



Diploma in Engine Design & Simulation Course Curriculum

Basics of Engine Configuration

- Displacement
- Number of cylinders
- Fuel/combustion cycle
- 2 stroke/4 stroke cycle
- Types of engines
- BMEP and aspiration
- Bore and stroke
- Cooling

Lower-End System

- Connecting rod size and type
- Crankshaft sizing and proportions
- Bearing system
- Power take-off

Engine Structure

- Crankcase type
- Cylinder head attachment
- Main bearing containment
- Bore spacing and deck height
- Head deck height
- Engine mounting
- Fatigue loading
- Modal analysis and NVH
- Bolted joint design
- Reliability
- Engine Wear

Valve Train and Cam System

- Type of valve train
- Number and location of camshafts
- Cam drive type and configuration

- Wear characterization and design

Future Projections

- Review of recent studies
- Comparative assessments

3D Modeling of Engine Parts Using Pro/E WildFire:

Basics of Pro/E

- Sketcher
- Part modeling
- Assembly
- Drafting

3D Modeling of Engine Parts:

- Connecting Rod
- Crankshaft
- Crank Case
- Cylinder Head
- Camshaft

Finite Element Analysis of Engine Parts Using ANSYS

Basics of ANSYS:

- Introduction to FEA & ANSYS
- Preprocessing techniques
- Solver techniques
- Post processing techniques
- ANSYS tips & tricks

Analysis of Engine Parts:

- Static linear analysis of crankcase
- Modal analysis of connecting rod
- Bolt pretension analysis of cylinder head & block
- Transient analysis of 2 cylinder crankshaft
- Contact analysis of gaskets

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