

GUJARAT TECHNOLOGICAL UNIVERSITY

AUTOMOBILE ENGINEERING (02) SPECIAL PURPOSE VEHICLES SUBJECT CODE: - 2180203 B.E 8TH SEMESTER

Type of Course: -Advanced Application

Pre-requisite:- Automobile Systems

Course Objective: The course is designed to give knowledge of various special purpose vehicles existing systems and their applications in the present context.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P		C	Theory Marks			Practical Marks		
			ESE (E)		PA (M)		ESE (V)		PA (I)	
PA	ALA	ESE		OEP						
3	1	0	4	70	20	10	30	0	20	150

CONTENT:-

S.N.	Course Content	Total Hours	% Weightage
1	Introduction : Classification of Special Purpose Vehicles, wheel type & track type, applications.	4	10
2	Principles and design considerations Study of working principles and design considerations of different systems involved such as power system, transmission, final drive, lubrication, electrical, braking, steering, pneumatic & hydraulic control circuits.	9	22
3	Constructional working features and instrumentation Study of different types of earth moving machinery such as rippers, Scrapers and shovels, Loaders , Excavators, Dumpers, Bulldozers, Fork Lift, JCB and Road rollers.	10	22
4	Tractors: Classification of tractors-lay out of wheeled tractor- power transmission system- steering system- accessories of wheeled tractors- hydraulic control system- power take off unit.	6	12
5	Mobile Cranes: Basic characteristics of truck cranes, stability and design features, control systems and safety devices.	6	12
6	Special purpose vehicles: Features of Oil tankers- Articulated vehicles, working -features of Ambulance, fire extinguishing vehicle and Tipper-working of Hover craft.	6	12
7	Ergonomic applications: Human factors in special purpose vehicle design with reference to comfort, convenience and safety, effects of noise, vibration and thermal stresses on human performance. Economics of special purpose vehicle utilization.	4	10
		45	100

SUGGESTED SPECIFICATION TABLE WITH MARKS (THEORY):

Distribution of Theory Marks (%)					
R Level	U Level	A Level	N Level	E Level	C Level
15	15	25	10	5	-

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyse and E: Evaluate

NOTE: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table

REFERENCE BOOKS:

1. Y. Pokras and M. Tushnyakov, "Construction Equipment Operation & Maintenance", MIR, Moscow.
2. A. Astskhov, "Truck Cranes", MIR, Moscow.
3. E.G. Poninson, "Motor Graders", MIR, Moscow.
4. Hand book of Earth Moving Machinery - Central Water & Power Commission (Govt. of India)
5. N. Rudenko, "Material Handling Equipment", M.R. Publishers.
6. Sheldon, R.Shacket, "Electric Vehicles", Domus Books, New York
7. David A. Day, Neal B. H. Benjamin, "Construction Equipment Guide", Wiley;
8. C.P. Nakra, "Farm Machines and Equipment", Dhanpat Rai Publications, New Delhi
9. Donnell hunt and L .W.garver - Farm machinery and mechanism - Iowa state university press
10. J.Y Wong - Theory of Ground vehicles - John Wiley and Sons

COURSE OUTCOME:

1. Students will be able to understand special type of vehicles based on the need and purpose.
2. Students will be able describe the working principles.
3. Students will be able to understand design considerations and features of special purpose vehicles.

Tutorial:

4. Study of tipping mechanism of a dumper
5. Study of forklift truck
6. Study of operation of a truck crane
7. Study of technical & operational features of a tractor
8. Study of technical & operational features of a power scraper
9. Study of technical & operational features of a power hoe and shovel
10. Study of an extinguishing vehicle

List of Open Source Software/learning website:

1. Videos on special purpose vehicles

ACTIVE LEARNING ASSIGNMENTS:

Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.