

GUJARAT TECHNOLOGICAL UNIVERSITY
CIVIL (TRANSPORTATION ENGINEERING) (13)
ROAD SAFETY AUDIT
SUBJECT CODE: 2731307
M.E. 3RD SEMESTER

Type of course: Major Elective - IV

Prerequisite: Traffic Engineering, Pavement construction

Rationale:

With the growth in population and vehicular ownership, the undesirable outcome of the transportation system is increase in the number of accidents. Loss of lives is detrimental for the economy and progress of the nation. It is prime consideration to provide maximum safety to the people during and after construction of highways. It is necessary for the transportation engineer to know about the causes of accidents and environmental pollution due to highway or other transportation facility construction activities. The mitigation measures shall be taken properly to minimize the accidents and environmental pollution. The road safety audit includes all these aspects in systematic way. Therefore, the study of this subject will enable to provide all necessary features regarding road safety to the students.

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)		
						ESE	OEP	PA	RP	
3	2	2	5	70	30	20	10	10	10	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Introduction: Road traffic accidents scenario in India, Characteristics of accidents, accidents vs. crash, land use and road environment for safety, Multidisciplinary approach to planning for traffic safety and injury control; pre crash and post crash models; roles of vehicle, roadway traffic, driver, and environment, crash and injury causations; accident analysis, conflict points at intersections, pedestrian safety, road safety improvement strategies.	12	30
2	Road safety audit and analysis: Stages, aim and objectives, principles, process, roles and responsibility, Specific parameters, design standards, various stages of road safety audit, RSA for rural roads, Checklists, Structuring of report. Steps in treatment of crash locations, diagnosing crash problem and solutions, accident report form, storing of data, using and interpreting crash data, identifying and prioritizing hazardous locations, condition and collision diagrams; Vulnerable road users: crashes related to pedestrian and bicyclists, their safety, provision for disabled; Crash reconstruction: understanding basic physics, calculation of speed for various skid, friction, drag, and acceleration scenarios.	12	30
3	Engineering measures:	8	18

	Speed humps, speed bumps, speed tables, speed cushions; Community awareness and education (Speed limits); Enforcement- Non-physical measures- physical measures		
4	Energy related aspects of different transport technologies: Traffic calming measures, road transport related air pollution, sources of air pollution, effects of weather conditions, vehicular emission parameters, pollution standards, measurement and analysis of vehicular emission; imitative measures, urban and non urban traffic noise sources, noise pollution, technology vision-2020	10	22

Reference Books:

1. Evans S.K., Traffic Engineering Handbook, Institute of Traffic Engineers, USA
2. Wohl M., Martin B.V., Traffic system analysis of Engineers & Planners, McGraw Hill, New York.
3. Babkov V.F., Road conditions & Traffic Safety, MIR Publishers, Moscow, 1975
4. Kadiyali L.R., Traffic Engineering & Transport Planning, Khanna Publishers, 2003
5. Little A.D., The state of art of Traffic Safety, Paraeger Publishers, New York, 1970
6. Relevant IRC codes,
7. Indian Roads Congress, Highway Safety Code, IRC: SP-44:1996
8. Indian Roads Congress, Road Safety Audit Manual, IRC:SP-88-2010
9. 10. Limpert, Rudolf. Motor Vehicle Accident Reconstruction and Cause Analysis, 5th Edition, Lexas Publishing, Charlottesville, VA.
11. American Association of State Highway and Transportation Officials (AASHTO),
12. Highway Safety Manual, 1st Edition, AASHTO

Course Outcome:

After learning the course the students should be able:

1. To be aware of importance of road safety aspects and environmental impacts for commissioning the highway project.
2. To know about Road Safety Audit and EIA requirements/guidelines of World Bank and India for Highway projects.
3. To give the idea for mitigation measures for improving traffic safety and environment.

List of Experiments:

1. Collection of road accident data.
2. Accident analysis of collected data.
3. Collection of data regarding black spots on major highways including geometric details.
4. Analysis of black spots data and suggest mitigation measures.
5. Collection of air quality data (emission level) and noise level data on problematic spots of highway.
6. Analysis of collected data and suggest improvement measures.

Design based Problems (DP)/Open Ended Problem:

Below mentioned problems are for reference only. Similar problems may be developed by individual teachers.

1. Carryout RSA of existing problematic road stretch
2. Carryout RSA of proposed Overbridge construction or Highway improvement.

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.