CONVENTIONAL AND FUTURISTIC VEHICLE TECHNOLOGY
(Professional Elective-I)

Course Code	23ME4501B	**Year**	**III**	**Semester**	I
Course Category	**Professional Elective-I**	**Branch**	Mechanical	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Pre-requisites**	NIL
Continuous Internal Evaluation:	30	**Semester End Evaluation:**	70	**TotalMarks:**	100

Course Outcomes		
Upon successful completion of the course, the student will be able-to		**Blooms Level**
CO1	Discuss the latest trends in engine technology	**L3**
CO2	Discuss the need of advanced combustion technologies and its impact on reducing carbon foot-print on the environment.	**L3**
CO3	Analyzing the basic characteristics of low carbon fuels, its impact over conventional fuels and in achieving sustainable development goals.	**L4**
CO4	Discuss the working and energy flow in various hybrid and electric configurations.	**L3**
CO5	Analyzing the need for fuel cell technology in automotive applications.	**L4**

Strength of Correlation between CO – PO , CO- PSO in scale of 1-3- Course Articulation Matrix

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO-1	**3**	**2**	**2**								**1**	**2**	
CO-2	**2**	**2**				**2**	**3**				**1**		
CO-3	**2**	**2**	**2**				**3**				**1**	**2**	
CO-4	**3**	**3**	**3**		**2**						**2**	**3**	**2**
CO-5	**2**		**3**				**3**				**2**	**2**	

SYLLABUS

UnitNo.	**Contents**	**MappedCO**
I	**ADVANCED ENGINE TECHNOLOGY** Gasoline Direct Injection, Common Rail Direct Injection, Variable Compression Ratio Turbocharged Engines, Electric Turbochargers, VVT, Intelligent Cylinder De-activation, After Treatment Technologies, Electric EGR, Current EMS architecture.	**CO1**

II	**COMBUSTION TECHNOLOGY** Spark Ignition combustion, Compression Ignition Combustion, Conventional Dual Fuel Combustion, Low Temperature Combustion Concepts– Controlled Auto Ignition, Homogeneous Charge Compression Ignition, Premixed Charge Compression Ignition, Partially Premixed Compression Ignition, Reactivity Controlled Compression Ignition, Gasoline Direct Injection Compression Ignition.	**CO2**
III	**LOW CARBON FUEL TECHNOLOGY** Alcohol Fuels, Ammonia Fuel and Combustion, Methane Technology, Dimethyl Ether, Hydrogen Fuel Technology, Challenges, and way forward	**CO3**
IV	**HYBRID AND ELECTRIC VEHICLE (BATTERY POWERED)** Conventional Hybrids (Conventional ICE + Battery), Modern Hybrids (RCCI/GDCI Engine + Battery), Pure Electric Vehicle Technology – Challenges and Way forward	**CO4**
V	**FUEL CELL TECHNOLOGY** Fuel cells for automotive applications - Technology advances in fuel cell vehicle systems - Onboard hydrogen storage - Liquid hydrogen and compressed hydrogen - Metal hydrides, Fuel cell control system - Alkaline fuel cell - Road map to market.	**CO5**

Learning Resourses

TEXT BOOKS:

1.Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design, CRC Press, 2004.
2.Rakesh Kumar Maurya, Characteristics and Control of Low Temperature Combustion Engines. ISBN 978-3-319-68507-6 , SPRINGER

REFERENCES:

1.Iqbal Hussein, Electric and Hybrid Vehicles: Design Fundamentals, CRC Press, 2003.
2.James Larminie, John Lowry, Electric Vehicle Technology Explained, Wiley, 2003
3.Rand D.A.J, Woods, R & Dell RM Batteries for Electric vehicles, John Wiley & Sons, 1998

4.Iqbal Hussein, Electric and Hybrid Vehicles: Design Fundamentals, CRC Press, 2003.
5.James Larminie, John Lowry, Electric Vehicle Technology Explained, Wiley, 2003