Course Specification
(Bachelor)

Course Title:	**Computer Application in Transportation Engineering**
Course Code:	**CE 4306**
Program:	**Bachelor of Science in Civil Engineering**
Department:	**Civil Engineering**
College:	**College of Engineering & Architecture**
Institution:	**Umm Al Qura University**
Version:	*Course Specification Version Number*
Last Revision Date:	*Pick Revision Date.*

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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: Level 9th , 10th / Year 5th					
4. Course General Description:					
To impart knowledge about use of CAD, GIS and professional software pertaining to planning, analysis and design in the field of transportation engineering.					
5. Pre-requirements for this course (if any)**:**					
CE 2202 CE 4303					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					
The objectives of this course are: • **Handle CAD and GIS applications proficiently.** • **Learn about the professional software used for planning, analysis and designing in the field of Transportation Engineering.**					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	66.7
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		33.3
5	Other (laboratory)	15	100

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	15
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
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	To handle CAD and GIS applications proficiently.	K3	• 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 multi-disciplinary approach.	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper.
1.2	To learn about the professional software used for planning, analysis and designing in the field of Transportation Engineering.	K3		
2.0	**Skills**			
2.1	To increase the ability to handle CAD and GIS	S2		• Assessed out-of-class and in-

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	applications proficiently.			class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations Project report(s), oral examination and writing of a journal-style paper
2.2	To increase the ability to use the professional software for planning, analysis and designing in the field of Transportation Engineering.	S3	• Through lectures, 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 multi-disciplinary approach.	
3.0	**Values, autonomy, and responsibility**			
3.1	To increase the ability to understand problems and issues related to Transportation planning, Traffic and Highway 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 exercises	• 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 activities
3.2	To interpret the data and information and overcoming the problems	V2		
3.3	To prepare our graduates for immediate employment in any primary branch of civil engineering.	V3		

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to the Course	3
2	Introduction to AUTOCAD Civil 3D and its uses with respect to highway engineering	3
3	Hands on Training on AUTOCAD Civil 3D – Part 1	3
4	Hands on Training on AUTOCAD Civil 3D – Part 2	3
5	Hands on Training on AUTOCAD Civil 3D – Part 3	3
6	Hands on Training on AUTOCAD Civil 3D – Part 4	3
7	Hands on Training on AUTOCAD Civil 3D – Part 5	3
8	Introduction to VISSIM and its uses with respect to highway engineering	3
9	Hands on Training on VISSIM – Part 1	3
10	Hands on Training on VISSIM – Part 2	3
11	Hands on Training on VISSIM – Part 3	3
12	Hands on Training on VISSIM – Part 4	3
13	Hands on Training on VISSIM – Part 5	3
14	Hands on Training on Highway Capacity Software/ Worksheets	6
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework Assignment	Bi-weekly	5 %
2.	Quizzes	Bi-weekly	5 %
3.	Term Project	Week 6-13	10%
4.	Midterm Exam	9	30 %
5.	Final Exam	16 / 17	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	• Jorge F. De Sousa and Riccardo Rossi, “Computer-based Modelling and Optimization in Transportation”, Springer, Switzerland, 2014. ISBN-10: 978-3-319-04629-7, ISBN-13: 978-3-319-04630-3

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	• Websites of software companies
Other Learning Materials	• Latest Software and Techniques

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. 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.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Faculty members who teach this course and the lab staff associated with the course.	• Student questionnaire at the end of the semester. • Student test result analysis. Regular feedback from students.
Effectiveness of Students assessment	Faculty members who teach this course and those teaching	• Regular review of the course contents by the

Assessment Areas/Issues	Assessor	Assessment Methods
	other courses relevant to this course.	related department committee. Input from visiting professors.
Quality of learning resources	Faculty members who teach this course	• Regular updating of learning resources. • Usage of new technologies in presenting the course materials. • Self-learning. • Promote reading of outside materials. • Encouraging students to conduct scientific presentations and group discussions. Additional training for the staff assistants.
The extent to which CLOs have been achieved	Independent members of 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 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.
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

Course Coordinator



Dr. Mohannad Alyamani