DMX5204 Materials Engineering

Level	5
Course Code	DMX5204
Course Title	Materials Engineering
Credit value	2
Core/Optional	Core
Course Aim/s	Aim of this course is to provide principles of materials engineering and their applications.
Course Learning Outcomes (CLO):	At the completion of this course student will be able to : CLO1: Determine the microstructure of alloys using phase diagrams CLO2:Explain variation of microstructure using isothermal transformation diagrams at different cooling rates CLO3: Determine type of failure and failure mechanism with the aid of fracture surface CLO4: Explain the applications and processing methods of ceramics, polymers and composites with the knowledge of their properties CLO5: Analyze the properties, cost and availability of various types of materials and select suitable materials for a given component.
Content	**Outline Syllabus:** Unit 1: Session 1: Multiphase materials Session 2: Binary systems Session 3: Iron - Carbon system and its applications Session 4: Phase diagrams of Inter-metallic compounds Session 5: Strengthening of Materials Session 6: Isothermal Transformation and Hardenability Session 7: Stainless steels and their applications Session 8: Dislocations and slip (yield) phenomenon Unit 2: Session 9: Fatigue, Creep and Ductile to Brittle Transition Session 10: Brittle fracture Session 11: Ceramics -1 Session 12: Ceramics – II Session 13: Polymers - 1 Session 14: Polymers - II Session 15: Composite materials Session 16: Selection of materials **Laboratory work** 1. Determination of Ductile-Brittle Transition Temperature using impact test 2. Preparation of material samples for microstructure observation 3. Microstructure observation for various materials