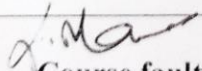
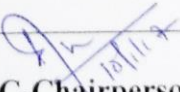



## NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

| <b>COURSE OUTLINE TEMPLATE</b>   |                                 |                |                 |
|--|---------------------------------|----------------|-----------------|
| Course Title   | Ferrous Metallography           |                |                 |
| Course Code  | MTLR11                          | No. of Credits | 2               |
| Department   | MME                             | Faculty        | Dr.S.Manivannan |
| Pre-requisites Course Code   | MTPC18                          |                |                 |
| Course Coordinator(s) (if applicable)  | Not applicable                  |                |                 |
| Tutor(s) E-mail  | manivannan@nitt.edu             | Contact No.    | 9363301801      |
| Course Type  | Lab course                      |                |                 |
| <b>COURSE OVERVIEW</b>   |                                 |                |                 |
| This course deals with the effect of sub atomic factors that influence electrical, magnetic and optical properties of different engineering materials. Theories explaining their behaviour will be discussed.  |                                 |                |                 |
| <b>COURSE OBJECTIVES</b>   |                                 |                |                 |
| <ul style="list-style-type: none"> <li>• To learn and to gain experience in the preparation of metallographic specimens.</li> <li>• To examine and analyse the microstructures of carbons steels, alloy steels, cast irons and other ferrous materials.</li> <li>• To understand the basic principles of optical microscopy<br/>To measure the grain size of materials</li> </ul>  |                                 |                |                 |
| <b>COURSE OUTCOMES (CO)</b>  |                                 |                |                 |
| Course Outcomes  | Aligned Programme Outcomes (PO) |                |                 |
| <p>At the end of the course student will be able</p> <p style="padding-left: 40px;">After the completion of this laboratory course, the student is able to prepare the specimens for metallographic examination with best practice, can operate the optical microscope and understand, interpret, analyze the microstructures of all ferrous materials. semiconductors and their processing methods used in the semiconducting materials industry.</p> | [1, 2, 5, 11]                   |                |                 |

| <b>COURSE TEACHING AND LEARNING ACTIVITIES</b> |   |  |                               |
|--|---|--|-------------------------------|
| <b>Sl.No</b>                                   | <b>Week</b>                               | <b>Topic</b>   | <b>Mode of Delivery</b>       |
| 1  | 1 <sup>st</sup> &<br>2 <sup>nd</sup> Week | Specimen preparation for metallographic observation - working of metallurgical microscope              | Chalk and Talk and Experiment |
| 2  | 3 <sup>rd</sup> &<br>4 <sup>th</sup> Week | Grain size measurements  | Chalk and Talk and Experiment |
| 3  | 5 <sup>th</sup> Week                      | Sulphur printing and phosphor printing   | Chalk and Talk and Experiment |
| 4  | 6 <sup>th</sup> &<br>7 <sup>th</sup> Week | Microstructure cast iron - gray, nodular and malleable iron - unetched                                 | Chalk and Talk and Experiment |
| 5  | 8 <sup>th</sup> &<br>9 <sup>th</sup> Week | Microstructure of gray, nodular and white iron – etched  | Chalk and Talk and Experiment |
| 6  | 10 <sup>th</sup> week                     | Microstructure of iron, steel (low carbon, medium carbon, high carbon, hypo and hypereutectoid steels) | Chalk and Talk and Experiment |
| 7  | 11 <sup>th</sup> & 12 <sup>th</sup> Week  | Microstructure of stainless steels and high speed steels   | Chalk and Talk and Experiment |
| 8  | 13 <sup>th</sup> Week                     | Over heated structure and banded structure in steels   | Chalk and Talk and Experiment |
| 9  | 14 <sup>th</sup> Week                     | Revision lab class   | Experiment                    |
|  |   |  |                               |

| <b>COURSE ASSESSMENT METHODS</b>  |  |                       |          |             |
|---|--|-----------------------|----------|-------------|
| Sl.No   | Mode of Assessment   | Week/Date             | Duration | % Weightage |
| 1   | Assessment 1<br>(Record, Observation and lab Experiment)     | 1 to 13 th Week       | 2 hours  | 50 %        |
| 2   | Assessment 2<br>(Written test)                               | 14 <sup>th</sup> Week | 1 hour   | 25%         |
| 3   | Final Assessment<br>(Final Experiment Written test and Viva) | 14 <sup>th</sup> Week | 3 hours  | 25 %        |
| <b>ESSENTIAL READINGS : Textbooks, reference books etc.,</b>  |  |                       |          |             |
| 1. Donald C. Zipperian, Ph.D. Pace Technologies “Metallographic Specimen Preparation Basics”<br>2. Jain P. L., „ Principles of Foundry Technology”, 3rd Edition, Tata McGraw Hill, 1995<br>3. ASM Handbook Volume 9: Metallography and Microstructures  |  |                       |          |             |
| <b>COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)</b>  |  |                       |          |             |
| The exit survey will be assessed based on the questionnaire prepared by the Institute/class teacher and the expected attainment to be greater 75%. The feedback collected from students by the Institute is to be informed to the teacher to improve the course in future semesters.  |  |                       |          |             |
| <b>COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)</b>   |  |                       |          |             |
| 1. The students are expected to attend all the classes except for medical reasons. Minimum attendance of 75% (including the concession for on-duty and medical reasons) is required for writing the semester examination.<br>2. The relative grading policy will be followed and the passing minimum marks will be fixed based on Institute guidelines. |  |                       |          |             |
| <b>ADDITIONAL COURSE INFORMATION</b>  |  |                       |          |             |
|   |  |                       |          |             |
| <b>FOR SENATE’S CONSIDERATION</b>   |  |                       |          |             |

|   |  |  |
|---|--|--|
| <br>Course faulty<br>(Dr.S.Manivannan) | <br>CC-Chairperson<br>(Dr.S.Jerome) | <br>HOD<br>(Dr.S.P.Kumaresh Babu) |
|---|--|--|