### Course Objectives: The course is aimed at:

1. Teaching the students concepts of data processing, instrumentation and ECU recording equipment.
2. Providing students, a good understanding about automotive sound system and navigation for vehicular systems.
3. Providing details about the positioning and guidance systems.

### Expected Course Outcome:

At the end of the course, the student will be able to

1. Understand the data processing in motor vehicles.
2. Comprehend the networking in automotive.
3. Gain knowledge about the information & communication.
4. Understand the ECU recording equipment and Parking systems.
5. Explore the sound system for automotive.
6. Understand the Positioning and Map Matching for vehicles.
7. Understand the Route Planning and Route Guidance techniques for automotives.
8. Design and implement vehicular information and communication system.

### Student Learning Outcomes (SLO):

1. Having an ability to apply mathematics and science in engineering applications.
2. Having an ability to design a component or a product applying all the relevant standards and with realistic constraints.

### Module: 1 Data processing in motor vehicles

- Requirements, Electronic control unit (ECU), Architecture, CARTRONIC.

### Module: 2 Automotive networking

- Cross-system functions, Requirements for bus systems, Classification of bus systems, Applications in the vehicle, Coupling of networks, Example.

### Module: 3 Instrumentation

- Information and communication areas, Driver information systems, Instrument clusters, Display types.

### Module: 4 ECU recording equipment and Parking systems

- Legal requirements, Design variations, parking aid with ultrasonic sensors, Further development.

### Module: 5 Automotive sound systems

- Radio tuners, Conventional tuners, Digital receivers, Reception quality, Reception improvement, Auxiliary equipment, Vehicle antennas.

### Module: 6 Positioning and Map Matching

- Dead Reckoning, Global Positioning System, Sensor fusion. Conventional map matching, Fuzzy logic Based Map matching, Map aided Sensor calibration.

### Module: 7 Route Planning and Route Guidance

- Shortest Path, Heuristic Search, Bidirectional Search, Hierarchical search, Guidance while En Route, Guidance while off Route, Guidance with dynamic information.

### Module: 8 Contemporary Topics

- Total Lecture Hours: 45 hours

### Text Book(s)

Reference Books


Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar

Mode of evaluation:

Recommended by Board of Studies | 09/03/2016
Approved by Academic Council | No. 40 | Date | 18/03/2016

Indicative project titles

1. Parking aid with ultrasonic sensors
2. Vehicle tracking using global positioning system (GPS)
3. Fuzzy logic Based Map matching
4. Finding the Shortest path from a given road network
5. Route guidance with dynamic route information