

Course Number and Name	
BME001 - ADVANCED INTERNAL COMBUSTION ENGINES	
Credits and Contact Hours	
3&45	
Course Coordinator's Name	
Dr.Balambika	
Text Books and References	
<p>TEXT BOOKS:</p> <ol style="list-style-type: none"> 1. R.B.Mathur and R.P.Sharma- Internal Combustion Engines, Dhanpat Rai & Sons, 1994. 2. V. Ganesan-Internal Combustion Engines - Tata McGraw Hill, 2003. 3. K.K.Ramalingam-Internal Combustion engines, Scitech Publications India(P) Ltd. 2000. <p>REFERENCES:</p> <ol style="list-style-type: none"> 1. John B. Heywood, Internal Combustion Engine Fundamentals, McGraw Hill International Editions, 1998. 2. https://www1.eere.energy.gov/hydrogenandfuelcells/pdfs/28890yy.pdf 	
Course Description	
update the knowledge in engine exhaust emission control and alternate fuels and enable the students to understand the recent developments in IC Engines .	
Prerequisites	Co-requisites
BASIC MECHANICAL ENGG.	Nil
required, elective, or selected elective (as per Table 5-1)	
Core elective	
Course Outcomes (COs)	
CO1	Will update the knowledge about spark ignition engine.
CO2	Will update the knowledge about compression ignition engine.
CO3	Will understand about catalytic convertor
CO4	Will understand the concept of alternate fuels .
CO5	Understand the different recent engines
CO6	Will gain confidence about gasoline engine

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l
CO1								M			L	
CO2			H				M	H	H		L	L
CO3			H	H	M		M			L	L	
CO4					M		M		M		L	H
CO5					M							H
CO6						M	H	M				L

List of Topics Covered

UNIT I SPARK IGNITION ENGINES

9

Spark ignition engine mixture requirements - Feedback control carburetors - Fuel-Injection systems - Monopoint and Multipoint injection - Stages of combustion - Normal and Abnormal combustion - Factors affecting knock - Combustion chambers -Introduction to Thermodynamic Analysis of S.I.Engine combustion.

UNIT II COMPRESSION IGNITION ENGINES

9

Direct and Indirect systems - combustion chamber - Fuel spray behaviour - Spray structure, Spray Penetration and Evaporation - air motion - Turbocharging - Introduction to Thermodynamic analysis of C.I.Engine combustion.

UNIT III POLLUTANT FORMATION CONTROL

9

Pollutants - Sources and types - Formation of Nox, Hydrocarbon Emission Mechanism - Carbon monoxide formation - Particulate emissions - Methods of Controlling Emissions - Catalytic converters and particulate Traps - Methods of Measurement and driving cycles.

UNIT IV ALTERNATE FUELS

9

Alcohol, Hydrogen, Natural gas and Liquefied petroleum gas - Properties, Suitability, Engine Modifications, Merits and Demerits on fuels.

UNIT V RECENT TRENDS

9

Lean Burn Engines - Stratified charge Engines - Gasoline Direct Injection Engine - homogeneous charge compression ignition - Plasma ignition - Measurement techniques.