

Academic Year:2023-2024	Examination No.: 1124	Version:3/9/2023	Start: 10/9/23																																
Module Name - Code	Highway Engineering-Code 1124																																		
Module Language	English																																		
Responsible & Lecturer	Asst. Prof. Dr. Abdulhakim O. Salih Kozapanky																																		
Teaching Assistance(s)	None																																		
College& University	College of Engineering – Salahaddin University																																		
Duration	14 week – 1 semester																																		
Course outcomes	<p>By the end of the course, the student should be able to learn:</p> <ol style="list-style-type: none"> 1. Classification of highways and Planning for different highway elements. 2. Highway Alignment & methods of economic analysis. 3. Typical highway cross section details. 4. Designing geometrically of horizontal and vertical alignments related to the planned project. 5. Designing of an over pass bridges and approaches. 6. Designing of highway drainage, and 7. Highway intersections detail. 																																		
Course Contents	<table border="1"> <thead> <tr> <th>Week</th> <th>Lecture</th> </tr> </thead> <tbody> <tr> <td>1st</td> <td>Introduction: Highways, Types, classifications and patterns</td> </tr> <tr> <td>2nd</td> <td>Highway Planning</td> </tr> <tr> <td>3rd</td> <td>Highway alignment</td> </tr> <tr> <td>4th</td> <td>Typical Highway Cross sections</td> </tr> <tr> <td>5th</td> <td>Geometric design of highways</td> </tr> <tr> <td>6th</td> <td>Horizontal alignment: Design of Horizontal Curve</td> </tr> <tr> <td>7th</td> <td>Design of Horizontal transition curve</td> </tr> <tr> <td>8th</td> <td>Midterm Exam.</td> </tr> <tr> <td>9th</td> <td>Vertical alignment</td> </tr> <tr> <td>10th</td> <td>Design of summit vertical curves</td> </tr> <tr> <td>11th</td> <td>Design of Sag Vertical curves</td> </tr> <tr> <td>12th</td> <td>Design an Overpass Bridge and Approaches</td> </tr> <tr> <td>13th</td> <td>Highway Intersections</td> </tr> <tr> <td>14th</td> <td>Highway Drainage Systems: Details & Design</td> </tr> <tr> <td>15th</td> <td>Final Examination</td> </tr> </tbody> </table>	Week	Lecture	1 st	Introduction: Highways, Types, classifications and patterns	2 nd	Highway Planning	3 rd	Highway alignment	4 th	Typical Highway Cross sections	5 th	Geometric design of highways	6 th	Horizontal alignment: Design of Horizontal Curve	7 th	Design of Horizontal transition curve	8 th	Midterm Exam.	9 th	Vertical alignment	10 th	Design of summit vertical curves	11 th	Design of Sag Vertical curves	12 th	Design an Overpass Bridge and Approaches	13 th	Highway Intersections	14 th	Highway Drainage Systems: Details & Design	15 th	Final Examination		
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Literature	<ol style="list-style-type: none"> 1- AASHTO Material (2013): Part 1: Specifications, Part 2: Tests. 2- AASHTO (2018): A Policy on Geometric Design of Highways & Streets. 3- SORB: Standard Specifications of Roads & Bridges, Iraq. 4- Highway Design Manual, Iraq. 5- Transportation & Traffic Engineering Hand Book, ITE. 6- Highway Engineering Hand Book, by: Woods. 7- Principle, Practice & Design of Highway engineering, by: Sharma. 8- Traffic and Highway Engineering, by: Garber and Hoeli 9- Traffic Engineering: Theory & Practice, by: Pignataro. 10- Asphalt Pavement Engineering, Theory & Practice, by: Wallace& Martin. 																																		

	<p>11-Traffic Engineering & Transportation Planning, by: Kadiyali, 1987. 12-Highway Engineering, by: Khanna & Justo. 13-Soil Mechanics for Road Engineers, TRRL. 14-Route Location & Design, by: Hickerson. 15-Traffic Planning & Engineering, by Hobbs. 16-Highway Materials, by: Krebs 17-Highway Capacity Manual (HCM), 2005. 18-Highway Engineering, by: Dr. L.R. Kadyali&Dr.N.B.Lal,2008. 19-Internet (for various update references).</p>																
Type of Teaching	3 hrs. Theory in Class & 2hrs. Laboratory Workings																
Pre-requisites																	
Frequency	Yearly in fall semester																
Requirements for credit points	<p>For the award of credit points, it is necessary to pass the module exam. Quizzes, Assignments, and reports for lab. Tests. The module exam (practical and theoretical) contains: [Written 150 min for theoretical] [Written 30min for practical] Student's attendance is required in all classes and in Laboratory.</p>																
Credit points	5																
Grade Distribution	<p>The following grade system is used for the evaluation of the module exam:</p> <table border="1"> <thead> <tr> <th>Activity</th> <th>Marks (%)</th> </tr> </thead> <tbody> <tr> <td>Lab Reports</td> <td>10</td> </tr> <tr> <td>Quiz (Practical and Theoretical)</td> <td>10</td> </tr> <tr> <td>Homework, Report, seminars, and Assignment</td> <td>10</td> </tr> <tr> <td>Mid-Term Exam (theoretical part only)</td> <td>20</td> </tr> <tr> <td>Final Exam (Practical part in lab)</td> <td>10</td> </tr> <tr> <td>Final Exam (theoretical)</td> <td>40</td> </tr> <tr> <td>Total</td> <td>100</td> </tr> </tbody> </table>	Activity	Marks (%)	Lab Reports	10	Quiz (Practical and Theoretical)	10	Homework, Report, seminars, and Assignment	10	Mid-Term Exam (theoretical part only)	20	Final Exam (Practical part in lab)	10	Final Exam (theoretical)	40	Total	100
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Work load	Workload 10hrs/w (150hrs/s): Contact face-to-face 3hrs/w (45hrs/s), Lab.Works:2hrs/w(30hrs/s) and Non-Contact Self learning 7hrs/w (105hrs/s)																