**NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**
**DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING**

| **COURSE PLAN – PART I** | | | |
|---|---|---|---|
| **Name of the programme and specialization** | M.Tech – Materials Science and Engineering | | |
| **Course Title** | METALLOGRAPHY, MATERIALS TESTING AND CHARACTERIZATION LABORATORY | | |
| **Course Code** | MT 659 | **No. of Credits** | 2 |
| **Course Code of Pre-requisite subject(s)** | Nil | | |
| **Session** | July 2023 | **Section (if, applicable)** | NA |
| **Name of Faculty** | Dr.N.RameshBabu | **Department** | MME |
| **Official Email** | nrb@nitt.edu | **Telephone No.** | 0431 2503464 |
| **Name of Course Coordinator(s)** | NA | | |
| **Official E-mail** | NA | **Telephone No.** | NA |
| **Course Type** | Core (M.Tech. lab course) | | |

**Syllabus (approved in BoS)**

1. Study of metallurgical microscope and sample preparation
2. Microscopic examination of ferrous alloys (plain carbon steels, stainless steels, maraging steels, tool steels, and cast irons).
3. Microscopic examination of non-ferrous materials (Magnesium alloys, Aluminium alloys, Titanium alloys, Copper alloys, Super alloys).
4. Tensile Testing using Hounsfield and UTM
5. Hardness Measurements (Rockwell, Vickers and Brinell)
6. Impact Testing (Izod and Charpy)
7. Determination of crystal structure and lattice parameters from XRD data
8. Crystallite size determination of materials using XRD
9. Fractography using a scanning electron microscope

**COURSE OBJECTIVES**

To learn the principles of material Testing and characterization and to apply them for various engineering applications

**NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**
**DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING**

| **MAPPING OF COs with POs** | |
|---|---|
| **Course Outcomes** | **Programme Outcomes (PO)** |
| 1. Prepare the specimens for metallographic examination with best practice, can operate the optical microscope and understand, interpret, and analyze the microstructure of materials | [1] |
| 2. Classify the different mechanical testing methods with their inherent merits and limitations | [1] |
| 3. Apply various test methods for characterizing the physical properties of materials | [2,4, 6] |
| 4. Recommend materials testing techniques based upon desired results, perform basic statistical analysis on data, and summarily present test results in a concise written format | [3,5, 7] |

**COURSE PLAN – PART II**

**COURSE OVERVIEW**

The objective of this laboratory course is to provide insight into the latest developments in materials testing and characterization**.**

**COURSE TEACHING AND LEARNING ACTIVITIES** **(** Add more rows)

| **S.No.** | **Week/Contact Hours** | **Topic** | **Mode of Delivery** |
|---|---|---|---|
| 1 | 1-2 weeks | Study of metallurgical microscope and sample preparation | Laboratory practice/demonstration |
| 2 | 3rd week | Microscopic examination of ferrous alloys (plain carbon steels, stainless steels, alloy steels and cast irons). | |
| 3 | 4th week | Microscopic examination of non-ferrous materials (Light alloys, Copper alloys, Super alloys). | |
| 4 | 5th week | Tensile Testing using Hounsfield and UTM | |
| 5 | 6th week | Hardness Measurements (Rockwell, Vickers and Brinell) | |
| 6 | 7th week | Impact Testing (Izod and Charpy) | |
| 7 | 8,9th week | Determination of crystal structure and lattice parameters from XRD data | |
| 8 | 10th week | Crystallite size determination of materials using XRD | |
| 9 | 11th week | Fractography using a scanning electron microscope | |

**NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**
**DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING**

**COURSE ASSESSMENT METHODS**

| S.No. | Mode of Assessment | Week/Date | Duration | % Weightage |
|---|---|---|---|---|
| 1 | Assignments | 1-13 week | NA | 35 |
| 2 | Mid Test | 6-11-23 to 10-11-23 | 2 h | 35 |
| 3 | Final Test / Viva Voce | 11-12-23 to 15-12-23 | 3 h | 30 |

***mandatory; refer to guidelines on page 4**

**COURSE EXIT SURVEY (**mention the ways in which the feedback about the course shall be assessed)

The feedback from students will be assessed based on the questionnaire prepared by the Institute and expected attainment to be 75%.

**COURSE POLICY (**including compensation assessment to be specified**)**

The students are expected to attend all the classes except for medical reasons. Minimum attendance of 75% is required for writing the semester examination.

**ATTENDANCE POLICY** (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

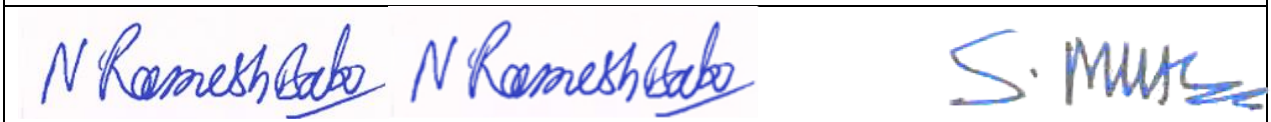
**ACADEMIC DISHONESTY & PLAGIARISM**

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
- The above policy against academic dishonesty shall be applicable for all the programmes.

**ADDITIONAL INFORMATION, IF ANY**

The course coordinator is available for consultation at any time. Students can contact me at any time through phone or e-mail.

**FOR APPROVAL**



**Course Faculty** **CC-Chairperson** **HOD**
**(Dr. N RameshBabu)**