usage of Gas welding and Arc welding techniques for making Lap and Butt joints.
CO 3 Make use of different types of welding techniques for Industrial Applications.
CO 4 Analyze various defects during gas welding, arc welding process and their causes and remedies.
CO 5 Demonstrate working principle of various sheet metal forming process such as Hydraulic press, deep drawing and bending operation.
CO 6 Demonstrate the various process in making of plastic components for engineering / domestic applications.

IV. COURSE CONTENT:

WEEK -1: PREPARATION OF WOODEN PATTERN FOR CASTING
To design and prepare a wooden pattern for the given casting with consideration of suitable allowances using wood turning lathe.

WEEK -2: PREPARATION OF SAND CASTING
To prepare a mould for sand casting for the given pattern and pouring of aluminum metal in the mould.

WEEK -3: SAND PROPERTIES TESTING
To determine the mould sand properties strength, permeability and moisture content.

WEEK -4: PREPARATION OF BUTT JOINT USING ARC WELDING
To prepare a butt joint and T lap Joint with mild steel strip using ARC Welding technique.

WEEK -5: PREPARATION OF JOINT USING MIG WELDING
To prepare V – Butt Joint using MIG welding technique with Mild Steel (MS) flat sheets.

WEEK -6: PREPARATION OF SQUARE TRAY USING SPOT WELDING
To prepare the square tray using spot welding technique with Galvanized Iron (GI) sheets.

WEEK -7: PREPARATION OF JOINT USING GAS WELDING
To prepare gas welding in different positions using the mild steel material.

WEEK -8: PREPARATION OF JOINTS FOR DIFFERENT MATERIALS USING BRAZING
To prepare "T" joint on copper to MS sheet 2mm thick in flat position by brazing operation.

WEEK -9: MANUFACTURING OF WASHERS USING SIMPLE DIE
To prepare washers on a given sheet using simple die.

WEEK -10: MAKE USE OF PROGRESSIVE DIE IN HYDRAULIC PRESS OPERATION
To perform sheet metal working or press working of sheet metal using progressive die.

WEEK -11: PREPARATION OF BLANKING AND PIERCING OPERATION USING COMPOUND DIE
To perform blanking and piercing operations and to determine the punching force and blanking force theoretically and compare the same with obtained readings.

WEEK -12: INJECTION MOULDING
To prepare a plastic product using injection molding machine with high grade poly ethylene material.

WEEK -13: BLOW MOULDING
To prepare a plastic product using blow molding machine with high grade poly ethylene material.

WEEK -14: RIVETING
To perform riveting on a given Aluminum plates with blind and solid rivets.

V. TEXT BOOKS:

1. R. K. Jain, "Production Technology", Khanna Publishers, 18th edition, 2013.
2. T. V. Ramana Rao, "Metal Casting", New Age, 1st edition, 2010.

VI. REFERENCE BOOKS:

1. Philips Rosenthal, "Principles of Metal Castings", TMH, 2nd edition, 2001.
2. B. S. Raghuwamshi, "A Course in Workshop Technology", Dhanpat Rai & Sons, 2014.
3. Kalpakjin S, "Manufacturing Engineering and Technology", Pearson Education, 7th edition, 2014.
4. HMT, "Production Technology", McGraw-Hill Education, 1st edition, 2013.

VII. ELECTRONIC RESOURCES:

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

VIII. MATERIALS ONLINE:

1. Course Template
2. Lab manual