



**4 CDP
POINTS**

**Awarded by
Suruhanjaya Tenaga**

2 Days Program

Date : 20 & 21 April 2026 (Mon & Tue)

**Venue : Wyndham Grand Bangsar
Kuala Lumpur Hotel**

INTERNAL COMBUSTION ENGINES - OPERATIONS AND MAINTENANCE

PROGRAM OBJECTIVE:

This training program is designed to provide an understanding of engineering related problems related to industry globally and a clear sense of what is required to effectively structure, establish measurements and solve problems. Participants will learn the goals and deliverables behind the solutions. Methodology as well as the most commonly used tools within each phase will be discussed. Participants will also learn how to support a problem solving initiative within their organization.

LEARNING OUTCOMES

On successful completion of this course, the participant should be able to:-

- Understand the working of an ICE.
- Understand the methods involved to maintain ICEs
- Select ICEs better

TARGET AUDIENCE

Manufacturing and process, executives, managers, support employees, operational managers, technicians, engineers etc.



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ABSTRACT

An internal combustion engine (ICE) is a heat engine where the combustion of a fuel occurs with an oxidizer (usually air) in a combustion chamber that is an integral part of the working fluid flow circuit. In an internal combustion engine the expansion of the high-temperature and high-pressure gases produced by combustion apply direct force to some component of the engine. The force is applied typically to pistons, turbine blades, or a nozzle. This force moves the component over a distance, transforming chemical energy into useful mechanical energy.

The term internal combustion engine usually refers to an engine in which combustion is intermittent, such as the more familiar four-stroke and two-stroke piston engines, along with variants, such as the six-stroke piston engine and the Wankel rotary engine. A second class of internal combustion engines use continuous combustion: gas turbines, jet engines and most rocket engines, each of which are internal combustion engines on the same principle.

COURSE OVERVIEW

This course is **industry designed**, to provide a broad understanding of the improvement methodology, concepts, and process. The methodology is presented with case studies and examples drawn from service, business process and manufacturing applications. The integration of manufacturing and maintenance is also addressed. With a heavy practice orientation, as much as a third of your time will be spent working through interactive practical exercises and assessments. This course is designed as an introduction to concepts and methodology.

TRAINING METHODOLOGY

1. The latest educational methods and strategies will be utilized.
2. The course is designed to maximize delegate participation.
3. Questions and answers are encouraged throughout and at the daily wrap-up sessions. This gives participants the opportunity to discuss with others and the presenter their specific problems and appropriate solutions.
4. The course shall be conducted through lectures, case studies, group discussions and exercises to reinforce participant's learning.

Course Format

The course consists of formal content presentation interspersed with content quiz sessions. The presenter's style involves intensive participant participation.

COURSE CONTENT

DAY 1

Introduction

- Engine Classification
- Small Engine Development
- Energy Conservation Principles

Why IC Engines

- Definition of Internal Combustion Engines
- Types of ICE
- History and evolution of ICEs
- What are the alternatives to ICEs?
- How they work
- Why they are designed that way
- Gasoline vs. diesel
- Practical perspective

Operation of the 4-Stroke Cycle Engine

- Basic function of an internal combustion engine.
- The events required for internal combustion engine operation.
- Events in the history of engine development.
- The construction and function(s) of primary engine components.
- Principles of 2- and 4-stroke cycle engine operation.

Hydrogen Internal Combustion Engines

- Basic Design
- Cost
- Modifications Needed
- Power, Safety and Efficiency
- Availability

The Two Stroke Internal Combustion Engine

- Introduction
- The two stroke cycle
- 2 stroke compared to 4 stroke
- Disadvantages of a two stroke

COURSE CONTENT

DAY 2

The Gas Power Cycle

- The Otto Cycle
- The Diesel Cycle
- Improvement of Performance

Design of i.c. engines-components & sub-systems

- The Future of Car Engines
- The Scope for Innovation
- The Concept of Green Car
- Why I.C. Engines in 21st Century?

Induction Tuning of the Internal Combustion Engine

- Port Sizing Considerations
- Inlet Air Density and Performance
- Acoustic Modelling
- Swept and Displaced Volumes
- Port Sizing and Mach Index
- Inlet air density

Noise Reduction for Internal Combustion Engines

- Risk Assessment
- Sound is Pressure
- Mechanical Design Options

Question & Answer Session

End of Workshop