



The Hashemite University
Faculty of Engineering
Civil Engineering Program
Course Syllabus



Course Title: Highway Engineering Laboratory **Course Number:** 110401467
Designation: Compulsory **Prerequisite(s):** Highway Material & Pavement Design.
Instructor: Dr. Yahia Khalayleh **Instructor's e-mail:** yahia@hu.edu.jo
Office Hrs.: Sun, Tues & Thus 12-1pm Mon, Wed 10 – 11am

Course description: The course is intended to teach the civil engineering student how to conduct tests on materials used in highway pavement construction. Tests on asphalt binders include: penetration, softening and flash points, ductility, viscosity, and specific gravity. Tests on subgrade soils include CBR. Whereas aggregates are tested for their specific gravity, absorption, and gradation. Marshall mix design is conducted in the lab and both extraction and skid resistance tests are conducted on the designed asphalt mix.

Textbook(s): American Society of Testing and Materials (ASTM).
American Association of State Highway and Transportation Officials (AASHTO).

Major Topics Covered:

TOPICS	No. of Weeks	Contact Hours*
Tests on asphalt binders: penetration, softening and flash points, ductility, viscosity, and specific gravity.	6	9
Test on subgrade soils or granular materials: CBR	2	3
Tests on aggregates: Specific gravity, absorption, and sieve analysis (gradation)	2	3
Design of hot mix asphalt using Marshall design method	2	3
Tests on bituminous mixtures: Extraction and skid resistance	2	3
TOTAL	14	21

*Contact hours include lectures, conducting experiments and exams

Specific Outcomes of Instruction (Course Learning Outcomes): This course focuses on familiarizing the civil engineering student with the tests that are conducted to ensure that materials that will be used in the highway construction meet some specified specifications. The course will cover tests conducted on asphalt binders, aggregates and granular materials, and bituminous mixtures.

- 1 Asphalt binder **b, d, i, k.**
- 2 Aggregates and granular material **b, d, i, k.**
- 3 Bituminous mixtures **b, d, i, k.**



**The Hashemite University
Faculty of Engineering
Civil Engineering Program
Course Syllabus**



Student Outcomes (SO) Addressed by the Course:

ABET	Outcome description	Contribution
	General Engineering Student Outcomes	
(a)	An ability to apply knowledge of mathematics, science, and engineering	
(b)	An ability to design and conduct experiments, as well as to analyze and interpret data	H (50)
(c)	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	
(d)	An ability to function on multidisciplinary teams	M (30)
(e)	An ability to identify, formulate, and solve, engineering problems	
(f)	An understanding of professional and ethical responsibility	
(g)	An ability to communicate effectively	
(h)	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	A recognition of the need for, and an ability to engage in life-long learning	L (10)
(j)	A knowledge of contemporary issues	
(k)	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	L (10)
H = High, M = Medium, L = Low		

Class/laboratory schedule: 1 class sessions each week; 180 minutes

Grading Plan:

Mid term Exam (30 Points)
 Lab work & Reports (30 Points)
 Final Exam (40 Points) Will be announced by the registrar

General Notes: Students are expected to do the Lab reports independently and to submit them on time. Failure to fulfill these two conditions for any report will result in a ZERO grade for that report.