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|  | **OML751 TESTING OF MATERIALS LPTC** |  |

**3003**

**OBJECTIVE:**

To understand the various destructive and non destructive testing methods of materials and its industrial applications.

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| **UNIT I** | **INTRODUCTION TO MATERIALS TESTING 9** |  |

Overview of materials, Classification of material testing, Purpose of testing, Selection of material, Development of testing, Testing organizations and its committee, Testing standards, Result Analysis, Advantages of testing.

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| **UNITII** | **MECHANICAL TESTING 9** |  |

Introduction to mechanical testing, Hardness test (Vickers, Brinell, Rockwell), Tensile test, Impact test (Izod, Charpy) - Principles, Techniques, Methods, Advantages and Limitations, Applications. Bend test, Shear test, Creep and Fatigue test - Principles, Techniques, Methods, Advantages and Limitations, Applications.

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| **UNITIII** | **NON DESTRUCTIVE TESTING 9** |  |

Visual inspection, Liquid penetrant test, Magnetic particle test, Thermography test – Principles, Techniques, Advantages and Limitations, Applications. Radiographic test, Eddy current test, Ultrasonic test, Acoustic emission- Principles, Techniques, Methods, Advantages and Limitations, Applications.

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| **UNITIV** | **MATERIAL CHARACTERIZATION TESTING 9** |

Macroscopic and Microscopic observations, Optical and Electron microscopy (SEM and TEM) - Principles, Types, Advantages and Limitations, Applications. Diffraction techniques, Spectroscopic Techniques, Electrical and Magnetic Techniques- Principles, Types, Advantages and Limitations, Applications.

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| **UNITV** | **OTHER TESTING 9** |  |

Thermal Testing: Differential scanning calorimetry, Differential thermal analysis. Thermo- mechanical and Dynamic mechanical analysis: Principles, Advantages, Applications. Chemical Testing: X-Ray Fluorescence, Elemental Analysis by Inductively Coupled Plasma-Optical Emission Spectroscopy and Plasma-Mass Spectrometry.

**TOTAL : 45 PERIODS**

**OUTCOMES:**

• Identify suitable testing technique to inspect industrial component  
• Ability to use the different technique and know its applications and limitations

**TEXT BOOKS:**

1. Baldev Raj, T.Jayakumar, M.Thavasimuthu “Practical Non-Destructive Testing”, Narosa Publishing House, 2009.  
2. Cullity, B. D., “Elements of X-ray diffraction”, 3rd Edition, Addison-Wesley Company Inc., New York, 2000.  
3. P. Field Foster, “The Mechanical Testing of Metals and Alloys” 7th Edition, Cousens Press, 2007.

**REFERENCES:**

1. Metals Handbook: Mechanical testing, (Volume 8) ASM Handbook Committee, 9th Edition, American Society for Metals, 1978.  
2. ASM Metals Handbook, “Non-Destructive Evaluation and Quality Control”, American Society of Metals, Metals Park, Ohio, USA.  
3. Brandon D.G., “Modern Techniques in Metallography”, Von Nostrand Inc. NJ, USA, 1986.