SEMESTER S8

AUTOTRONICS

Course Code	OEMRT831	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	ESE Marks	60
Credits	3	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	None	Course Type	Theory

Course Objectives:

1. To understand the fundamentals and control of automobiles using electronic equipment.

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	Automotive fundamentals: The engine, components, drive train, starting & charging systems operation, ignition system, suspension systems, brakes, steering system. Sensors and actuators for power train and chassis systems: Introduction, working principle, throttle position, Manifold absolute pressure (MAP), lambda sensor, detonation, emission.	9
2	SI Engine Management: Feedback carburettor system, throttle body injection and multi point fuel injection system, injection system controls, advantage of electronic ignition systems, three way catalytic converter, group and sequential injection techniques. Working of the fuel system components. Advantages of electronic ignition systems CI Engine Management: Parameters affecting combustion, noise and emissions in CI engines. Pilot, main, advanced, post injection and retarded post injection layout of the Common Rail Fuel Injection system, working of components like fuel injector, fuel pump, rail pressure limiter, flow limiter, EGR valve control in electronically controlled systems.	9
3	Safety and comfort : Antilock Braking System (ABS), Electronic Stability Control (ESC), Roll Stability Control (RSC), traction control system,	9

KTU SPECIAL

	adaptive cruise control, electric power steering, electronic clutch, electronic suspension system, airbags. Electric vehicles and hybrid vehicles: Introduction, electric vehicle development, system layout, basic system components, fuel cell, electric vehicle, hybrid vehicle: series hybrid vehicle, parallel hybrid vehicle, CNG-electric hybrid vehicle.	
4	Vehicle Intelligence: Introduction, basic structure, vision based autonomous road vehicles, architecture for dynamic vision system, features, applications, application of mobile robot vision to a vehicle information system, object detection, collision warning and avoidance system, low tire pressure warning system.	**9**

Course Assessment Method

(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

KTU SPECIAL

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	**15**	**10**	**10**	**40**

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Acquire knowledge on various electronic controls, sensors and actuators used in automobiles	**K2**
CO2	Obtain an overview of components, sub-systems, and basics of engine management employed in today's automotive industry.	**K2**
CO3	Apply fundamental knowledge for design of safety systems like airbags, ABS, etc. in automobiles.	**K3**
CO4	Comprehend the basic system components and their functions of electric and hybrid vehicles.Acquire a fundamental knowledge on intelligence vehicle systems.	**K3**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										
CO2	3	2										
CO3	3	2	2						1			
CO4	3	2	2						1			2

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

KTU SPECIAL

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Automobile electrical and electronic systems	Tom Denton	BH Publications	3rd Ed., 2004
2	Automobile Electrical & Electronic Equipments	Young, Griffitns	Butterworths	
3	Automotive Electronics Design Fundamental	Najamuz Zaman	Springer,	1st Ed., 2015
4	Fundamentals of Motor Vehicle Technology on Chassis and Body Electronics	Hillier's	Nelson	5th Ed.

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Automotive Technology	Jack Erjavec, Robert Scharff	Delmar publications Inc	1992
2	Electric and Hybrid-electric vehicles	Ronald K. Jurgen	SAE	2002
3	Vision-based Vehicle Guidance	Ichiro Masaki	Springer Verlag, Newyork	1992
4	Class room manual for automotive service and system	Jay Webster	Delmer	1995

KTU SPECIAL