



FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: Bachelor of Technology (Automobile Engineering)

Semester: VII

Course Code: 202010706

Course Title: Special Purpose Vehicles

Course Group: Professional Elective Course-III

Course Objectives: Some vehicles are designed for special purposes and applications. The course explores the technical details of such vehicles. First the special purpose vehicles are classified, and then their working principle and working is studied. Subsequently, few specialized vehicles such as farm tractors, mobile cranes, etc. are investigated in detail.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Internal		External		Total
				Theory	J/V/P*	Theory	J/V/P*	
3	0	0	3	50/18	--/--	50/17	--/--	100/35

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction : Classification of special purpose vehicles, wheel type & track type, applications, vehicles for differently challenged persons	5
2	Principles and design considerations of special purpose vehicles: 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.	10
3	Earth Moving Machines & Tractors: Construction and working features of different types of earth moving machinery such as Tippers, Scrapers and shovels, Loaders, Excavators, Dumpers, Bulldozers, Fork Lift and Road rollers. Classification of tractors-lay out of wheeled tractor-power transmission system & drive line - steering system - accessories of wheeled tractors- hydraulic control system- power take off unit.	15



4	Mobile Cranes & Miscellaneous Vehicles: Basic characteristics of truck cranes, stability and design features, control systems and safety devices. Features of Oil tankers- Articulated vehicles, working -features of Ambulance, fire extinguishing vehicle and Tipper-working of Hover craft, ATVs, Racing Cars.	10
5	Ergonomic considerations: 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.	5

Reference Books:

1	Farm Machines and Equipment by C.P.Nakra, Dhanpat Rai Publications, New Delhi.
2	Material Handling Equipment by N.Rudenko, M.R. Publishers
3	Construction Equipment Guide by David A. Day, Neal B. H. Benjamin, Wiley Publications
4	Theory of Ground vehicles by J.Y Wong, John Wiley and Sons.
5	Motors Graders by E.G.Paninson, MIR, Moscow
6	Construction Equipments Operation and Maintenance by Y. Pokras and M. Tushnyakov, MIR, Moscow

Supplementary learning Material:

1	NPTEL resources.
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Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment

Internal Evaluation :

The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc. where individual component weightage should not exceed 20%.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks						R: Remembering; U: Understanding; A: Application, N: Analyze; E: Evaluate; C: Create
R	U	A	N	E	C	
25	25	25	15	5	5	

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.

Course Outcomes (CO):



Sr.	Course Outcome Statements	%weightage
CO-1	Understand classification and different application of special purpose vehicles.	10
CO-2	Understand the design consideration of special purpose vehicles.	25
CO-3	Understand different features of earth moving machineries and tractors.	35
CO-4	Understand design features of mobile cranes and special purpose vehicles.	20
CO-5	Understand importance of ergonomic consideration of special purpose vehicles.	10

Curriculum Revision:

Version:	2
Drafted on (Month-Year):	June-2022
Last Reviewed on (Month-Year):	
Next Review on (Month-Year):	June-2027