

## AUTOTRONICS

<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 basic fundamentals of Automobile Engineering Electronics	Understand	L2	1,2,3,4,5
<b>CO2</b>	Apply the knowledge of automobile engineering for design of electronically operated sensor based fuel injection and ignition systems	Apply	L3	2,3,4
<b>CO3</b>	Analyse basic electronic devices for designing of vehicle intelligence systems on automotive electronics	Analyse	L4	3,4,5

	<b>Contribution of Course Outcomes towards achievement of Program Outcomes</b>													
	<b>Strength of correlations (3: High, 2: Moderate, 1: Low)</b>													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
<b>CO 1</b>	2		3			2						2	2	2
<b>CO 2</b>	2		3			2						2	2	2
<b>CO 3</b>	3		3			3						2	2	2

<b>Syllabus</b>		
<b>UNIT</b>	<b>Contents</b>	<b>Mapped COs</b>
<b>I</b>	<b>AUTOMOTIVE FUNDAMENTALS:</b> The engine-components-Drive train -Starting &charging systems operation- Ignition system- Suspension systems-brakes -ABS - Steering system	<b>CO1</b>
<b>II</b>	<b>AUTOMOTIVE SENSORS:</b> Temperature sensor-gas sensor-knock sensor-pressure sensor - flow sensor torque sensor-crash sensor-Speed sensor and acceleration sensor-micro sensor-smart sensor-operation, types, characteristics, advantages and their applications. Solenoids, stepper motors, relay.	<b>CO1, CO2</b>
<b>III</b>	<b>FUEL INJECTION AND IGNITION SYSTEM:</b> Introduction -fuel system components-electronic fuel system fuel injection-types-throttle body versus port injection-electronic control fuel injection-operation different types-fuel injectors-idle speed control-continuous injection system-high pressure diesel fuel injection -MPFI	<b>CO1, CO2, CO3</b>

	system -Electronic ignition system-operation-types-Electronic spark timing control.	
<b>IV</b>	<b>FUNDAMENTALS OF AUTOMOTIVE ELECTRONICS</b> Current trends in automotive electronic engine management system, electromagnetic interference suppression, electromagnetic compatibility, electronic dashboard instruments, onboard diagnostic system, security and warning system.	<b>CO1, CO2, CO3</b>
<b>V</b>	<b>VEHICLE INTELLIGENCE:</b> Introduction -basic structure-vision based autonomous road vehicles architecture for dynamic vision system -features-applications- A visual control system using image processing and fuzzy theory-An application of mobile robot vision to a vehicle information system- object detection, collision warning and Avoidance system-low tyre pressure warning system.	<b>CO1, CO3</b>

### Learning Resources

<b>Text books</b>
<ol style="list-style-type: none"> <li>1. William B. Ribbens, Understanding Automotive Electronics - Sixth edition Elsevier Science 2003.</li> <li>2. Automotive Sensors Handbook, 8th Edition, 2011, BOSCH</li> <li>3. Crouse, W.H "Automobile Electrical Equipment", McGraw-Hill Book Co., Inc., New York, 3rd edition, reprint 2010 .</li> </ol>
<b>Reference books</b>
<ol style="list-style-type: none"> <li>1. Ronald K. Jurgen, Sensors and Transducers - SAE 2003</li> <li>2. Jack Erjavec, Robert Scharff, Automotive Technology - Delmar publications Inc 1992</li> <li>3. Ronald K. Jurgen, Electric and Hybrid-electric vehicles - SAE 2002</li> <li>4. Ichiro Masaki, Vision-based Vehicle Guidance - Springer Verlag, Newyork 1992</li> <li>5. Jay Webster, Class Room Manual For Automotive Service And System - Delmer Publications Inc 1995</li> <li>6. Ron Hodkinson, John Fenton, Light Weight Electric/Hybrid Vehicle Design - Read Educational and Professional Publications Ltd. 2001</li> </ol>
<b>E- Resources &amp; other digital material</b>
<ol style="list-style-type: none"> <li>1.. <a href="http://nptel.ac.in/courses/108108076/">http://nptel.ac.in/courses/108108076/</a></li> <li>2. <a href="http://nptel.ac.in/courses/108108176/">http://nptel.ac.in/courses/108108176/</a></li> <li>3. <a href="https://books.google.co.in/books?id=PaznCAAQBAJ&amp;printsec=frontcover&amp;dq=isbn:9401168814&amp;hl=en&amp;sa=X&amp;ved=0ahUKEwiIrKC9sN7ZAhXKQY8KHTrwB1gQ6AEIJjAA#v=onepage&amp;q&amp;f=false">https://books.google.co.in/books?id=PaznCAAQBAJ&amp;printsec=frontcover&amp;dq=isbn:9401168814&amp;hl=en&amp;sa=X&amp;ved=0ahUKEwiIrKC9sN7ZAhXKQY8KHTrwB1gQ6AEIJjAA#v=onepage&amp;q&amp;f=false</a></li> </ol>