Advanced Internal Combustion Engines

Module I

Thermodynamic Analysis of I.C.Engine Cycles. Effect of design and operating parameters on cycle efficiency. Modified fuel-aircycle considering heat losses and valve timing. Engine dynamics and torque analysis. Use of Combustion chart. Thermodynamic cycle with supercharging both S.I. and C.I. Engines. Limits of Supercharging. Methods of Supercharging and Superchargers.

Module II

Fuels and combustion in S.I. engines, knocking and fuel rating. Energy balance, volumetric efficiency, measurement of indicated and brake power. Advanced theory of carburetion. Fuel Injection Systems for S.I. and C.I. Engines. Cooling of engine and governing of engine. Ignition system: conventional and electronic.

Module III

Variable compression ratio engine. Theoretical analysis, methods of obtaining variable compression ratio, Wankel rotary combustion engine, Stratified charged engine, Methods of charge stratification, Dual fuel and Multifuel engines, Biofuels, Variable Valve timing engines, Exhaust emissions, its measurement and control. Fault diagnosis of S.I. Engines.

Books

Fundamentals of I.C. Engines by H.B.Heywood, McGraw Hill

I.C.Engine Theory and Practices, Vol.I & II C.F.Taylor, MIT Press

I.C.Engine, Mathur and Sharma, Dhanpat Rai and Sons

Fundamentals of I.C.Engine by Ganeshan, Tata McGraw Hill