

AUTOTRONICS

CourseCode	20ME5702	Year	IV	Semester	I
Course Category	Minor in AE	Branch	ME	Course Type	Theory
Credits	4	L – T – P	3 – 1 – 0	Prerequisites	Nil
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes		Skill	BTL	Units
Upon successful completion of the course, the student will be able to				
CO1	Understand the basic fundamentals of Automobile Engineering Electronics	Understand	L2	1,2,3,4,5
CO2	Apply the knowledge of automobile engineering for design of electronically operated sensor based fuel injection and ignition systems	Apply	L3	2,3,4
CO3	Analyse basic electronic devices for designing of vehicle intelligence systems on automotive electronics	Analyse	L4	3,4,5

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

Syllabus		
UNIT	Contents	Mapped COs
I	AUTOMOTIVE FUNDAMENTALS: The engine-components-Drive train -Starting &charging systems operation- Ignition system- Suspension systems-brakes -ABS - Steering system	CO1
II	AUTOMOTIVE SENSORS: 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.	CO1, CO2
III	FUEL INJECTION AND IGNITION SYSTEM: 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 system -Electronic ignition system-operation-types-Electronic spark timing control.	CO1, CO2, CO3
IV	FUNDAMENTALS OF AUTOMOTIVE ELECTRONICS Current trends in automotive electronic engine management system, electromagnetic interference suppression, electromagnetic compatibility, electronic dashboard instruments, onboard diagnostic system, security and warning system.	CO1, CO2, CO3

V	VEHICLE INTELLIGENCE: 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.	CO1, CO3
----------	--	---------------------

Learning Resources

Text books

1. William B. Ribbens, Understanding Automotive Electronics - Sixth edition Elsevier Science 2003.
2. Automotive Sensors Handbook, 8th Edition, 2011, BOSCH
3. Crouse, W.H "Automobile Electrical Equipment", McGraw-Hill Book Co., Inc., New York, 3rd edition, reprint 2010.

Reference books

1. Ronald K. Jurgen, Sensors and Transducers - SAE 2003
2. Jack Erjavec, Robert Scharff, Automotive Technology - Delmar publications Inc 1992
3. Ronald K. Jurgen, Electric and Hybrid-electric vehicles - SAE 2002
4. Ichiro Masaki, Vision-based Vehicle Guidance - Springer Verlag, New York 1992
5. Jay Webster, Class Room Manual For Automotive Service And System - Delmer Publications Inc 1995
6. Ron Hodgkinson, John Fenton, Light Weight Electric/Hybrid Vehicle Design - Read Educational and Professional Publications Ltd. 2001

E- Resources & other digital material

1. <http://nptel.ac.in/courses/108108076/>
2. <http://nptel.ac.in/courses/108108176/>
3. <https://books.google.co.in/books?id=PznCAAAQBAJ&printsec=frontcover&dq=isbn:9401168814&hl=en&sa=X&ved=0ahUKEwiIrKC9sN7ZAhXKQY8KHTrwB1gQ6AEIJjAA#v=onepage&q&f=false>