Module Descriptor Form

Civil and Environmental Engineering

CL209 - Land Surveying And Mapping

Module Code	CL209	**Module Title**	Land Surveying And Mapping				
Module Registrar	Pytharouli, Dr Stella I						
Other Staff Involved	Dr James M Leak (Tutor), Dr Matteo Pedrotti (Tutor)						
Credit Weighting	20	**Semester**	1/2	**Elective**	No	**Academic Level**	2
Pre-requisites							
Required for							

Module Format and Delivery (hours):

Lectures	Tutorials	Assignments	Labs	Private Study	Total
14	10	0	10	166	200

Educational Aim

This module aims to:

provide a basic understanding of (1) the concepts and application of land surveying for civil engineering purposes and (2) the concept of deformation monitoring and monitoring data analysis in civil engineering projects.

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Syllabus

This module will teach the following:

Semester 1:
Focus on Geodetic Measurement theory:
Introduction to Land Surveying
Basic surveying principles
Calculation of azimuths
Theory of errors, survey statistics and basic time series analysis
Levelling, use of level and surveying staff, levelling procedure
Angle and distance measurement with use of total stations
Traverse surveying and adjustment
Setting out engineering structures
Topographic surveying and contour generation
Calculations of Earthworks, areas and volumes
Coordinate Systems and map projections
Introduction to Global Navigation Satellite Systems
Deformation monitoring (slopes, and civil engineering infrastructure)

Semester 2:
Focus on the practical aspect of geodetic measurements:
weeks 2-5: Practical exercises (on campus)
Weeks 7 – 9: Field course at Strathclyde's playing fields

Learning Outcomes

On Completion of the module, the student is expected to be able to:

LO: 1	Understand and quantify errors in measurements in land surveying.
LO: 2	Understand the basic surveying principles and apply them to successfully conduct a basic land survey.
LO: 3	Be able to process and correctly use surveying data (levelling data, angle and distance measurements).
LO: 4	Understand and interpret displacement monitoring data.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

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Assessment of Learning Outcomes - Criteria

Learning Outcome: **1**

	Criteria
1	Be able to estimate and interpret statistical quantities in measurements in surveying.

Learning Outcome: **2**

	Criteria
1	Be able to set up and use correctly basic surveying instruments, i.e. level and total station.
2	Be able to apply the basic surveying principles to provide answers to simple surveying problems.
3	Be able to provide adequate answers to questions on the theory of land surveying.
4	Be able to understand GNSS data and their uncertainties

Learning Outcome: **3**

	Criteria
1	Be able to reduce heights from levelling data
2	Be able to reduce horizontal and vertical angles from measurements using a total station
3	Be able to calculate earthworks, areas and volumes, and understand the relationship between map distances and ground distances.

Learning Outcome: **4**

	Criteria
1	Be able to carry out a basic time series analysis using deformation data

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

To Pass the module, students need to gain a summative mark of: 40%

Description	Semester	Start Week	Duration	Weight	Submission Week	Linked Criteria
Lab report	1	5		10%	7	LO 1: C1 LO 2: C1, C2, C3 LO 3: C1, C2
Practical assessment in the field. Closed Book	2		8.00	45%	7	LO 2: C1, C2, C3 LO 3: C1, C2
May exam. Closed Book	2		2.00	45%	E	LO 1: C1 LO 2: C2, C3, C4 LO 3: C1, C2, C3 LO 4: C1

Principles of Assessment Feedback

Principle 1: The assessment of the course has been revised to encourage student engagement and understanding. The assessment schedule also aims to help students take responsibility of their own learning. Three different assessment methods are used: exam, lab report submission and field group work. The first is at individual level, the last two are group work. This way personal study is encouraged as well as good teamwork skills. There are a number of formative assessments (not credit bearing), i.e. online revision test and quizzes are designed in such a way so that feedback is provided to each student within minutes from the completion of the activity. These assessments aim to help student self-assess their learning and highlight areas of the theory that students need to improve, well before the practical assessment and May exam. During the semesters, certain weeks have been specified as Q& A (revision) to give students to opportunity to ask questions out-with the class environment and discuss their progress with the tutor on a one-to-one basis.

Principle 2: All assessments are marked in an appropriate, fair and transparent way with pre-specified marking criteria and individual feedback as well as general observations for the whole year cohort.

Principle 3: Marking criteria are clearly stated in each assessment brief, also communicated to students in the class, on the course page on MyPlace, as well as on each assessment's handing out date.

Principle 4: The course is reviewed every year, based on feedback from students collected in the form of a mid-term and end-term surveys taking place in both Semesters.

Additional Information

Students must gain a summative mark of 40% to pass the module, including attending the compulsory assessments, i.e. the Stepps field day and the May exam. Attendance of the May exam AND the field day-assessment at Stepps is a requirement of this module. Absence from the May exam or absence from the field day at Stepps will result in an Absence (ABS) being returned.

Resit Procedure

Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of the resit exam. No marks from any previous attempts/submitted coursework will be transferred to a resit attempt.

Recommended Reading

Recommended Reading

- Schoefield, W. and Breach, M. "Engineering Surveying", 6th Edition (2007), Elsevier, ISBN-13: 978-0-7506-6949-8 (Electronic Access via Strathclyde Library)

Expanded Reading List

- Uren, J., Price, W.F. "Surveying for engineers", 5th Edition (2010), Palgrave Macmillan, ISBN 9780230221574 (Hard copy available in Strathclyde library - D 526.9024 URE)
- Grant, S. "Setting out for Construction: A practical Guide to Site Surveying" (2019), Costello House Publishing, ISBN 1916068405 (Hard copy available in Strathclyde library - D 692.5 GRA)
- Bannister, A., Raymond S. and Baker, R. "Surveying", 7th Edition (1998), Pearson-Prentice Hall, ISBN 0-582-30249-8 (Hard copies available in Strathclyde library - D 526.9 BAN)
- Irvine, W. and MacLennan, F. "Surveying for Construction", 5th Edition (2006), McGraw-Hill, ISBN 0077111144.

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Module Timetable

Week	Semester 1	Semester 2
0		
1		
2		
3		
4		
5		
6		
7	Lab 10%	Examination 45%
8		
9		
10		
11		
E		Examination 45%

Date of Last Modification

18-08-2025