

22MTOE05	MATERIALS FOR AUTOMOTIVE APPLICATIONS				L	T	P	C
					3	0	0	3
Course Objectives:								
1.	To give an overview of material properties, use of materials selection chart and considerations for material selection							
2.	To impart knowledge about the basis of materials selection							
3.	To give insight about the factors that influence materials selection for engines and transmission system							
4.	To instill the knowledge required for the selection of materials for automotive structures							
5.	To render the basis of material selection for electronics devices in the automobile.							
UNIT I	ENGINEERING MATERIALS AND THEIR PROPERTIES				9	+	0	
Classes of engineering materials - the evolution of engineering materials, Definition of materials properties, Displaying material properties using materials selection charts, Forces for change in materials selection and design, Materials and the environment. Selection of materials for automotive, aerospace, marine and defence applications.								
UNIT II	BASIS OF MATERIAL SELECTION				9	+	0	
Selection strategy, Attribute limits and Material indices, structural index Selection procedure: Design process - types of design, design requirements, Function, Material attributes, Shape and Manufacturing processes - Materials processing and design processes and their influence on design, Process attributes, Systematic process selection, Process selection diagrams, Process cost, Energy consumption for production, Material costs, Availability, Recyclability, Environmental consideration. Computer aided selection.								
UNIT III	MATERIALS FOR ENGINES AND TRANSMISSION SYSTEMS				9	+	0	
Materials selection for IC engines: Piston, piston rings, cylinder, Engine block, Connecting rod, Crank shaft, Fly wheels, Gear box, Gears, Splines, Clutches.								
UNIT IV	MATERIALS FOR AUTOMOTIVE STRUCTURES				9	+	0	
Materials selection for bearings, leaf springs, chasis& frames, Bumper, shock absorbers, Damping fluid, wind screens, panels, brake shoes, Disc, wheels, differentials , damping and Antifriction fluids, Tyres and tubes.								
UNIT V	ELECTRONIC MATERIALS FOR AUTOMOTIVE APPLICATIONS				9	+	0	
Materials for electronic devices meant for engine control, ABS, Steering, Suspension, Sensors, Temperature sensors for climate control, anti-collision, Anti-fog, Head lamps.								
					Total (L+T) = 45 Hours			
Course Outcomes:								
Upon completion of this course, the students will be able to:								
CO1	:	Identify the criteria and forces that cause the changes in materials selection.						
CO2	:	Investigate the influence of structural index, manufacturing process, design and Functional requirements on selection strategies.						
CO3	:	Recognize the temperature regime, nature of load and property requirements of materials for engines and transmission system.						
CO4	:	Analyse the various stresses acting on the structural members of automobile under Dynamic loading and select suitable material.						
CO5	:	Adjudicate the apt material for electronic devices used in automobiles						

Text Books:	
1.	Charles J A and Crane. F A. A., -Selection and Use of Engineering Materials, 3rd Edition, Butterworths, London UK, 1996.
2.	Jason Rowe, —Advanced Materials in Automotive Engineering, Wood Head Publishing, 2012.
Reference Books:	
1.	Ahmed E, —Advanced composite materials for Automotive applications, Wiley, 2013
2.	Don H Wright, Testing Automotive Materials and Components, SAE 1993.
3.	Geoff Davis, — Materials for Automobile bodies, Butter Worth Heinemann, 2012
4.	Hiroshi Yamagata, -The Science and Technology of Materials in Automotive Engines, Elsevier, 2005
5.	Mstislav A M, Valentin N A, Gleb V M, —Automotive materials: a handbook for the mechanical engineer, NTIS, 1972.

CO PO MAPPING

CO/PO	PO 1	PO 2	PO3	PO 4	PO5	PO6	PO 7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO1	PSO2	PSO3	PSO 4
CO1	1	2	0	1	2	0	0	0	0	0	1	2	2	2	1	
CO2	2	3	2	1	3	1	0	2	1	0	1	2	2	3	1	
CO3	0	1	1	0	2	1	2	3	1	0	1	2	1	1	2	
CO4	1	2	3	3	2	1	0	0	0	1	3	2	1	1	0	
CO5	2	1	1	1	2	0	1	0	2	1	1	0	0	0	1	1
Total	1.2	1.8	1.4	1.2	2.2	0.6	0.6	1	0.8	0.4	1.4	1.6	1.2	1.4	1	0.2

1- Faintly, 2- Moderately, 3- Strongly