**ACADEMIC – GRADUATE STUDIES AND RESEARCH DIVISION**

**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI-HYDERABAD CAMPUS SECOND SEMESTER 2021-22**

**COURSE HANDOUT**

**Date: 15-01-22**

In addition to part I (General Handout for all courses appended to the Time table) this portion gives further specific details regarding the course.

## Course No : CE G573

#### **Course Title : Road Safety and Accident Analysis**

**Instructor-in-Charge : Bandhan Bandhu Majumdar**

**Instructor(s) : NA**

**Tutorial/Practical Instructors: Bandhan Bandhu Majumdar**

1. **Course Description:**

Road safety, accident statistics and investigation, collision and condition diagrams, accident data collection. Reactive and proactive measures of road safety, safe systems approach, blackspot identification and mitigation measures, development of safety performance functions, road safety audit (RSA), identification and treatment of crash locations, economic analysis of road safety measures, Application of intelligent transportation system in road safety management, Accident investigation, Introduction to Road safety manuals including IRC SP 88, PIARC Documents, AUSTROADS Documents, International Road Assessment Program (I-RAP), Network-based safety analysis, Road signs and markings and related codes, Accident Reconstruction

The course provides practical information on how to conduct a road safety audit. One will learn how to improve transportation safety by applying a proactive approach that includes examination of a future or existing road. The course is aimed at learning traffic and road safety engineering and relevant practices for remedial of road crashes. Through this course, students as Safety Engineers will learn how to deal with road safety audit and crash investigation leading to understanding of crash investigation and treatment as well as blackspot investigations. The course is also aimed at learning how to carry out safety studies from the viewpoint of roadway and its environment; vehicles; and human elements.

**2. Scope and Objective of the Course:** Over past few decades, a sustained increase in the per capita ownership of vehicles, has given rise to several traffic related issues including accidents. Hence, there is a need to find solutions to these problems by understanding the principal components governing them. The present course seeks to develop an understanding of the problems related to traffic safety. Not only that, it also aims at gaining knowledge of the analysis which can help in mitigating the road crashes.

**3. Text Book**:

**T1:** Washington S., Karlaftis M., Mannering F., and Anastasopoulos P. **Statistical and Econometric Methods for Transportation Data Analysis**, CRC Press, Third edition.

**4. Reference Codes:**

**R1:** Various IRC codes

**R2:** Training manual for drivers. Transport Department, Govt. of West Bengal and IIT Kharagpur

**R3:** PIARC (2019) Road Safety Manual

**4. Course Plan:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Lecture No.** | **Topics to be covered** | **Learning Objectives** | **Reference to Text Book / Reference Book** | **SLO\*** |
| 1-2 | Road Safety: An overview | To understand the safe system approach  To understand the 4E’s of road safety | R1 and R2 | a,e |
| 3-4 | Pro-active and Re-active approaches of road safety management | To understand and apply pro-active and re-active approaches of road safety | R1 | a,e |
| 5-7 | Blackspot Identification and management | To identify blackspots and propose remedial measure | R1 | a,e |
| 8-12 | Accident data collection and investigation | To be able to collect crash data and analyze the data with understanding on  Collision diagram, Condition Diagram, Accident data forms IRC 53, Safety Performance Functions and Before-after study | T1 | a,b,c,e |
| 13-14 | Introduction to Road safety Audit (RSA) | To understand the concept of RSA and its’ different stages | R1 | a,d,e |
| 15-16 | Audit during planning and feasibility stage | To conduct audit during planning and feasibility stage | R1 | a,d,e |
| 17-18 | Audit during design stage | To conduct audit during design stage | R1 | a,d,e |
| 19-20 | Audit during construction stage | To conduct audit during construction stage | R1 | a,d,e |
| 21-22 | Audit during operation and maintenance stage | To conduct audit during operation and maintenance stage | R1 | a,d,e |
| 23-25 | Auditing Work zone | To conduct audit at work-zones | R1 | a,d,e |
| 26 | RSA report preparation and result dissemination | To prepare RSA report and result dissemination | R1 | a,d,e |
| 27 | Legal Issues of Road Safety | To have an idea on the legal aspect of Road Safety particularly with respect to Indian Penal Code | R3 | a,e |
| 28-32 | IRC SP 88, 2019 | To be able to conduct RSA as per Indian standards and able to use various checklists | R1 | a,e |
| 33-34 | Speed Management | To be able to conduct detailed speed management to reduce crashes | R2 | a,e |
| 35-36 | Traffic Signs and Pavement Markings | To be able to provide adequate traffic signs and pavement markings as per current Indian standards | R1 | a,e |
| 37-38 | State of the art Road Safety Practices | To understand the state of the art knowledge on road safety practices across the globe | R2 | j |
| 39-40 | Road Safety aspects as a driver | To understand various road safety specific activities as a driver | R3 | k |
| 41-42 | Crash Modification Factor and Economics | To be able to interpret Crash modification Factor and conduct Cost-Benefit analysis for Road Safety Management | R2 | a,e |

**\*Student Learning Outcomes (SLOs):**

SLOs are outcomes (a) through (k) plus any additional outcomes that may be articulated by the program.

1. An ability to apply knowledge of mathematics, science and engineering
2. An ability to design and conduct experiments, as well as to analyze and interpret data
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
4. An ability to function on multidisciplinary teams
5. An ability to identify, formulate, and solve engineering problems
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
9. A recognition of the need for, and an ability to engage in life-long learning
10. A knowledge of contemporary issues
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

**5. Evaluation Scheme**:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Component** | **Duration** | **Weightage (%)** | **Date & Time** | **Nature of component**  **(Close Book/ Open Book)** |
| Mid-Semester Test | 90 Min. | 25 | TBA | CB |
| Comprehensive | 120 Min | 35 | TBA | CB |
| Term Project | Continuous | 10 | Spread over the semester | OB |
| Research Seminar | Continuous | 10 | Spread over the semester | OB |
| Assignments | Continuous | 10 | Spread over the semester | OB |
| Road Safety Audit-Field work | Continuous | 10 | Spread over the semester | OB |

**6. Chamber Consultation Hour**: To be announced during the lecture.

**7. Notices:** Notices concerning this course will be displayed on Google Classroom.

**8. Make-up Policy:** Prior permission for all make ups are a must. For medical emergencies, requests have to be forwarded by the Chief Warden to the satisfaction of IC.

**9. Note (if any):** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

**Instructor-in-charge**

**Course No. CE G573**