



# GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3170214

Semester –VII

Subject Name: Vehicle and Road Safety

Type of course: Professional Elective

Prerequisite: NIL

**Rationale:** Subject is designed to cover various and concerned over utilizing appropriate safety procedures with maintenance & service of vehicles and generate awareness about road accidents, traffic rules and characteristics of accident, people’s responsibilities and duties for road safety, imparting knowledge about importance of multidisciplinary approach to planning for traffic safety and rehabilitation.

### Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE (E)	PA (M)	ESE (V)	PA (I)		
3	0	2	4	70	30	30	20	150

### Content:

Sr. No.	Content	Total Hrs
1	<b>The Concept of Vehicle Safety:</b> Need of safety, active safety: driving safety, conditional safety; perceptibility safety, operating safety- passive safety, exterior safety, interior safety, deformation behaviour of vehicle body.	12
2	<b>Vehicle Safety System:</b> Regulations, automatic seat belt Tightener system; Collapsible steering column; Tilttable steering wheel. Electronic system for activating air bags; Bumper design for safety; antiskid braking system.	12
3	<b>Speed Control Devices:</b> Causes of rear end collision; Frontal object detection; Rear vehicle object detection system; Object detection system with braking system interactions.	6
4	<b>Introduction to Road Safety:</b> Road traffic accidents scenario in India and in world. Road Safety and its importance. Traffic rules and driving behaviour. characteristics of accidents, accidents vs. crash, crash test	3
5	<b>Planning for Road Safety:</b> Awareness about rules and regulations of traffic, assisting traffic control authorities. Multidisciplinary approach to planning for traffic safety and injury control, Vulnerable road users: crashes related to pedestrian and bicyclists, their safety, provision for disabled.	4
6	<b>Responsibility of Road Accidents and Safety Measures:</b> People responsible for accident prevention: Police, Politicians, Community members, Policy makers, Teachers, Parents, Infrastructure authorities, Drivers and Official road safety body. Reasons of students/ children have accidents. 4 E’s of Accidents Prevention: 1.Engineering – by altering the environment 2. Enforcement - by imposing laws 3. Encouragement - by the use of publicity campaigns 4. Education - by gaining and using knowledge.	3
7	<b>Road Safety Education:</b> Introduction to Road Safety Education. 5 P’s of Road safety education: 1. Pre-school road safety education 2. Practical rather than theory education 3. Principles of own development as regards to road safety education 4. Presentations on road safety education 5. Place for road safety education in syllabus	3
8	<b>Road Safety Events:</b> Discussions on efforts done by Government on Road Safety.	2



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Celebration of Road Safety week or Workshop on Road Safety week/ Organization of seminar on Road Safety. This is to be entirely organized by students under the mentorship of concerned Head of the Department.
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## Suggested Specification table with Marks (Theory):

R Level	U Level	A Level	N Level	E Level	C Level
25	25	30	15	5	0

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**

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. Ronald. K. Jurgen - "Automotive Electronics Handbook" - Second edition- McGraw-Hill Inc., - 1999.
2. ARAI Safety standards.
3. Kadiyali L.R., Traffic Engineering & Transport Planning, Khanna Publishers, 2003
4. Indian Roads Congress, Highway Safety Code, IRC: SP-44:1996
5. Indian Roads Congress, Road Safety Audit Manual, IRC:SP-88-2010

**Course Outcome:** After learning the course the students will able to:

Sr. No.	CO statement	Marks % weightage
CO-1	Summarize Importance of vehicular safety and demonstrate Safety considerations in automobile	40
CO-2	Generate awareness about road accidents, characteristics of accident and traffic rules.	25
CO-3	Gain information and knowledge about people responsible for accidents and their duties	15
CO-4	Understand the importance of multidisciplinary approach to planning for traffic safety habitation and dramatize road safety events	20

## List of Assignment/Tutorial

1. Study of Bumper design for safety
2. Study of advanced automobile seat belts and Air bag systems.
3. Study of advanced steering wheel and steering system.
4. Study anti-skid braking system and antilock brake system.
5. Study rear vehicle object detection system.
6. Study of central door locking systems
7. Study of characteristics of accidents.
8. Study of Multidisciplinary approach to planning for traffic safety and injury control
9. Study of Accidents prevention and people's responsibility for accident prevention.
10. Study of 5 P's of Road safety education.



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**Major Equipment:** cut section of Automobile

**List of Open Source Software/learning website:**

<https://nptel.ac.in/courses/107/106/107106088/>

<https://nptel.ac.in/courses/105/105/105105204/>

<https://irsc.road-safety.co.in/home/>