

MODERN TECHNOLOGY IN AUTOMOBILE ENGINEERING

CourseCode	20ME5603	Year	III	Semester	II
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	Level	Units
Upon successful completion of the course, the student will be able to				
CO1	Understand the current technologies in the automobile industry	Understand	L2	1,2,3,4,5
CO2	Apply fundamental concepts on digitalizing the engine controls system and subsystem arrangements in automobiles	Apply	L3	2,3
CO3	Apply fundamental knowledge of automobile engineering for design of Electronic sensor and comfort systems	Apply	L3	2,3,4
CO4	Analyse state of art technology in automobile field for design of safety and security systems	Analyse	L4	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	2	1			2	2					3	2	1
CO2	2	2	1			2	2					3	2	1
CO3	2	2	1			2	2					3	2	1
CO4	2	2	1			2	2					3	2	1

Syllabus		
UNIT	Contents	Mapped COs
I	Recent Trends: Common rail direct injection diesel engine, dual fuel and multi fuel engine, free piston engine, gasoline direct injection engine, homogeneous charge compression ignition engine, lean burn engine, stratified charge ignition engine, variable compression ratio engine, Wankel engine.	CO1
II	Digital Engine Control System: Open loop and closed loop control system; engine cooling and warm-up control; acceleration, deceleration and idle speed control; integrated engine control system; exhaust emission control engineering; on-board diagnostics; future automotive electronic systems.	CO1, CO2, CO3
III	Basic sensor arrangements: Types of sensors – oxygen sensor, hot wire anemometer sensor, vehicle speed sensor, detonation sensor, accelerometer sensor, crank position sensor. Microprocessor and microcomputer controlled devices in automobiles such as travel information system, keyless entry system, automatic transmission	CO1, CO2, CO3

	system, electronic steering system.	
IV	Warning and alarm instruments : Brake actuation warning system, traficators, flash system, oil pressure warning system, engine over heat warning system, air pressure warning system, speed warning system, door lock indicators, neutral gear indicator, horn design, permanent magnet horn, air & music horns. Wind shield wiper. window washer, instrument wiring system and electromagnetic interference suppression, wiring circuits for instruments, electronic instruments, dash board illumination.	CO1, CO3, CO4
V	Safety system: Antilock braking system, air bag restraint system, voice warning system, seat belt system, road navigation system, anti theft system.	CO1, CO4

Learning Resources

Text books

- 1.Heinz Heisler, Advanced Engine Technology, SAE International Publications, USA, 1998.
- 2.A.W. Judge, Modern Electrical Equipment of Automobiles, Chapman & Hall, London, 1992.
- 3.William B. Ribbens -Understanding Automotive Electronics, 5th edition- Butter worth Heinemann, 1998
- 4.A.P. Young, &L.Griffiths, Automobile Electrical Equipment, English Language Book Society & New Press, 1990.

Reference books

- 1.W.H.Crouse, Automobile Electrical Equipment, McGraw Hill Book Co Inc., New York, 1980.
- 2.Robert N Brady, Automotive Computers and Digital Instrumentation, Prentice Hall, Eagle Wood Cliffs, New Jersey, 1988.
- 3.P L. Kohli, Automotive Electrical Equipment, Tata McGraw Hill Publishing Co., Delhi, 2004

E- Resources & other digital material

- 1.<https://nptel.ac.in/courses/107/106/107106088/>
- 2.<https://nptel.ac.in/courses/107/103/107103084/>
- 3.<https://www.avnet.com/wps/portal/apac/resources/article/automotive-electronics-top-5-tech-trends-tomorrows-smart-cars/>