Course Specification
(Bachelor)

Course Title:	Computer Applications in Surveying
Course Code:	CE4809
Program:	Bachelor of Science in Civil Engineering
Department:	Civil Engineering Department
College:	College of Engineering and 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: (3 hours)					
2. Course type					
A.	☐University	☐College	X Department	☐Track	Others
B.	☐Required		X Elective		
3. Level/year at which this course is offered: Level 5 / 3rd Year					
4. Course General Description:					
The course covers Least Squares Method for observations adjustment and methods of coordinates transformations. It includes mapping using AutoCAD software, Surfer and AUTOCAD Civil 3D. Surveying applications for contouring and preparation of the longitudinal and cross sections of roads using AutoCAD will be included.					
5. Pre-requirements for this course (if any)**:**					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					
The main purposes of this course are: • **Knowledge of various professional software packages used for network adjustment techniques, analysis, contouring, earthwork computation and coordinates transformation.** **Ability to apply Mapping and CAD applications proficiently using one of the available well-known software packages.**					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		

No	Mode of Instruction	Contact Hours	Percentage
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	45
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		75

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 demonstrate knowledge about the available computer software related to surveying and observations adjustment.	K1	• Lectures and training tutorials • Through group project work • Through detailed research and analysis of a particular topic for surveying applications.	• Class works. • Written and oral examinations. • Projects. • Reports.
1.2	To discuss knowledge and understanding the use of some programs in the surveying applications.	K1	• Lectures and training tutorials • Through group project work • Through detailed research and analysis of a particular topic for surveying applications.	• Class works. • Written and oral examinations. • Projects. • Reports.
2.0	**Skills**			
2.1	To identify and apply knowledge about the available computer software related to surveying applications	S1	• Lectures and training tutorials • Through group project work	• Class works. • Written and oral examinations. • Projects. • Reports.

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	and enable the student to use some of these programs in the analysis and mapping problems.		• Through detailed research and analysis of a particular topic for surveying applications.	
2.4	To increase the ability to understand problems and issues related to Surveying, Mapping and computations.	S3	• Lectures and training tutorials • Through group project work • Through detailed research and analysis of a particular topic for surveying applications.	• Class works. • Written and oral examinations. • Projects. • Reports.
3.0	**Values, autonomy, and responsibility**			
3.1	Integrate professionally and ethically with teams to manipulate solving specific surveying problems.	V1	• Lectures and training tutorials • Through group project work • Through detailed research and analysis of a particular topic for surveying applications	• Class works. • Written and oral examinations. • Projects. • Reports.
3.2	Use advanced software capabilities in managing contemporary projects for serving society and pilgrims during Hajj and Umrah.	V3	• Lectures and training tutorials • Through group project work • Through detailed research and analysis of a particular topic for surveying applications	• Class works. • Written and oral examinations. • Projects. • Reports.

C. Course Content

No	List of Topics	Contact Hours
1	Least Squares Method for observations adjustment.	5
2	Different techniques for network adjustment.	5
3	Network adjustment techniquesusing the available software (e.g. LandSurMap software) (1)	5
4	Network adjustment techniquesusing the available software (e.g. LandSurMap software) (2)	5

5	Methods of coordinates transformations	5
6	coordinates transformationsusing the available software	5
7	Mapping using AutoCAD software (1)	5
8	Mapping using AutoCAD software (2)	5
9	Preparation of Cadastral Maps Using AutoCAD	5
10	Preparation of Topographical Maps Using AutoCAD	5
11	Using Surfer and AUTOCAD Civil 3D for contouring (1)	5
12	Using Surfer and AUTOCAD Civil 3D for contouring (2)	5
13	Using Surfer and AUTOCAD Civil 3D for earthwork computation	5
14	Preparation the longitudinal and cross sections of roads using AutoCAD (1)	5
15	Preparation the longitudinal and cross sections of roads using AutoCAD (2)	5
Total		**75**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Tutorials	2-15	10%
2.	Reports and Practical Examination	3-15	15 %
3.	Mid Term Exam	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	• Wolf, P. R., and Ghilani, C. D. “Elementary Surveying”, 14th Edition, Prentice Hall, 2015
Supportive References	• Barry F. K. and Gelnnbind, S. J. "Surveying, Principles and Applications", 9th Edition. Prentice Hall, 2014. • Wolf, P. R., and Ghilani, C. D. “Elementary Surveying”, 14th Edition, Prentice Hall, 2015
Electronic Materials	• Websites of softwares companies.
Other Learning Materials	• Latest Softwares 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, computers, projector and internet.
Technology equipment (projector, smart board, software)	A white board, Computer with multi-media, a printer, internet connection, data show, Microsoft Office, AUTOCAD, SURFER
Other equipment (depending on the nature of the specialty)	Printers and laptops for staff members are required.

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.	• Both written and verbal, through presentations. • Analysis of students` marks • Regular feedback of the students about the course and the teaching methods
Effectiveness of Students assessment	Faculty members who teach this course and those teaching other courses relevant to this course.	• Regular revising and improving of the course contents and consulting the faculty members • Teaching faculty and lab staff associated with the course are also available for personal consultation.
Quality of learning resources	Faculty members who teach this course	• Frequent improvement for teaching and learning techniques. • Frequent survey for latest references. • Encouraging the students in team work cooperation and writing reports.
The extent to which CLOs have been achieved	Independent member(s) teaching staff	A sample of students answer sheets is revised by a specified committee of the department.
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**

