

Course code	Course Name	L-T-P – Credits	Year of Introduction
AU363	PLASTICS AND COMPOSITES IN AUTOMOBILE	3-0-0-3	2016
Prerequisite : Nil			
Course Objectives <ul style="list-style-type: none"> To introduce different types of plastics and composite materials, their properties and applications. 			
Syllabus Introduction to plastics-thermoplastics and thermosets-Processing of Plastics-Calendering.-Thermoforming-Fundamentals of composites-Polymer matrix composites-Metal matrix composites-Ceramic matrix composites			
Expected outcome. <ul style="list-style-type: none"> The students will become aware of different types of plastics and composites used in the manufacture of automobile components. 			
Text Books: <ol style="list-style-type: none"> Chawla K.K., Composite materials, Springer – Verlag, 1987 Mathews F.L. and Rawlings R.D., Composite materials: Engineering and Science, Chapman and Hall, London, England, 1st edition, 1994. 			
References: <ol style="list-style-type: none"> Blow C.M and Hepburn C, rubber Technology and Manufacture, 1982 Clyne T.W. and Withers P.J., Introduction to Metal Matrix Composites, Cambridge University Press, 1993. Freakly P.K and Payne A.R, Theory and Practice of engineering with rubber, Applied science publishers Hobel E.F, rubber spring Design Raymond A Higgins, Materials for Engineers and Technicians, Fourth edition, Newnes an imprint of Elseviers Sharma S.C., Composite materials, Narosa Publications, 2000. Strong A.B., Fundamentals of Composite Manufacturing, SME, 1989. 			
Course Plan			
Module	Contents	Hours	End Sem. Exam Marks
I	Application of natural rubber, synthetic rubber and plastics in automobiles. Introduction to plastics: Structure and characteristics/properties of plastics, Polymerization, Compounding materials, Classification of plastic, thermoplastics and thermosets,	7	15%
II	Processing of Plastics: Extrusion, Injection moulding, Thermoforming, Compression moulding, Transfer moulding. Rubber, plastic springs and its characteristics. Applications of plastics in automobile interior.	7	15%
FIRST INTERNAL EXAMINATION			
III	Fundamentals of composites: Need for composites, Enhancement of properties, Classification of composites, properties relationships of	8	15%

	polymers and elastomers, resilience, creep, hysteresis, and damping, stability, set and stress relaxation, behavior under dynamic application.		
IV	Polymer matrix composites: Polymer matrix resins, Thermosetting resins, thermoplastic resins, Reinforcement fibres, Various types of fibres. Tyre and tyre manufacture, blending, curing, vulcanization, compounding, composite materials,	8	15%
SECOND INTERNAL EXAMINATION			
V	Fluid seals, flexible coupling and hoses, seals for static and dynamic application, effect of heat and oil aging, frictional behaviour, types of couplings, selection of couplings, torque v/s deflection characteristics, hydraulic hoses- materials and manufacturing.	8	20%
VI	composite materials, FRP and GRP, application in automobiles, manufacturing techniques of composite material components	7	20%
END SEMESTER EXAM			

Question Paper Pattern

Maximum marks: 100

Time: 3 hours

The question paper shall consist of three parts

Part A

4 questions uniformly covering modules I and II. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B

4 questions uniformly covering modules III and IV. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C

6 questions uniformly covering modules V and VI. Each question carries 10 marks
Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed