

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Highway Engineering</b>		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	<b>CIV022</b>		
ECTS Credits	6		
SWL (hr/sem)	<b>150</b>		
Module Level	UGIV	Semester of Delivery	
Administering Department	CV101	College	Civil Engineering College
Module Leader	Dr. Duraid Muayed Abd	e-mail	Duraid.abd@uoanabr.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<b>Module Aims</b> أهداف المادة الدراسية	<ol style="list-style-type: none"><li>1. Recognize the various components of Highway Engineering.</li><li>2. Identify highway planning, engineering surveys for highway alignment,</li><li>3. Design of Geometric Elements of Highways (Horizontal and Vertical curves)</li><li>4. Learn the desirable properties of highway materials and various practices adopted for construction.</li><li>5. Develop skills in evaluation of the pavements and deciding appropriate types of maintenance.</li><li>6. Know asphalt concrete mix production in asphalt plants and constructing flexible pavement layers in the site.</li><li>7. provide hands-on training in the determination of desirable properties of highway materials</li></ol>
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"><li>1. Apply math and science principles in the design and analysis process.</li><li>2. Analyze and interpret field and laboratory data to obtain design properties.</li><li>3. Design major Highways and pavement structure a geotechnical perspective.</li><li>4. Develop semester-long interaction with students on homework and design submittals.</li><li>5. Consider public safety in design for every major structure type and the impacts of the structures on society and environment.</li><li>6. Conduct external research for design and creation of design tools.</li></ol>
<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<p>This course introduce various components of Highway Engineering, highway alignment (horizontal and vertical curves), design of geometric elements of highways, skill on blending of aggregate fractions by using graphical and mathematical methods and asphalt concrete mix evaluation. In addition, it includes design of flexible and rigid pavements by studying AASHTO1993 structural design method to find rigid pavement slab thickness and different layer thicknesses for flexible pavement taking in consideration studying the effects of traffic loading, environmental, and materials properties. Furthermore, an attention will be given to the pavement distress so that candidates will be able to distinguish between causes and failure of each mode..</p>

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	93	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	6.0
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	7.0
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	200		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		<b>Time/Number</b>	<b>Weight (Marks)</b>	<b>Week Due</b>	<b>Relevant Learning Outcome</b>
<b>Formative assessment</b>	<b>Quizzes</b>	4	10% (10)	3, 6,10,14	LO #1, 3,5, and 6
	<b>Assignments</b>	2	5% (5)	2, 12	LO # 4 and 6
	<b>Projects / Lab.</b>	1	10% (10)		
	<b>Report</b>	1	5% (5)	13	LO # 2 - 6
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	20% (20)	7	LO # 1-4
	<b>Final Exam</b>	3hr	50% (50)	16	All
<b>Total assessment</b>			100% (100 Marks)		

<b>Weekly Distribution of Course Topics/Contents</b>			
<b>Week</b>	<b>Topic</b>	<b>Comments</b> *	<b>Course SLO</b>
1.	Highway location		1, 2
2.	Design speed, factors affecting design, highway types, cross section elements		1, 2
3.	Sight distances and horizontal alignment design		2, 3
4.	Horizontal alignment design		2, 3
5.	Horizontal alignment design		2, 3
6.	Vertical alignment design		2, 3
7.	Intersections and interchanges		2, 3
8.	<b>Mid-term exam</b>		-----
9.	Intersections and interchanges		2, 3
10.	Highway construction, Pavement materials (including aggregate combination)		4, 7
11.	Pavement design – General		4, 6
12.	Pavement design – flexible pavement		4, 6
13.	Pavement design- rigid pavement		4, 6

### Weekly Distribution of Course Topics/Contents

Week	Topic	Comments *	Course SLO
14.	Pavement distress and Maintenance		5
15.	Selected topics		----
16.	<b>Final Exam</b>		

### Scheduling of laboratory and other non-lecture sessions, including online sessions, as appropriate (if applicable)

Week	Topic	Comments
1	Introduction	
2	Soil: Sieve Analysis, Lab Density Test	
3	Field Density Test	
4	California Bearing Ratio Test	
5	<b>Exam</b>	
6	Bitumen and Tar: Flash point, Penetration, Ductility, Viscosity	
7	Softening point, thin film oven , and Loss on Heating Tests.	
8	Aggregate: Specific Gravity, Crushing, Abrasion	
9	Impact Tests, Water absorption, Flakiness and Elongation indices and Stone polishing value test	
10	<b>Exam</b>	
11,12,13, 14	Asphalt Mixtures- Marshal test, Analysis and Binder Recovery, Testing of Bituminous Mixtures, Specific Gravity, Temperature and	
15	<b>Exam</b>	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	<ul style="list-style-type: none"> <li>Garber, N. J. and L. A. Hoel (2009). Traffic and highway Engineering, Cengage</li> </ul>	Yes

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.