College: Engineering Department: Civil Engineering

Course Title: Highway Design

Course No: 0901405

Credit Hours: 3

Semester: Second

About The Course

Course Title: Highway Design Class: 1 & 2
Course No: 0901405
Credit Hours: 3 Lecture Room: 409

Obligatory/ Optional: Obligatory
Text Book: Principles of Highway Engineering and Traffic Analysis. 2009. "Fourth Edition". Fred L. Mannering, Scott S. Washburn, and Walter P . Kilareski. John Wiley & Sons, Inc.

The Instructor

Name: Abdulrazzaq Jawish Title: Assistant Professor
Office Tel:
Office No: 207 Office Hours: 12:30-15:00 Sun-Wed

E-maile: alkherret@yahoo.com

Course Description

This course covers: highway and road design concept, design objectives, design considerations, and design process. Design control and criteria: principles of route location road types, design vehicles, driver characteristics, design volume, and design speed. Highway alignment design: overall alignment, horizontal alignment, vertical alignment. Sight distance, stopping sight distance, decision sight distance, passing sight distance on two-lane road, criteria for measuring sight distance. Combination curves. Intersection alignment and interchanges

Course Objectives

To highlight the fundamental and mathematical concepts of highway geometric design and route location, to familiarize students with design and layout of horizontal and vertical curves, to design intersections and overcome special curve problems, and to attain superelevations and sight distances.

Learning Outcome

After successfully completing this course, the students should be able to :

1. understand the basic principles of highway design geometry and route survey.
2. design and layout horizontal and vertical alignments.
3. design intersections and overcome special problems.
4. attain superelevation and sight distance
5. design and layout of composite, compound, simple, reverse, and vertical curves.
6. deal with geometrical problems, settingout and layout.
7. know elements of design.

Course Outline and Time schedule

Week	Course Outline
First week	**Introduction**: Text Book, References, and Outlines
	Design Controls and Criteria
2nd week	**Sight Distances:** Stopping Sight Distance (SSD), Passing Sight Distance (PSD), and Decisions Sight Distance (DSD).
	Sight Distances: Numerical Examples
3rd week	**Horizontal Alignment:** Highway Route.
	Horizontal Alignment: Types of Curves.
4th week	**Horizontal Alignment:** Elements of Circular Curve (Simple Curve)- Part I
	Horizontal Alignment: Elements of Circular Curve (Simple Curve)- Part II
5th week	**Horizontal Alignment:** Numerical Examples
	Horizontal Alignment: Numerical Examples
6th week	**First Exam**
	Horizontal Alignment: Transition Curve
7th week	**Horizontal Alignment:** Compound Curve and Reverse Curve
	Horizontal Alignment: Numerical Examples
8th week	**Horizontal Alignment:** Widening of Pavement on Horizontal Curve
	Horizontal Alignment: Sight Distance on Horizontal Curves
9th week	**Horizontal Alignment:** Balance Condition (Balance Equation)
	Horizontal Alignment: Adequate Sight Distance Condition
10th week	**Horizontal Alignment:** Numerical Examples
	Horizontal Alignment: Numerical Examples

11th week	**Second Exam**
	Horizontal Alignment: Superelevation
12th week	**Vertical Alignment:** Design of Crest Vertical Curve
	Vertical Alignment: Design of Sag Vertical Curve
13th week	**Vertical Alignment:** Numerical Examples
	Vertical Alignment: Numerical Examples
14th week	**Intersections:** Intersection Design Elements
	Intersections: Intersection Examples
15th week	**Final Exam**

Presentation methods and techniques

Methods of teaching varied according to the type of text, student and situation. The following techniques are usually used:

1- Lecturing with active participations.

Involve the civil engineering students in asking some questions related to the target topic of the course.

2- Problem solving.

Encourage the students to solve the given assignments and submit them at the definite time,

3- Cooperative learning.

By enhancing the students studying in groups .

4- Discussion.

To discuss the results and the answers of the target problems.

5- Learning by activities.
To encourage the students to some group activity.

6- Connecting students with different sources of information.

Sources of information and Instructional Aids

Power Point

Using weight board.

Assessment Strategy and its tools

The assigned syllabus is assessed and evaluated
Through: feed back and the skills that are acquired by the students
The tools:
Formal (stage) evaluation

a) Class Participation 10%
b) Group activity and Quizzes 10%
c) 1st Exam 20%
d) 2nd Exam 20%

Tool & Evaluation

Tests and quizzes are permanent tools & assessment, in addition to the activity file which contains curricular and the co-curricular activities, research, report papers and the active participation of the student in the lecture.

The following table clarifies the organization of the assessment schedule:

Test	Date	Grade
First Exam	24/3/2019	20%
2nd Exam	5/5/2019	20%
Activities & Participation	Students should be notified about their marks	20%
Final Exam		40%

Activities and Instructional Assignment

1- Practical assignments to achieve the syllabus objectives.

2- Group Activity and demonstrations.

Regulations to maintain the teaching-Learning Process in the Lecture:

1- Regular attendance.
2- Respect of commencement and ending of the lecture time.
3- Positive relationship between student and teacher.
4- Commitment to present assignments on time.
5- High commitment during the lecture to avoid any kind of disturbance and distortion.
6- Allowed Absence percentages is (15%).

Internet websites

1. https://www.fhwa.dot.gov/

References :

1. AASHTO: A Policy on Geometric Design of Highways and Streets, 6th Edition (2011).
2. Traffic and Highway Engineering. 2009. Nicholas J. Garber and Lester A. Hoel. Fourth Edition. University of Virginia.

Syllabus Classification

Objectives	***Learning outcome***	***Assessment tools***

• ***Introduction*** *to the design controls and criteria used in different stages of roads design.*	*To produce student in civil engineering to be familiar with concept and procedure of road design.*	*Power point and weight board.*
• ***Sight Distances***	*To make the student familiar with the types of sight distances and how to calculate them*	*By using solved problems. Power point and weight board.*
• ***Horizontal Alignment***	*To make the student to have capability in determining:* - *elements of horizontal curve* - *sight distance on horizontal curves* - *superelevation rate* *and to enable the student to design horizontal curves and achieve the condition of balance and condition of vision*	*By using solved problems. Power point and weight board.*
• ***Vertical Alignment***	*To enable the student to design vertical curves and to make the student to have capability in determining:* - *elements of vertical curve* - *sight distance on vertical curves*	*By using solved problems. Power point and weight board.*
• ***Intersections***	*To make the student familiar with the types of intersections and calculate the different elements of intersections*	*By using solved problems. Power point and weight board.*