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. Hamza Alkuime **Instructor's e-mail:** Alkuime@hu.edu.jo
Office Hrs. Sun, Tues & Thus 10:00-11:00

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 [**5, 6, and 7]**
2. Aggregates and granular material [**5, 6, and 7].**
3. Bituminous mixtures [**5, 6, and 7].**

Student Outcomes (SO) Addressed by the Course:

ABET 7-1	Outcome Description	Contribution
	General Engineering Student Outcomes	
1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	
2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	

3	an ability to communicate effectively with a range of audiences	
4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	**M (30)**
6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	**H (60)**
7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	**L (10)**
H=High, M= Medium, L=Low		

Class/laboratory schedule: 1 class session each week, 180 minutes .

Grading Plan:

Midterm 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.