



Philadelphia University

Faculty of Engineering and Technology
Department of Civil Engineering
Second Semester 2023/2024

Course Information

Title: Geometric Design of Highways (0670324)
Sun, Tue 11:15-12:30
Classroom: 701

Prerequisite: Surveying (0670261)

Credit Hours: 3 credit hours (15 weeks per semester, approximately 45 contact hours)

Textbook:

- “Traffic and Highway Engineering” by Nicholas J. Garber, Laster A. Hoel, 4th ed.
- “The Civil Engineering HandBook” by W. F. CHEN, J.y. Richard Liew. 2nd ed.

References:

- A policy on geometric design of highways and streets, 4th edition, AASHTO. 2001.
- Principles of highway engineering and traffic analysis by Fred Mannering & Walter Kilareski, 2nd edition.

Course Description: Geometric design concepts for highways, Traffic characteristics, design control and criteria, sight distance, horizontal and vertical alignment, cross section elements, superelevation attainment, laying out highways, earthwork computations, highway types and introduction of interchanges and intersections.

Website: <https://www.philadelphia.edu.jo/academics/maldwaik/>

Instructor: Dr. Mais Aldwaik
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Office: Faculty of Engineering, room 815
Office hours: Sat, Mon: 10:35-12:40. Sun, Tue: 12:30-1:30.

Course Outline

Week	Topic
Week 1	1-Basic principles 2-Road classification
Week 2	3- Intersections & Interchanges
Week 3	4- Highway Surveys and Location: Earthwork Computations, Average end area method, Mass haul diagram
Week 4	5- Characteristics of the Driver, the Pedestrian, the Vehicle, and the Road.
Week 5	6- Horizontal alignment: Stopping sight distance on horizontal curves, Simple circular curves, Compound circular curves, Reverse curve, Transition curve.
Week 6	Setting out horizontal curves, Curve widening.
Week 7	7- Super elevation: Standards for super elevation, Super elevation attainment.
Week 8	8- Cross section elements: Travel lanes, Shoulders, Medians, Roadside barriers, Side slopes.
Week 9	9- Highway drainage.
Week 10& 11	10- Vertical Alignment: Introduction of Vertical curves, Stopping sight distance on sag vertical curves, Stopping sight distance on crest vertical curves.

Week 12 & 13	Vertical curve design.
Week 14 & 15	11- Special facilities for heavy vehicle on steep grades: Climbing lanes, Emergency escape Ramps.

Course Learning Outcomes with reference to ABET Student Outcome

Upon successful completion of this course, students should:

1.	Knowledge of the elements of road	[1, 2]
2.	Determine the Characteristics of road classification	[1, 2]
3.	familiarity with highway geometric design and its procedures	[1, 2]
4.	Designing the different types of intersections	[1, 2]
5.	Earthwork computations	[1, 2]

Assessment Guidance

Evaluation of the student performance during the semester (total final grade) will be conducted according to the following activities:

Exams:	Students will be undergo a midterm exam during the semester.
Quizzes:	Two-four quizzes of (10-15) minutes will be conducted during the semester. The materials of the quizzes are set by the lecturer.
Homework, projects, and reports:	One-three homeworks and reports will be assigned during the semester. You are usually given one week to submit each homework. <u>Cheating by copying homework from others is strictly forbidden and punishable by awarding the work with zero mark.</u>
Collective Participation:	Brainstorming and collective discussions will be carried out during any lecture. Individual students will be assessed accordingly.
Final Exam:	Students will undergo a scheduled final exam at the end of the semester covering the whole materials taught in the course.

Grading policy

Midterm Exam	30%
Home works, Quizzes, and term work	30%
Final Exam	40%
Total:	100%

Attendance Policy

The semester has in total 45 credit hours. Total absence hours must not exceed 15% of the total credit hours. Exceeding this limit without a medical or emergency excuse approved by the deanship will prohibit the student from sitting the final exam and a zero mark will be recorded for the course. If the excuse is approved by the deanship the student will be considered withdrawn from the course.