



Course Specification

(Bachelor)

Course Title: **Roads and Bridges Construction Engineering**

Course Code: **COE4502**

Program: **Bachelor of Construction Engineering**

Department: **Civil and Environmental Engineering Department**

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

Institution: **Umm Al-Qura University**

Version: **2nd**

Last Revision Date: **March 2025**



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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: (9 or 10/5)

4. Course General Description:

This course provides an overview of the construction processes involved in roads and bridges. Topics include the construction of flexible and rigid pavements, types of bridges, and key structural components such as deck slabs, pedestals, bearings, open foundations, end bearing piles, skin friction piles, clusters of piles, and pile caps. Emphasis is placed on practical construction techniques and procedures to ensure quality and durability in road and bridge projects.

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

Highway Engineering (COE4501)

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

7. Course Main Objective(s):

- To give the students the principles underlying roads and bridges construction.
- To provide students the methods and equipment used in road and bridges constructions

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 	None	None



No	Mode of Instruction	Contact Hours	Percentage
	• E-learning		
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 roads and bridges construction	K1	Lecture	Assignment, Quiz, Midterm and final exam
2.0	Skills			
2.1	Analyze methods, materials, and equipment used to construct flexible and rigid pavement.	S4	Lecture	Assignment, Quiz, Midterm and final exam
2.2	Identify bridge types and bridge components.	S2	Lecture	Assignment, Quiz, Midterm and final exam
2.3	Analyze methods, materials, and equipment used to construct bridges	S4	Lecture	Assignment, Quiz, Midterm and final exam



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
3.0	Values, autonomy, and responsibility			
3.1	Contributes to the economical, industrial, social, and cultural development.	V1	Lecture	Assignment, Quiz, Midterm and final exam

C. Course Content

No	List of Topics	Contact Hours
1.	Course Description and Introduction to Roads and Bridges Construction Engineering	6
2.	Flexible and rigid pavement construction: Site Clearance, different types of road rollers, earth moving equipment and construction equipment, Modern highway practices of construction, Specifications for highway materials and construction.	12
3.	Bridge components: deck slab, pedestals, bearings, open foundation, end bearing piles, skin friction piles, cluster of piles, pile caps.	6
4.	Classification of bridges: - Classification according to the materials used in their construction. - Classification according to various structural forms. - Classification according to construction and function	6
5.	Construction methods of Bridges: Cast in situ Method, Balanced Cantilever Method, Precast Method, Span by Span Casting Method, Cable-Stayed Method, Arch Method.	9
6.	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	Austin J. Byrne, "Highway Construction: A Practical Guide to Modern Methods of Roadbuilding and the Development of Better Ways of Communication". Forgotten Books April 2018. ISBN-13: 978-0266485759
Supportive References	K. S. Rakshit. "Design and Construction of Highway Bridges", 1st Edition 1 January 2010. C.A. O'Flaherty, A. Boyle, S.E. Zoorob. "Highways The location, design, construction and maintenance of road pavements", 4th Edition 2002
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	





Assessment Areas/Issues	Assessor	Assessment Methods
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
REFERENCE NO.	The fifteenth session of the academic year 1446
DATE	01/05/2025

