

## **Module outline for Certificate Course in 2nd Grade Steam Engineers**

### **1. Certificate Course in 2nd Grade Computer Aided Drafting**

#### **Course Objective:**

This module provides the knowledge of interpreting and preparing engineering drawing of mechanical parts based on ISO Standard recommendations. The module will provide students with knowledge in blue print reading, orthographic projection, sectioning and dimensioning of mechanical components and parametric modelling of mechanical devices which are key elements of engineering graphics communication. Participants will be able to use Computer-Aided Drafting & Design (CADD) software to create parametric solid models of mechanical parts.

#### **Course Outline:**

1. Engineering Drawing Practices
2. Computer-Aided Drafting using AutoCAD
3. Geometrical Profiles
4. Blue Print Reading
5. Orthographic Projection
6. Dimensioning
7. Introduction to Sectioning
8. Component Drawing
9. Introduction to 3D Computer-Aided Design using Autodesk Inventor
10. Solid Modelling

### **2. Certificate Course in 2nd Grade Engineering Knowledge II**

#### **Course Objective:**

This course provides participants with further coverage in the statutory requirements, operational principles, safe and efficient operation and maintenance of steam boilers including burners and related auxiliary equipment.

#### **Course Outline:**

1. The Statutory Requirements on
  - a) pressure vessels including steam boilers.
  - b) manning requirement for steam boiler operation.
2. General Principles of Steam Boilers & Steam Generation
3. Construction of Steam Boilers
4. Combustion of Fuel, Combustion Equipment Type & Operation
5. Auxiliary Steam Plant Equipment
6. Controls for Safe Operation, Combustion Controls & Boiler Management System
7. Operation of Steam Boilers in various operating conditions
8. Maintenance & Inspection of Steam Boilers
9. Boiler Safety Appurtenances, Connections & Auxiliaries
10. Water Treatment & Water Chemistry
11. Feed Heaters, Steam Piping, Water Hammer, Steam Installation Devices .
12. Relevant Applicable Codes (General Outline)
  - a) SS 102
  - b) ASME Section 1, 7,8 and 9

### **3. Certificate Course in 2nd Grade Engineering Materials I**

**Course Objective:**

This course provides participant with the knowledge in mechanical testing methods, properties and applications of common engineering materials.

**Course Outline**

1. Introduction to the properties and mechanical testing methods.
2. Metallurgy, classification and applications of steels.
3. Aluminium and its alloys.
4. Plastics and elastomers

**4. Certificate Course in 2nd Grade Thermo Fluids II**

**Course Objective:**

This course provides participants with the further knowledge in thermo fluids and in particular the power cycles.

**Course Outline**

1. Second Law of Thermodynamics and Entropy
2. Gas Power Cycles
3. Steam Power Cycles
4. Air Compressors
5. Fluid Mechanics

**5. Certificate Course in 2nd Grade Mechanics II**

**Course Objective:**

This course provides participants with the knowledge in the application of basic solid mechanics and the fundamental of machine components.

**Course Outline**

1. Direct Stress & Strain
2. Shear Force & Bending Moment
3. First & Second Moment of Area
4. Bending Theory
5. Torsion
6. Work, Power & Energy
7. Simple Lifting Machines
8. Centripetal & Centrifugal Forces

Participants who are attending this course are not required to register separately for the examination.