



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

ENGINEERING WORKSHOP								
I Semester: AE / CE / ME / ECE / EEE / CSE (AI&ML) / CSE (DS)								
II Semester: CSE / IT								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AMEE02	Foundation	L	T	P	C	CIA	SEE	Total
		0	0	2	1	40	60	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45			Total Classes:45			
Prerequisite: There is no prerequisite for this course.								

I. COURSE OVERVIEW:

This course provides the opportunity to become confident with new tools, equipment, and techniques for creating physical objects and mechanisms with a variety of materials. The students will learn principles of contemporary trends in manufacturing processes, such as CNC machining and 3D printing, as well as gain practical experience in carpentry, fitting, and welding. Skills learned in the course enable the students to learn about the design process in digital manufacturing used in various industrial applications.

II. COURSES OBJECTIVES:

The students will try to learn

- I. The basics and hands-on practice of carpentry, fitting, and welding
- II. The impart knowledge and skill to use tools, equipment, measuring instruments, and modern techniques.
- III. The concepts apply to the manufacturing processes of casting, moulding and forging.
- IV. The basic machining operations by CNC lathe, CNC milling, and 3D printing machine.

III. COURSE OUTCOMES:

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

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| CO 1 | Select appropriate tools, work material and measuring instruments useful for carpentry, fitting, and welding. |
| CO 2 | Use flat sheets for sheet metal and intricate shapes made from mild steel for Black smithy. |
| CO 3 | Choose appropriate components and tools to prepare pipe fitting and joints of specific shapes and sizes. |
| CO 4 | Experiment with the moulding techniques for producing cast components in complex shapes using different patterns. |
| CO 5 | Execute hard soldering techniques to join similar and dissimilar materials used in industries. |
| CO 6 | Demonstrate appropriate equipment and methods for various machining processes used in CNC machines and 3D printing for manufacturing industries. |

IV. COURSE CONTENT:

Week 1: CARPENTRY-I

Preparation of Square joint and Mortise & Tenon joint as per given dimensions.

Week 2: CARPENTRY-II

Preparation of Half Lap joint and Dove tail joint and as per given dimensions.

Week 3: FITTING -I

Make straight fit as per given size of mild steel plate.

Week 4: FITTING - II

Make square fit as per given size of mild steel plate.

Week 5: WELDING - I

Perform lap joint as per given size of mild steel plate.

Week 6: WELDING - II

Perform butt joint as per given size of mild steel plate.

Week 7: SHEET METAL

Prepare the development of surface and make a rectangular tray and round tin.

Week 8: BLACK SMITHY

Prepare S-hook and J-bend of given Mild steel rod.

Week 9: PLUMPING & CASTING

Perform a pipe fitting through various components such as elbow, union, reducer and coupling

Week 10: CASTING & PLUMPING

Demonstration on various casting process and different types moulds.

Week 11: MOULD PREPARATION

Prepare a flange mould and bearing housing mould using a given pattern.

Week 12: CONCRETE CUBE PREPARATION

Make a concrete cube using a given mould.

Week 13: HARD SOLDERING

Perform a hard soldering of two different materials.

Week 14: DEMONSTRATION ON CNC, 3D PRINTER, ROBOT AND CYLINDRICAL GRINDER

Demonstration on CNC Machines (lathe and Milling), 3D printer, 6-Axis Robot and cylindrical grinder

V. TEXT BOOKS:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "*Elements of Workshop Technology*", Media promoters and publishers private limited, Mumbai, 4th Edition, 2020.
2. Kalpakjian S, Steven S. Schmid, "*Manufacturing Engineering and Technology*", Pearson Education India Edition, 7th Edition, 2019.
3. Gowri P. Hariharan, A. Suresh Babu, "*Manufacturing Technology – I*", Pearson Education, 3rd Edition, 2018.

VI. REFERENCE BOOKS:

1. Gowri P. Hariharan, A. Suresh Babu, "*Manufacturing Technology – I*", Pearson Education, 5th Edition, 2018.
2. Roy A. Lindberg, "*Processes and Materials of Manufacture*", Prentice Hall India, 4th Edition, 2017.
3. Rao P.N., "*Manufacturing Technology*", Vol. I and Vol. II, Tata McGraw-Hill House, 2017.

VII. ELECTRONICS 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=337

VIII. MATERIALS ONLINE:

1. Course Template
2. Laboratory manual