

**M.E Semester: 3 M.E Mechanical (Automobile Engineering)**  
**Subject Name: special purpose vehicles MEA302**

**A. Course Objective**

- To present a problem oriented in depth knowledge of Special purpose vehicles
- To address the underlying concepts and methods behind Special purpose vehicles

**B. Teaching / Examination Scheme**

SUBJECT		Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
		L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
CODE	NAME	Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
MEA302	Special purpose vehicles	4	0	2	6	5	3	70	30	20	30	150

**C. Detailed Syllabus**

1. Classification of Special Purpose Vehicles: based on applications, wheel types & truck type.
2. Study of working principles & design considerations: of different systems involved like power system, transmission, final drive, lubrication, electrical, braking, steering, pneumatic & hydraulic control circuits.
3. Constructional & working features: of different types of earth moving machinery such as Tippers, shovels, loaders, Excavators, Dumpers, Dozers, Fork Lift truck, Road rollers.
4. Study of instrumentation applied to special purpose vehicles/machines.
5. Farm Tractor: Layout, Load distribution, Engine, Transmission & Drive line, Steering, Braking system, Wheels & Tyres, Hydraulic system, Auxiliary Systems, Draw bar, PTO Shaft. Different types of Implements, accessories and attachments. Tractor trolley.
6. Mobile Cranes: Basic characteristics of truck cranes, stability & design features, control systems & safety devices.
7. Tracked Vehicles, Articulated Vehicles, Multi-axle Vehicles, fifth wheel mechanism. Semi trailer & Prime mover brakes & electrical systems. Dead Axles.

8. Special Purpose Electric Vehicles, Solar Vehicles and Hybrid Vehicles. Types, architecture and parameters of design considerations.

**D. Lesson Planning**

<b>SR.NO</b>	<b>DATE/WEEK</b>	<b>UNIT NO</b>	<b>%WEITAGE</b>	<b>TOPIC NO</b>
1	1 <sup>ST</sup> , 2 <sup>ND</sup> , 3 <sup>RD</sup>	1	20	1,2
2	4 <sup>TH</sup> , 5 <sup>TH</sup> , 6 <sup>TH</sup>	2	20	3,4
3	7 <sup>TH</sup> , 8 <sup>TH</sup> , 9 <sup>TH</sup>	3	20	5
4	10 <sup>TH</sup> , 11 <sup>TH</sup> , 12 <sup>TH</sup>	4	20	6,7
5	13 <sup>TH</sup> , 14 <sup>TH</sup> , 15 <sup>TH</sup>	5	20	8

**E. Instructional Method & Pedagogy**

- At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all topics while teaching and conduction of all examinations.
- Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.
- One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.
- Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
- Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.

List of Experiments:

1. Technical & operational features of a tractor
2. Technical & operational features of a hole drill
3. Technical & operational features of a power scraper
4. Technical & operational features of a power hoe and shovel
5. Technical & operational features of tipping mechanism of a dumper
6. Technical & operational features of fork lift truck
7. Technical & operational features of a truck crane

8. Technical & operational features of an electric van

**F. Students Learning Outcomes**

- The student can identify different areas of Special purpose vehicles
- Can find the applications of all the areas in day to day life.

**G. Recommended Study Materials**

• **Text & Reference Books:**

1. "Construction Equipment Operation & Maintenance" by Y. Pokras and M. Tushnyakov, MIR, Moscow.
2. "Truck Cranes", by A. Astskhov, MIR, Moscow.
3. "Motor Graders" by E.G. Poninson, MIR, Moscow.
4. "Material Handling Equipment" by N. Rudenko, MIR. Publishers.
5. "Electric Vehicles" by Sheldon, R.Shacket, Domus Books, New York.
6. Hand book of Earth Moving Machinery - Central Water & Power Commission (Govt. of India).

