

COURSE CODE	COURSE TITLE	L	T	P	C
1154EC102	AUTOMOTIVE ELECTRONICS	3	0	0	3

Course Category:

Program Elective (2)

Preamble:

This subject serves as the prerequisite for many subjects such as basic electrical & electronics engineering, microprocessor & micro controller. It introduces students to cognitive learning in applied electrical & electronics and develops problem solving skills with both theoretical and engineering oriented problems.

1. Pre-Requisite:

Basic Electronics Engineering

Microprocessor and microcontroller

2. Related Courses:

Embedded system

3. Course Educational Objective:

The student should be made to

- Learn concepts and develop basic skills necessary to diagnose automotive electrical problems
- Understand starting and charging, lighting systems, advanced automotive electrical systems, to include body electrical accessories, and basic computer control.
- Understand the instructions necessary to take the Automotive Service Excellence examination.

4. Course Outcomes:

After successful completion of this course, the students will be able to

CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	Explain the basic automotive and transmission systems.	K2
CO2	Explain the various functions of the sensors and actuators in the field of automotive applications	K2

CO3	Discuss about the various analog and digital control methods.	K2
CO4	Describe the Electronic control unit design.	K2
CO5	Explain the various interfacing techniques and applications of automotive electronics.	K2

6. Correlation with Program Outcomes:

CO/PO Mapping (H/M/L indicates strength of correlation) H-HIGH, M-Medium, L-LOW												
COs	Programmed Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L		L	M		M						
CO2	M											L
CO3			L			L						
CO4												L
CO5		M										

7. SYLLABUS:

UNIT 1 Fundamental Of Automotive Electronics 9

Current trends in automotive electronic engine management system, electromagnetic interference suppression, electromagnetic compatibility, electronic dashboard instruments, onboard diagnostic system, security and warning system.

Unit 2: Sensor technologies in Automotive 9

Interfacing principles: Operation, topologies and limitations of all sensors covered in the above to in-vehicle processing or communications nodes. Interfacing electronics, Operational amplifier circuits, Instrumentation amplifiers, Comparators. Level shifting, Wave-shaping, Filters. Noise mechanisms and reduction. ADCs and DACs. Use of Actuators: Types, Working principle, Characteristics, limitations and use within the automotive context of each type

Unit 3: Automotive Control Systems. 9

Control system approach in Automotive: Analog and Digital control methods, stability Augmentation, control augmentation, Transmission control, System components and Functions. Cruise control, traction control, actuator limiting, wind-up, gain scheduling, Adaptive control. Special Control Schemes: Vehicle braking fundamentals, Antilock

Springer, 2004.

4. Allan Bonnick, Automotive Computer Controlled Systems: Diagnostic Tools and Techniques, Elsevier Science, 2001.

5. UweKiencke and Lars Nielsen, Automotive Control Systems: Engine, Driveline and Vehicle, 2nd Edition, Springer Verlag, 2005.

6. BehzadRazavi, "Design of Analog CMOS Integrated Circuits" McGraw-Hill, 1999.

iii. Online resources:

www.faadooengineers.com.

www.nptelvideos.in