



Course Specification

(Bachelor)

Course Title: **Highway Engineering**

Course Code: **COE4501**

Program: **Construction Engineering**

Department: **Civil and Environmental Engineering Department**

College: **College of Engineering and Computing in Al-Qunfudhah**

Institution: **Umm Al-Qura University**

Version: **3rd**

Last Revision Date: **March 2025**



Table of Contents

A. General information about the course:.....	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods.....	4
C. Course Content.....	4
D. Students Assessment Activities.....	5
E. Learning Resources and Facilities.....	5
F. Assessment of Course Quality.....	5
G. Specification Approval.....	6



A. General information about the course:

1. Course Identification

1. Credit hours: (3)

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered: (7/4)

4. Course General Description:

Introduction to roads and highway engineering, pavement design, geometric design of roads, traffic requirements, drainage, structural design of roads, current issues in road engineering: quality assurance, road safety needs and use of innovative techniques in road construction and maintenance.

5. Pre-requirements for this course (if any):

Soil Mechanics (COE3304)

6. Co-requisites for this course (if any):

7. Course Main Objective(s):

- 1- Understand the principles underlying roadway design
- 2- Design a roadway allowing for differing terrains, horizontal and vertical curves
- 3- Assess alternative surface drainage schemes, including sustainable urban drainage
- 4- Calculate earthworks quantities needed for roadway construction
- 5- Assess alternative pavement designs and understand their deterioration

2. Teaching mode (mark all that apply)



No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100 %
2	E-learning	None	None
3	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 	None	None
4	Distance learning	None	

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	None
3.	Field	None
4.	Tutorial	None
5.	Others (specify)	None
Total		45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Understand the principles underlying roadway design	K1	Lecture	Midterm exam OR final exam
2.0	Skills			
2.1	Design a roadway allowing for differing terrains, horizontal and vertical curves	S1	Lecture	Midterm exam OR final exam
2.2	Assess alternative surface drainage schemes, including sustainable urban drainage	S2	Lecture	Midterm exam OR final exam



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.3	Assess alternative pavement designs and understand their deterioration	S2	Lecture	Midterm exam OR final exam
3.0	Values, autonomy, and responsibility			
3.1				
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Course Description and Introduction To Highway Engineering	3
2.	Fundamental of Traffic Flow and Level of Service	9
3.	Geometric Design of Roads	9
4.	Drainage Design	6
5.	Sub-Grade and Sub-Base Geotechnical Design	6
6.	Road Materials	6
7.	Introduction to Pavement Design	3
8.	Quizzes and Midterm Exam	3
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	2, 5, 8, 11, 14	15%
2.	Quizzes	4, 11, 14	15%
3.	Midterm exam	7 or 8	30%
4.	Final exam	16 or 17	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References

Martin Rogers, Bernard Enright, "Highway Engineering". Wiley-Blackwell; 3rd edition, May 2016.





	ISBN-13: 978-1118378151
Supportive References	Paul H. Wright & Karen K Dixon “Highway Engineering”, 7th Edition, John Wiley 2009. ISBN: 9788126524518
Electronic Materials	<ul style="list-style-type: none"> • Electronic materials of the required textbook and its PowerPoints slides • Umm Al-Qura LMS related contents
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Equipped Classroom
Technology equipment (projector, smart board, software)	Blackboard, Data show, Smart Board
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Indirect
	Instructor	Direct
Effectiveness of Students assessment	Student	Indirect
	Instructor	Direct
Quality of learning resources	Student	Indirect
	Instructor	
The extent to which CLOs have been achieved	Instructor	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Civil and Environmental Engineering Department Council in Al-Qunfudah
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REFERENCE NO.

The fifteenth session of the academic year 1446

DATE

01/05/2025

