Academic Year: 2023-2024	Semester: Spring	Starting Date: 18-2-2024

Course Name	**Highway Engineering**
Module Language	English
Instructor	**Asst. Prof. Dr. Abdulhakim O. Salih Kozapanky**
Teaching Assistance(s)	None
College/University	College of Engineering – Salahaddin University-Erbil
Department	Civil
Semester Duration	15 weeks
Course Overview	During the past century, highway transportation has evolved from the "out of the mud" era to one in which a network of highways provides multiple levels of service from uncontrolled to controlled access. Transportation deals with the movement of persons and things from one place to another and it contributes to the economic, industrial and cultural development of any country. Science that covers the building of roads and providing the adequate facilities to the users and the safety of road vehicles defined as Highway Engineering as a main branch from Transportation Engineering. In general, it may be said that the Highway Engineering deals with various phases like: Highway design-geometrical and structural; Highway traffic performance and its control; Materials, construction and Maintenance of the Highways.
Course Objectives	The objective of this course is to provide students with an understanding of the important problems associated with Highway Engineering: Through designing geometrically of horizontal and vertical alignments; an over pass bridges and approaches; Designing of highway drainage and Highway intersections detail**.** Also Pavement Design:i.e: Structural design of Flexible and Rigid Pavements through different methods, Wheel Load analysis by different methods and also Temperature Stresses, details of Joints in Rigid Pavement, Pavements and Types of Roads and their Construction. Details of Asphalt material as a binder, designing of Asphalt Concrete and its Performance through the maintenance of the Pavements in view of Different type of failures, causes and corresponding remedies.

Course Contents

Week	Lecture
1st	Introduction-Geometric design of highways
2nd	Horizontal alignment
3rd	Horizontal transition curve
4th	Vertical alignments: Summit Vertical curves
5th	Sag Vertical curves
6th	Highway Intersections
7th	Highway drainage
8th	Midterm Exam.
9th	Pavements & Types of roads
10th	Structural Design of flexible pavements
11th	Structural Design of rigid pavements
12th	Asphalts, types, manufacture, properties required and grade selection
13th	Bituminous mixes, properties required, material properties and design
14th	Maintenance of asphalt surfacing, common failures and remedies.
15th	Final Examination

Textbooks and References

1. Principles of Pavement Design, Yoder.[Text Book]
2. AASHTO (2018): A Policy on Geometric Design of Highways & Streets. [Text Book]
3. AASHTO Material (2013): Part 1: Specifications, Part 2: Tests.
4. SORB: Standard Specifications of Roads & Bridges, Iraq.
5. Highway Design Manual, Iraq.
6. Transportation & Traffic Engineering Hand Book, ITE.
7. Highway Engineering Hand Book, by: Woods.

	8. Asphalt Pavement Engineering, Theory& Practice, by: Wallace& Martin . **9.** Traffic Engineering & Transportation Planning, by: Kadiyali. **10.** Highway Engineering, by: Khanna & Justo. **11.** Route Location & Design, by: Hickerson. **12.** Highway Materials, by: Krebs **13.** Bituminous Road Construction, Hand Book, by: Nairetez **14.** Highway Capacity Manual (HCM), 2005. **15.** Highway Engineering, by: Dr. L.R. Kadyali& Dr.N.B.Lal.
Teaching Style	3 hrs. Theory in Class
Requirements for Credit Points	For the award of credit points, it is necessary to pass the module exam. It contains: **An examination during the academic semester, Quizzes, Assignments, and Final Examination. Student's attendance is required in all classes**.
Credit ECTS	**6**
Grade Distribution	The following grade system is used for the evaluation of the module exam: The module exam is based on the summation of two categories of evaluations: **First: (50%)** of the mark is based on the academic semester effort which includes: - Midterm Exam = **20%.** - Quizzes = **10%** - Seminar =**10%** - Assignment Report=**10%** **Second: (50%)** of the mark is based on the Final Examination that is comprehensive for the whole of the study materials reviewed during the academic semester.
Workload	Workload 10hrs/w (150hrs/s): Contact face-to-face 3hrs/w (45hrs/s) and Non-Contact Self learning 7hrs/w (105hrs/s)