KARUNYA INSTITUTE OF TECHNOLOGY AND SCIENCES
(Declared as Deemed to be University under Sec. 3 of the UGC Act 1956)
A CHRISTIAN MINORITY RESIDENTIAL INSTITUTION
AICTE Approved & NAAC Accredited
Karunya Nagar, Coimbatore - 641 114, Tamil Nadu, India

DEPARTMENT OF MECHANICAL ENGINEERING

METALLURGY LABORATORY

With the rapidly increasing importance placed by industry upon the development, treatment, examination and testing of metals and their alloys, there follows increasing stress on sound fundamental in metallurgical laboratory practice as employed by the student majoring in this field. Following a study of the requirements which must usually be met by the graduate who intends to continue his work in metallurgy, a series of experiments has been carefully planned, performed, and thoroughly studied to determine their value to the student.

During this course the student will be exposed to basic techniques commonly used in a Metallurgical Laboratory. Students will become familiar with metallography by sectioning, mounting, grinding, polishing and etching samples. These samples will be examined and photomicrographs obtained by using optical microscopes equipped with digital cameras. Various Microhardness and Macro-hardness equipment will be used to demonstrate the strengths and limitations of the tests. Tensile Testing, Wear test and Impact Testing will be performed on standard samples. To impart knowledge on use of Oil furnace for heat treatment process, students will be trained on conducting heat treatment process. Training on use of Wire EDM and Abrasive cutter for preparing the standard tests specimens will be will be covered during this lab classes. Hands on testing complimented by lectures on the basics of the tests will give a thorough overview of these procedures.

Course Objectives:

1. Gain practical experience with the microstructure, Identify the steps required to prepare a metallographic sample and performance of materials.
2. Demonstrate to use optical microscope for analysis of materials, to operate a metallographic microscope to observe and document the microstructure.
3. Impart knowledge to obtain properties of foundry sand

Course Outcomes:

Ability to

1. Demonstrate the working principle of optical microscope
2. Prepare samples for metallurgical studies following appropriate metallographic procedure and extractmetallographic images.
3. Determine the strength of foundry sand
4. Analyze various phases of Iron Carbon alloy
5. Select heat treated alloys for various applications.
6. Identify the microstructures of different types of Steels, Aluminum and Copper.

Facilities available for regular class work, project, research and consultancy:

- Metallurgical Microscope
- Permeability Meter
- Sieve Shaker
- Belt Grinder
- Abrasive cutter
- Wire EDM
- Twin Disk Polisher
- Optical Microscope
- Oil Press
- Digital heat treatment furnace

Industry matching equipment's:

Major Equipment's / Instruments:

1. **OPTICAL MICROSCOPE**

2. **DIGITAL HEAT TREATMENT FURNACE**

3. UNIVERSAL SAND RAMMER

4. UNIVERSAL SAND TESTING MACHINE

5. WIRE CUT ELECTRIC DISCHARGE MACHINE (WIRE EDM)

6. ABRASIVE CUTTING MACHINE

7. TWIN DISC POLISHING MACHINE

8. SIEVE SHAKER

9. PERMEABILITY METER

10. OIL PRESS

Lab in charge:

Dr. D.S.Robinson Smart, M.E., Ph.D., Professor

Lab technician:

Mr. Deva Manoharan, D.M.E., B.E.,