SRM University

M.Tech Automotive Hybrid Systems Engineering

(Collaborative program with NFTDC, Hyderabad)

(Proposed syllabus from the academic year 2015-16)

Core courses

		L	T	P	C
AH2101	**AUTOMOTIVE ENGINE SYSTEMS**	**3**	**0**	**2**	**4**
	Total Contact Hours-75				
	Prerequisites				
	Nil				
PURPOSE					
The purpose of this course is to impart knowledge about automotive engine systems.					
INSTRUCTIONAL OBJECTIVES					
1.	To understand intake and exhaust systems				
2	To understand carburetion and injection in engines				
3	To understand supercharging, turbo charging and scavenging in engines				

UNIT-I - INTAKE AND EXHAUST SYSTEMS

Intake system components - Discharge coefficient, Pressure drop - Air filter, intake manifold, Plenum, Ram pressure charging, Connecting Pipe - Exhaust system components - Exhaust manifold and exhaust pipe - Spark arresters - Exhaust mufflers, Types, operation.

UNIT II - CARBURETION AND GASOLINE INJECTION

Properties of air-fuel mixtures - Mixture requirements for steady state and transient operation, Mixture formation studies of volatile fuels, design of elementary carburetor Chokes - Effects of altitude on carburetion

Petrol injection - Open loop and closed loop systems, mono point, multi point and direct injection systems - Principles and Features, Electronic fuel injection systems.

UNIT III - DIESEL INJECTION SYSTEMS

Requirements - Air and solid injection - Function of components - Jerk and distributor type pumps. Pressure waves - Injection lag - Unit injector - Mechanical and pneumatic governors - Fuel injector - Types of injection nozzle - Nozzle tests - Spray characteristics - Injection timing - Factors influencing fuel spray atomization, penetration and dispersion of diesel - pump calibration-CRDI system components and working.

UNIT IV -LUBRICATION AND COOLING SYSTEMS

Need for cooling system – components-Thermosyphon and Forced circulation-pressure cooling system - properties of coolant, additives for coolants

Need for lubrication system - Mist lubrication system, wet and dry sump lubrication - Properties of lubricants, Grading of Lubrication oil-consumption of oil.

UNIT V - SUPERCHARGING AND SCAVENGING SYSTEMS

Effects on engine performance - engine modification required - Thermodynamics of supercharging and turbo charging - Turbo lag- Turbocharging methods – VGT- Engine exhaust manifold arrangements-Types and methods of supercharging-Limitations.

Classification of scavenging systems -scavenging pumps-Mixture control through Reed valve induction - Shankey diagram -perfect displacement, perfect mixing.

REFERENCES:

1. Ganesan V, *Internal Combustion Engines*, 4th edition, Tata McGraw Hill Book Cop., 2015
2. Mathur. M. L, and Sharma. R. P., *A course in Internal Combustion Engines*, Dhanpat Rai Publications Pvt.Ltd., 1998
3. Ramalingam, K. K. *Internal Combustion Engine*, Scitech Publication (India) Pvt.Ltd. 2000
4. Domkundwar, V. M. *A course in Internal Combustion engines*, Dhanpat Rai and Co., 1999
5. Duffy Smith, *Auto Fuel Systems*, The Good Heart Willcox Company Inc., Publishers, 1987
6. Edward F, Obert, *Internal Combustion Engines and Air Pollution*, Intext Education Publishers, 1980.