						CWS	PRS	MTE	ETE	PRE
L	**T**	**P**	**Credit**	**Area**						
3	0/1	2/0	4	DEC		15/25	25/-	20/25	40/50	-

AE-319: Computer Simulation of I.C. Engine Process

Objectives: To know the basic combustion in IC engine .to learn some relevant simulation softwares. To analyse combustion for the performance parameters. To analyse the combustion for emission .to understand the impact of combustion chamber geometry and other related parameters on combustion in IC engine

	AE-319: Computer Simulation of I.C. Engine Process	Contact Hours
Unit-1	**Introduction:** Introduction - Heat of Reaction - Measurement of URP- Measurement of HRP - Adiabatic Flame Temperature: Complete Combustion in C/H/O/N Systems, Constant Volume Adiabatic Combustion, Constant Pressure Adiabatic Combustion. Calculation of Adiabatic Flame Temperature - Isentropic Changes of State.	8
Unit-2	**Engine Simulation With Air As Working Medium:** Deviation 10 Between Actual and Ideal Cycle - Problems, SI Engine Simulation With Adiabatic Combustion, Temperature Drop Due to Fuel Vaporisation, Full Throttle Operation - Efficiency Calculation, Part Throttle Operation, Super Charged Operation.	6
Unit-3	**Engine Simulation Fuel Air and actual cycles:** Deviation Between 11 Actual and Ideal Cycle - Problems, SI Engine Simulation With Adiabatic Combustion, Temperature Drop Due to Fuel Vaporisation, Full Throttle Operation - Efficiency Calculation, Part-Throttle Operation, Super Charged Operation.	6
Unit-4	**Progressive Combustion:** SI Engines Simulation With Progressive 10 Combustion With Gas Exchange Process, Heat Transfer Process, Friction Calculation, Compression of Simulated Values, Validation of the Computer Code, Engine Performance Simulation, Pressure Crank Angle Diagram and another Engine Performance. Simulation of 2-Stroke SI Engines.	8
Unit-5	**CI Engine Simulation:** Mixing of Air & Fuel, Multi Zone Model for Combustion, Different Heat Transfer Models, Equilibrium Calculations, Simulation of Engine Performance, Simulation for Pollution Estimation.	8
Unit-6	**SI Engine Simulation:** Multi Zone Model for Combustion, Different Heat Transfer Models, Stoichiometric Calculations, Simulation of Engine Performance, Simulation for Pollution Estimation.	6
	Total	**42**

Reference Books:	
1	Ganesan.V. "Computer Simulation of Spark Ignition Engine Process ", Universities Press (I) Ltd, Hyderabad, 1996. ISBN 9780195699630
2	Ramoss.A.L., "Modelling of Internal Combustion Engines Processes ", McGraw Hill Publishing Co., 1992 ISBN 0-76-80-0052-1
3	A shleyCampbel, "Thermodynamic Analysis of Combustion Engines ", John Wiley & Sons, New York, 1986. ISBN-13: 9780898747744
4	Benson.R.S., Whitehouse.N.D., "Internal Combustion Engines ", Pergamon Press, Oxford, 1979 ISBN 13: 9780080227207

Course Outcomes

CO1	To understand the basics of combustion related measurement and its calculation.
CO2	To understand engine simulation with air as working medium with different cycles and Efficiency Calculation.
CO3	To understand Engine Simulation Fuel Air and actual cycles with different cycles and Efficiency
CO4	To understand Engine Performance Simulation2-Stroke SI Engines and Validation of the Computer Code
CO5	To understand CI Engine Simulation for Pollution Estimation
CO6	To understand SI Engine Simulation for Pollution Estimation

CO-PO/PSOMatrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	0	0	0	0	0	0	2	2	1	1
CO2	3	3	2	3	1	0	0	0	0	0	0	1	2	1	1
CO3	3	3	3	3	1	0	0	0	0	0	0	2	3	3	2
CO4	3	3	3	3	1	0	0	0	0	0	0	1	3	3	2
CO5	2	2	2	2	2	0	0	0	0	0	0	1	2	2	2