Course Specification
(Bachelor)

Course Title:	Traffic Engineering
Course Code:	CE 4302
Program:	Bachelor of Science in Civil Engineering
Department:	Civil Engineering Department
College:	College of Engineering&Architecture
Institution:	Umm Al-Qura University
Version:	1
Last Revision Date:	31 January 2025

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A. General information about the course:

1. Course Identification

1. Credit hours: (2)					
2. Course type					
A.	☐ University	☐ College	☒ Department	☐ Track	☐ Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (Level 9 / 5th Year)					
4. Course General Description:					
This course covers fundamental traffic engineering concepts, including traffic flow analysis, volume studies, intersection design, and safety audits. It integrates simulation and modeling tools such as VISSIM, Synchro, and SIDRA for analyzing traffic capacity, signal timing, and transportation impacts. Students will apply these techniques to real-world scenarios, enhancing their ability to evaluate and optimize transportation systems.					
5. Pre-requirements for this course (if any)**:**					
Introduction to Transportation Engineering					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					
• To learn about the characteristics of traffic streams, • To undertake capacity analysis under varying traffic operating conditions and • To acquire basic knowledge about traffic control measures and traffic management tools.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	15	25%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning	45	75%
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	15
2.	**Laboratory/Studio**	45
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		60

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	To learn about the characteristics of Traffic Streams	K1	•Through lectures, module notes, tutorials, coursework and examinations. • Through group project work requiring detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic for their Individual Project requiring a multidisciplinary approach	• Assessed outof-class and in-class course works. Course works may be in the form of laboratory and fieldwork reports, essays, inclass tests, design calculations, and literature reviews • Written examinations Project report(s), oral examination and writing of a journal-style paper
1.2	To undertake capacity analysis under varying traffic operating conditions.	K2		
1.3	To acquire basic knowledge about traffic control measures and traffic management tools.	K1		
2.0	**Skills**			
2.1	To increase the ability to calculate	S1	• Through lectures,	• Assessed outof-

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	traffic stream characteristics and undertake capacity analysis under varying traffic operating conditions using both basic principles and modern engineering tools.		module notes, tutorials, coursework and examinations. • Through group project work that will require detailed consideration of a multi-disciplinary approach. • Through detailed research and analysis of a particular topic in the compulsory Individual Project module requiring a multidisciplinary approach.	class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, inclass tests, design calculations, and literature reviews • Written examinations Project report(s), oral examination and writing of a journalstyle paper
2.2	To increase the ability towards improvement of traffic control measures and traffic management.	S2		
2.3	To formulate relevant analysis and to derive the solutions for them.	S4		
3.0	**Values, autonomy, and responsibility**			
3.1	To increase the ability to understand transportation planning and traffic engineering.	V1	• Through lectures, tutorials, coursework and group project work. • Through supervised laboratory exercises following standard procedures • Through supervised outdoor practical work Through supervised computer-based laboratory	• Assessed out of class and in-class coursework. (Laboratory and fieldwork reports, modelling calculations) • Project reports and peer review of individual contributions to group work Observation by tutors during laboratory and fieldwork
3.2	To overcome the problems of transportation planning and traffic engineering.	V2		
3.3	To prepare our graduates for immediate employment in any primary branch of civil engineering.	V2		

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			exercises.	activities

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to the Course and background to sumulation and modeling software	4
2.	Traffic stream components and characteristics	4
3.	Traffic volume studies and analysis	8
4.	Speed Travel time and delay studies	4
5.	Accident studies and Safety Audit	4
6.	Highway traffic capacity concepts and analysis	4
7.	Basic Principles of intersection design, control, and signalization	4
8.	Fundamentals of signal design and timing	4
9.	Design of parking and terminal facilities	4
10.	Developing traffic impact studies	4
11.	Highway and intersection Level of service Simulation and Modeling	4
13.	Techniques for addressing freeway system congestion	4
14.	Modern tools and software for Traffic Analysis	4
15	Tutorial, Exams, presentations, etc.	4
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework Assignment	Bi-weekly	15 %
2.	Quizzes	Bi-weekly	10 %
3.	Midterm Exam	6 or 7	25 %
4.	Final Exam	16	50 %

*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	Roess, R. P., Prassas, E. S., and McShane, W. R., “Traffic Engineering”, 5th Edition, Pearson, 2018. ISBN-10: 9780134599717, ISBN-13: 978-0134599717
Supportive References	N.J. Garber and L.A. Hoel, "Traffic and Highway Engineering"

	5th Edition, Stamford, Connecticut : Cengage Learning, [2015] ISBN-13: 9781133605157
Electronic Materials	Latest Traffic Engineering Software
Other Learning Materials	Highway Design Manual, Ministry of Transport, KSA.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom for about 40 students, with white board, computer, projector and internet
Technology equipment (projector, smart board, software)	Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.
Other equipment (depending on the nature of the specialty)	A white board & Computer with internet and data show.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Faculty members who teach this course	• Student questionnaire at the end of the semester. • Student test result analysis. • Regular feedback from students.
Effectiveness of Students assessment	Independent member(s) teaching staff	• Check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of

Assessment Areas/Issues	Assessor	Assessment Methods
		assignments with staff at another institution. • A review of a sample of student answers by a related department committee. • In-department group review and marking. • External reviewer for a sample of student answering sheets.
Quality of learning resources		• Increasing the number of computers. • E- learning • Video conference • Field applications must be completed. • Additional training for the staff assistants. • Scanning electron microscope. • Multi-media facility (video projector, TV, etc.).
The extent to which CLOs have been achieved		
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	CIVIL ENGINEERING COUNCIL
REFERENCE NO.	THE FIFTEENTH SESSION OF THE ACADEMIC YEAR 1446
DATE	30 APRIL 2025

