

**MODERN TECHNOLOGY IN AUTOMOBILE ENGINEERING**

<b>CourseCode</b>		<b>Year</b>		<b>Semester</b>	
<b>Course Category</b>	Minor in AE	<b>Branch</b>	ME	<b>Course Type</b>	Theory
<b>Credits</b>	4	<b>L – T – P</b>	3 – 1 – 0	<b>Prerequisites</b>	Nil
<b>Continuous Internal Evaluation</b>	30	<b>Semester End Evaluation</b>	70	<b>Total Marks</b>	100

<b>Course Outcomes</b>		<b>Skill</b>	<b>Level</b>	<b>Units</b>
Upon successful completion of the course, the student will be able to				
<b>CO1</b>	Understand the current technologies in the automobile industry	Understand	L2	1,2,3,4,5
<b>CO2</b>	Apply fundamental concepts on digitalizing the engine controls system and subsystem arrangements in automobiles	Apply	L3	2,3
<b>CO3</b>	Apply fundamental knowledge of automobile engineering for design of Electronic sensor and comfort systems	Apply	L3	2,3,4
<b>CO4</b>	Analyse state of art technology in automobile field for design of safety and security systems	Analyse	L4	4,5

	<b>Contribution of Course Outcomes towards achievement of Program Outcomes</b>													
	<b>Strength of correlations (3: High, 2: Moderate, 1: Low)</b>													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	2	2	1			2	2					3	2	1
<b>CO2</b>	2	2	1			2	2					3	2	1
<b>CO3</b>	2	2	1			2	2					3	2	1
<b>CO4</b>	2	2	1			2	2					3	2	1

<b>Syllabus</b>		
<b>UNIT</b>	<b>Contents</b>	<b>Mapped COs</b>
<b>I</b>	<b>Recent Trends:</b> Common rail direct injection diesel engine, dual fuel and multi fuel engine, free piston engine, gasoline direct injection engine, homogeneous charge compression ignition engine, lean burn engine, stratified charge ignition engine, variable compression ratio engine, Wankel engine.	<b>CO1</b>
<b>II</b>	<b>Digital Engine Control System:</b> Open loop and closed loop control system; engine cooling and warm-up control; acceleration, deceleration and idle speed control; integrated engine control system; exhaust emission control engineering; on-board diagnostics; future automotive electronic systems.	<b>CO1, CO2, CO3</b>
<b>III</b>	<b>Basic sensor arrangements:</b> Types of sensors – oxygen sensor, hot wire anemometer sensor, vehicle speed sensor, detonation sensor, accelerometer sensor, crank position sensor. Microprocessor and microcomputer controlled devices in automobiles such as travel information system, keyless entry system, automatic transmission	<b>CO1, CO2, CO3</b>

	system, electronic steering system.	
IV	<b>Warning and alarm instruments</b> : Brake actuation warning system, traficators, flash system, oil pressure warning system, engine over heat warning system, air pressure warning system, speed warning system, door lock indicators, neutral gear indicator, horn design, permanent magnet horn, air & music horns. Wind shield wiper. window washer, instrument wiring system and electromagnetic interference suppression, wiring circuits for instruments, electronic instruments, dash board illumination.	<b>CO1, CO3, CO4</b>
V	<b>Safety system:</b> Antilock braking system, air bag restraint system, voice warning system, seat belt system, road navigation system, anti theft system.	<b>CO1, CO4</b>

### Learning Resources

<b>Text books</b>
<p>1.Heinz Heisler, Advanced Engine Technology, SAE International Publications, USA, 1998.</p> <p>2.A.W. Judge, Modern Electrical Equipment of Automobiles, Chapman &amp; Hall, London, 1992.</p> <p>3.William B. Ribbens -Understanding Automotive Electronics, 5th edition- Butter worth Heinemann, 1998</p> <p>4.A.P. Young, &amp;L.Griffiths, Automobile Electrical Equipment, English Language Book Society &amp; New Press, 1990.</p>
<b>Reference books</b>
<p>1.W.H.Crouse, Automobile Electrical Equipment, McGraw Hill Book Co Inc., New York, 1980.</p> <p>2.Robert N Brady, Automotive Computers and Digital Instrumentation, Prentice Hall, Eagle Wood Cliffs, New Jersey, 1988.</p> <p>3.P L. Kohli, Automotive Electrical Equipment, Tata McGraw Hill Publishing Co., Delhi, 2004</p>
<b>E- Resources &amp; other digital material</b>
<p>1.<a href="https://nptel.ac.in/courses/107/106/107106088/">https://nptel.ac.in/courses/107/106/107106088/</a></p> <p>2.<a href="https://nptel.ac.in/courses/107/103/107103084/">https://nptel.ac.in/courses/107/103/107103084/</a></p> <p>3.<a href="https://www.avnet.com/wps/portal/apac/resources/article/automotive-electronics-top-5-tech-trends-tomorrows-smart-cars/">https://www.avnet.com/wps/portal/apac/resources/article/automotive-electronics-top-5-tech-trends-tomorrows-smart-cars/</a></p>