Module (Course Book)

2025-2026

College/ Institute	Erbil Technical College	
Department	Civil Engineering Department	
Module Name	Transportation Engineering	
Module Code	TRE801	
Degree	Technical Diploma ☐ Bachler x High Diploma ☐ Master ☐ PhD ☐	
Semester	Fourth stage – 8th semester	
Qualification	B.Sc.	
Scientific Title	Engineer	
ECTS (Credits)	6	
Module type	Prerequisite ☐ Core x Assist. ☐	
Weekly hours	5	
Weekly hours (Theory)	(3)hr Class	(118) Total hrs Workload
Weekly hours (Practical)	(2)hr Class	(44) Total hrs Workload
Number of Weeks	12	
Lecturer (Theory)	Dilveen Hassan Omar; Tava Dhahir Mohammed	
E-Mail & Mobile NO.	dilveen.omar@epu.edu.iq; tava.mohammed@epu.edu.iq	
Lecturer (Practical)	Dilveen Hassan Omar; Tava Dhahir Mohammed	
E-Mail & Mobile NO.	dilveen.omar@epu.edu.iq; tava.mohammed@epu.edu.iq	
Websites	epu.edu.iq	

Course Book

<table>
<tr><td>Course Description</td><td colspan="5">Transportation Engineering has two parts, Theoretical part (3 hours) and Practical part (2 hours) for each week. Transportation is that branch of engineering which deals with design and operation of facilities which enable us to move persons and goods from one place to another place efficiently and economically. In this course, the overall process is divided into planning, traffic design, location, and physical design phases, and ultimately results in construction of the facility.</td></tr>
<tr><td>Course objectives</td><td colspan="5">The main aim and purpose behind the study of engineering transportation is to:
For the advancement of community.
Is Essential for the economy and general development of country.
Is Essential for strategic movement in emergency for defense of the country and maintain better law and order.
Students learn how to prepare, check and test some types of pavement materials during their lab sessions.</td></tr>
<tr><td>Student's obligation</td><td colspan="5">Attending the lecture is a fundamental part of the course. You are responsible for material presented in the lecture whether or not it is discussed in the textbook. You should expect questions on the exams to test your understanding of concepts discussed in the lecture and in the homework assignments.
It can be very helpful to study with a group. This type of cooperative learning is encouraged; however, be sure that you have a thorough understanding of the concepts besides the mathematical steps used to solve a problem. You must be able to work through the problems on your own.
Your full attendance will give you full scaling grades and you can participate in the student’s feedbacks. Absence more than 10% will restrict you to get a chance from the involvement in the feedbacks and your scaling grades will be decreasing in the same percentage.</td></tr>
<tr><td>Required Learning Materials</td><td colspan="5">During lecturing the data show is used for showing lecture notes using power point program while the white board is used for explanation and solving problems and using transportation instruments in laboratory.</td></tr>
<tr><td rowspan="8">Evaluation</td><td colspan="2">Task</td><td>Weight (Marks)</td><td>Due Week</td><td>Relevant Learning Outcome</td></tr>
<tr><td colspan="2">Paper Review</td><td>N/A</td><td></td><td></td></tr>
<tr><td rowspan="5">Assignments</td><td>Homework</td><td>5%</td><td>12</td><td>1,2,3</td></tr>
<tr><td>Class Activity</td><td>2%</td><td>2</td><td>1,2,3</td></tr>
<tr><td>Seminar</td><td>5%</td><td>2</td><td></td></tr>
<tr><td>Essay</td><td>N/A</td><td>-</td><td></td></tr>
<tr><td>Project</td><td>5%</td><td>10</td><td>1,2,3</td></tr>
<tr><td colspan="2">Quiz</td><td>8%</td><td>2</td><td>1,2</td></tr>
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	Lab. Reports	10%	12	4
	Midterm Exam/Theory	10%	1	1,2
	Final Exam/ Theory	20%	1	1;2
	Midterm Exam/Practical	15%	1	4
	Final Exam/ Practical	20%	1	4
	Total	100%		

Specific learning outcome:	Students learn: 1. Design and construction of base course, pavement design, geometric design, and intersection design. 2. Planning, design, construction, and operation of highways, roads, and other vehicular facilities. 3. How to prepare, check and test some types of pavement materials during their lab sessions.
Course References:	**[1] "Highway Engineering"** by: Darkson H. Dglisby. **[2] "Highway Capacity Manual (HCM2010)"** Transportation Research Board (TRB). **[3] "Route Location and Design"** by: Thomas F. Hikerson. **[4] "Route Surveying"** by: Thomas F. Hikerson. **[5]** "**A policy on Geometric design of Highway"** by: AASTO. **[6] "Traffic Engineering"**: by Natson, Smith and Hurd. **[7] "Introduction to Transportation Engineering"** second edition, by James H. Banks. **[8] "Highway Engineering Pavements, Materials, Control of Quality"** by Athanassios Nikolaides. **[9] "Principles of Highway Engineering and Traffic Analysis"** fifth edition, by Fred L. Mannering, Scott S. Washburn. **[10] "Traffic and Highway Engineering"** fourth edition, by Nicholas J. Garber, Lester A. Hoel.

Course topics (Theory)	Week	Learning Outcome
1. Engineering Transportation	1	1
2. Highway Location and Design	2	2
3. Earth work	3	2,3

4. Highway and Traffic Engineering	4	1,4
5. Geometric Alignment and Design (Horizontal Curve)	5	1,4,5
6. Geometric Alignment and Design (Vertical Curve)	6	1,4,6
7. Flexible Pavement	7, 8	4, 3, 7, 8
8. Rigid Pavement	9, 10	4, 3, 8, 9
9. Intersection design	11	4, 11
10. Intersection Delay	12	4,11, 12
Practical Topics	**Week**	**Learning Outcome**
1. Compaction Test	1	
2. In-situ Density (Sand Replacement) Test	2	
3. CBR Test	3	
4. Specific Gravity of Aggregate	4	1,2,3
5. Bulk Density of Aggregate Test	5	
6. Abrasion Test (L.A. Abrasion Test)	5	
7. Blending of Aggregate Test	6	
8. Bitumen Tests (Specific Gravity Test, Penetration Test, Ductility Test, Softening Point Test, Viscosity 6. Flash and Fire Point, Loss on Heating).	7-9	4,5,6
9. Marshall Test	10-11	7,8,9
10. Phase diagram approach to calculate the volumetric properties of HMA paving mixture.	12	10,11

Questions Example Design

Question 1: What is the transportation planning?

Answer:

Transportation planning is also commonly referred to as **transport planning** internationally, and is involved with the evaluation, assessment, design and siting of transport facilities (generally streets, highways, bike lanes and public transport lines).

Question 2: List the most important lab tests for bitumen?

Answer:

1. Bitumen content. 2. Ductility of Bitumen. 3. Penetration of Bitumen.

4. Specific Gravity of Bitumen. 5. Softening Point of Bitumen.

6. Flash and Fire Point of Bitumen. 7. The Marshall Stability of Bituminous Mixture.

Question 3: A highway has a design speed of 70 mph and super elevation rate of 0.01. If f_s= 0.15, what should be the radius of the curve?

Answer: $R = V^2 / [15 (f_s + e)]$

$= 70^2 / [15 * (0.15 +0.01)] = 2042$ (ft)

Extra notes:

- The syllabus is subject to change at the discretion of the instructor as course or other circumstances require.
- Students with documented disabilities are encouraged to discuss with me arrangements that will enhance their learning in this class.
- Students are expected to act with utmost caution and great care of each instrument and materials in the laboratory during their presence.
- Students with any kind of problem should contact the instructor as soon as possible.

Using cell phones is not allowed at all, MUST be OFF and invisible please.

Note: **All Communications will be done only by MOODLE.**

External Evaluator

After reviewing the course book, I found that the contents are very good satisfying the aim and objectives of the transportation subject course. It also fulfils and covers the main subjects of Transportation, Traffic, and Highway Engineering. As an expert (Assistant Professor in civil engineering Specialisation in Transportation, I fully agree with the contents for the 4th-year civil engineering department.

……Name…
Professor
Civil Engineering