OPEN ELECTIVES OFFERED FROM THE DEPARTMENT

V – VIII SEMESTER

Sl. No.	Course Code	Course Title	Credits			
			L	T	P	Total
1.	ECOE03	Automotive Electronics	3	0	0	3
2.	ECOE04	IOT Applications	3	0	0	3

AUTOMOTIVE ELECTRONICS

Subject Code: ECOE03 **Credits: 3:0:0**
Prerequisites: Nil **Contact Hours: 42**
Course Coordinator: Flory Francis

UNIT – I

Automotive Fundamentals Overview: Ignition System, Spark plug, Spark pulse generation, Ignition Timing, Brakes, Steering System, Battery, Starting System.

UNIT – II

Sensors: Oxygen (O2/EGO) Sensors, Throttle Position Sensor (TPS), Engine Crankshaft Angular Position (CKP) Sensor, Magnetic Reluctance Position Sensor, Engine Speed Sensor, Ignition Timing Sensor, Hall effect Position Sensor, Knock Sensor, Optical Crankshaft, Manifold Absolute Pressure (MAP) Sensor

UNIT – III

Actuators: Fuel Metering Actuator, Fuel Injector, Ignition Actuator

Exhaust After-Treatment Systems: Catalytic Converter, Exhaust Gas Recirculation (EGR), Evaporative Emission Systems, electronic engine control systems and electronic ignition control systems

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UNIT – IV

Vehicle Motion Control: Antilock Brake System (ABS), Electronic Steering Control, Power Steering, Traction Control, Electronically controlled suspension.
Integrated Body: Safety Systems.

UNIT – V

Automotive Diagnostics: Timing Light, Engine Analyzer, On-board diagnostics, Off-board diagnostics, Expert Systems.

Future Automotive Electronic Systems: Alternative Fuel Engines, Collision Avoidance Radar warning Systems, Low tire pressure warning system, Radio navigation.

Text Books:

1. William B. Ribbens**, "**Understanding Automotive Electronics", 8th Edition, SAMS/Elsevier Publishing, 2017.

References:

1. Robert Bosch GmbH, "Automotive Electrics Automotive Electronics Systems and Components", 5th edition, John Wiley& Sons Ltd., 2007

Course Outcomes (COs):

1. Explain fundamentals of automotive electronics systems for different applications. (POs - 1, 2, 5, PSO - 2)
2. Apply the knowledge of embedded systems in terms of sensor functioning to build subsystems for automotive electronics. (POs - 1, 2, 5, PSO - 2)
3. Analyze the functioning of actuator systems involved in the exhaust after-treatment system, engine control system and ignition control system using electronics. (POs - 1, 2, 5, PSO - 2)
4. Apply the knowledge of electronics in vehicle motion control systems, antilock braking systems, steering control systems suspension systems and communication system using electronics. (POs - 1, 2, 5, PSO - 2)
5. Identify defects in engine operation using automotive diagnostics and future automotive electronic systems. (POs - 1, 2, 5, PSO -2)

COURSE NAME: IOT Applications	
Course Code: ECOE04	**Credits: 3:0:0**
Prerequisites: Nil	**Contact Hours: 42**
Course Coordinator: Dr. Lakshmi S	

UNIT -1

Review of Basics of IoT: Definition and Characteristics of IoT, Things in IoT, IoT Protocols, IoT Functional Blocks, IoT Communication Models, IoT Communication APIs, IoT Enabling Technologies, IoT levels and deployment templates.

UNIT -2

Developing Internet of Things: IoT Platform design methodology, Specifications: Requirements, Process, Domain, Information, Services, Level, Functional, Operational, Integration, Application and Development.

UNIT -3

IoT Applications: Home automation: Supply of Gas and Water, Smart Meters, Smart lighting, Home intrusion detection; Smart City: Smart parking environment: Smart Grid, Traffic control, Waste management

UNIT -4

IoT Applications: Environmental monitoring: Weather monitoring system, Weather reporting bot, Air Quality and monitoring pollutants, Forest fire detection.

UNIT -5

IoT Applications: IOT in Automobiles: Intelligent Transportation and the Connected Vehicle, Vehicular Ad-hoc Networks (VANETs)

Textbooks:

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.

References:

1. Waher, Peter. Mastering the Internet of Things. 1st ed. Packt Publishing, 2018. Web. 14 Oct. 2022.

Course outcomes

1. Review the basics of IoT technology. (POs-1,2,3,4,5,8,12, PSO-3)

2. Understand the IoT specifications and requirements for applications. (POs-1,2,3,4,5,8,12, PSO-3)
3. Study the design of IoT applications for home and city. (POs-1,2,3,4,5,8,12, PSO-3)
4. Analyze the design of IoT for environmental monitoring(POs-1,2,3,4,5,8,12, PSO-3)
5. Interpret the application of IoT for automobiles. (POs-1,2,3,4,5,8,12, PSO-3)