

SURV1200: Introduction to Surveying

Callaghan

Semester 1 - 2024



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

OVERVIEW

Course Description This course enables students to develop basic skills in measurement and calculation related to angles, distances and heights. Students will develop competency in using modern surveying equipment to collect three-dimensional data. They will also acquire skills in preparing maps and presenting measured data in plan formats such as long sections, cross sections, and contour plans. Students will develop an understanding of how roads and rail lines are designed to best fit the measured topography and meet safety requirements. They will also be introduced to advanced systems such as satellite measurement systems (GPS/GNSS) and digital mapping systems (GIS).

Academic Progress Requirements Nil

Requisites This course replaces SURV1110. If you have successfully completed SURV1110 you cannot enrol in this course.

Contact Hours

Callaghan
Field Study
Face to Face On Campus
2 hour(s) per week(s) for 5 week(s) starting Week 3
The above distribution of contact hours may alter on a weekly basis and will be confirmed during the lectures or on the course Canvas site.

Lecture
Face to Face On Campus
2 hour(s) per week(s) for 13 week(s) starting Week 1
The above distribution of contact hours may alter on a weekly basis and will be confirmed during the lectures or on the course Canvas site.

Tutorial
Face to Face On Campus
1 hour(s) per week(s) for 13 week(s) starting Week 1
The above distribution of contact hours may alter on a weekly basis and will be confirmed during the lectures or on the course Canvas site.

Unit Weighting Workload 10
Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

COURSE OUTLINE

CONTACTS

Course Coordinator **Callaghan**
Dr Lloyd Pilgrim
Lloyd.Pilgrim@newcastle.edu.au
(02) 4921 6051
Consultation: I operate with an open-door policy. Feel free to drop by my office if you have a question. You can find me in Room EA122, or please send an email from your university email account with your question.

Teaching Staff Lecture and Tutor: Dr Lloyd Pilgrim
Field work Demonstrators: To be advised in fieldwork classes.

School Office **School of Engineering**
EAG02
EA Building
Callaghan
Seng-admin@newcastle.edu.au
9.00am-1.00pm and 2.00pm-5.00pm (Monday to Friday)

SYLLABUS

Course Content

- Basic Geometry and Trigonometry
- Coordinate Systems and Datums
- Basic statistics in surveying
- Levelling
- Theodolites and Total Stations
- Bearings and coordinates
- Introduction to GNSS/GPS
- CAD/GIS
- Contouring, long sections and cross sections
- Areas and Volumes
- Introduction to Road Design

Course Learning Outcomes

On successful completion of this course, students will be able to:

1. Apply fundamental surveying concepts such as datums, horizontal and vertical coordinate systems, horizontal and vertical angles, and the graphical representation of the three-dimensional information in a plane surveying environment
2. Implement the concepts and practicalities of differential levelling in a plane surveying environment
3. Execute the basic techniques and capabilities of surveying instruments including total stations, levels, and autonomous GNSS/GPS positioning devices
4. Apply the concepts and practicalities of computer aided drafting to a plane surveying project
5. Design and calculate the basics of geometric road design geometry

Course Materials

Lecture Materials:
A book of Notes will be provided as a PDF file on the course Canvas site. The notes are provided to support the material covered in the weekly lectures. PDF copies of the lecture slides will also be provided via the Course Canvas site on a weekly basis.

Other Resources:
Additional information can be found in the textbook "Surveying for Engineers", by John Uren and Bill Price (2010), Ed. 5. There are many copies of this text in the library, including earlier editions, which are also suitable as a reference source for the course.
There is no requirement to purchase this textbook for this course.

ASSESSMENTS

This course has 7 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Survey Instrument Use and Testing - Levelling	As specified in the Course Schedule provided in Canvas, subject to weather delaying the completion of fieldwork. Any alteration to due dates will be notified in the Lectures, and on the course Canvas site.	Individual	5%	1, 3
2	Levelling Exercise	As specified in the Course Schedule provided in Canvas, subject to weather delaying the completion of fieldwork. Any alteration to due dates will be notified in the Lectures, and on the course Canvas site.	Individual	10%	1, 2, 3
3	Survey Instrument Use and Testing - Theodolite	As specified in the Course Schedule provided in Canvas, subject to weather delaying the completion of fieldwork. Any alteration to due dates will be notified in the Lectures, and on the course Canvas site.	Individual	10%	1, 3
4	Topographic Survey Exercise	As specified in the Course Schedule provided in Canvas. Any alteration to due dates will be notified in the Lectures, and on the course Canvas site.	Individual	20%	1, 3
5	CAD Exercise	As specified in the Course Schedule provided in Canvas. Any alteration to due dates will be notified in the Lectures, and on the course Canvas site.	Individual	5%	1, 3, 4
6	Class Quiz 1	Quiz answers will be submitted during the schedule lecture class session.	Individual	25%	1, 2, 3
7	Class Quiz 2	Quiz answers will be submitted during the schedule lecture class session.	Individual	25%	1, 2, 3, 4, 5

Late Submissions

The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 - Survey Instrument Use and Testing - Levelling

Assessment Type	Written Assignment
Purpose	Two Peg Test
Description	Field work exercise covering automatic level operation, with a focus on instrument checking. A written report is required to be submitted.
Weighting	5%
Length	N/a
Due Date	As specified in the Course Schedule provided in Canvas, subject to weather delaying the completion of fieldwork. Any alteration to due dates will be notified in the Lectures, and on the course Canvas site.
Submission Method	Assignment Boxes A submission box for all written reports is located outside the Survey Equipment Room

Assessment Criteria	(EDG08). Assessment requirements are provided in the course practical notes available on the course Canvas site.
Return Method	In Class
Feedback Provided	Returned Work - Two weeks after report submission. General feedback will be provided to the class in the Lectures, and specific feedback will be provided to each student via written comments on each assessed report.

Assessment 2 - Levelling Exercise

Assessment Type	Written Assignment
Purpose	Level Run
Description	A level run will be conducted from a datum point of known height, and students will determine the heights of a number of distant points, identified during the field work class.
Weighting	10%
Length	n/a
Due Date	As specified in the Course Schedule provided in Canvas, subject to weather delaying the completion of fieldwork. Any alteration to due dates will be notified in the Lectures, and on the course Canvas site.
Submission Method	Assignment Boxes A submission box for all written reports is located outside the Survey Equipment room (EDG08).
Assessment Criteria	Assessment requirements are provided in the course practical notes available on the course Canvas site.
Return Method	In Class
Feedback Provided	Returned Work - Two weeks after report submission. General feedback will be provided to the class in the Lectures, and specific feedback will be provided to each student via written comments on each assessed report.

Assessment 3 - Survey Instrument Use and Testing - Theodolite

Assessment Type	Written Assignment
Purpose	Familiarise students with angle measurement procedures using a modern total stations instrument.
Description	The fieldwork exercise will cover the operation of a total station instrument, with a focus on checking the angular measurement quality achievable with the equipment.
Weighting	10%
Length	n/a
Due Date	As specified in the Course Schedule provided in Canvas, subject to weather delaying the completion of fieldwork. Any alteration to due dates will be notified in the Lectures, and on the course Canvas site.
Submission Method	Assignment Boxes A submission box for all written reports is located outside the Survey Equipment room (EDG08).
Assessment Criteria	Assessment requirements are provided in the course practical notes available on the course Canvas site.
Return Method	In Class
Feedback Provided	Returned Work - Two weeks after report submission. General feedback will be provided to the class in the Lectures, and specific feedback will be provided to each student via written comments on each assessed report.

Assessment 4 - Topographic Survey Exercise

Assessment Type	Written Assignment
Purpose	Detail Survey and preparation of a topographic plan
Description	Students are to collect topographic data with a total station, and to prepare a site plan. Once the site plan is developed, students will then use this data to design the geometry for a simple engineering element or calculate.
Weighting	20%
Length	n/a
Due Date	As specified in the Course Schedule provided in Canvas. Any alteration to due dates will be notified in the Lectures, and on the course Canvas site.
Submission Method	Assignment Boxes

Assessment Criteria	A submission box for all written reports is located outside the Survey Equipment room (EDG08). Assessment requirements are provided in the course practical notes available on the course Canvas site.
Return Method	In Class
Feedback Provided	Returned Work - Two weeks after report submission. General feedback will be provided to the class in the Lectures, and specific feedback will be provided to each student via written comments on each assessed report.

Assessment 5 - CAD Exercise

Assessment Type	Written Assignment
Purpose	Use a computer drafting package to prepare a contour plan.
Description	Students will use the co-ordinate data they acquired in Assessment 4, with surveying drafting software, to prepare a contour plan of the mapped site.
Weighting	5%
Length	n/a
Due Date	As specified in the Course Schedule provided in Canvas. Any alteration to due dates will be notified in the Lectures, and on the course Canvas site.
Submission Method	Assignment Boxes A submission box for all written reports is located outside the Survey Equipment room (EDG08).
Assessment Criteria	Assessment requirements are provided in the course practical notes available on the course Canvas site. Requirements and assessment matters will be covered in the Lectures prior to each assessment tasks.
Return Method	In Person
Feedback Provided	Returned Work - Two weeks after report is submitted. Specific feedback will be provided to each student via written comments on each assessed report.

Assessment 6 - Class Quiz 1

Assessment Type	Quiz
Purpose	To assess material covered in the first six weeks of the course.
Description	An in class supervised quiz will be conducted during the scheduled lecture session for week 7.
Weighting	25%
Length	90 minutes
Due Date	Quiz answers will be submitted during the schedule lecture class session.
Submission Method	In Class Answers will be submitted in the Schedule lecture session.
Assessment Criteria	
Return Method	Not Returned
Feedback Provided	In Class - Two weeks after quiz is completed. Marks will be posted to the Canvas course site. General feedback will be provided in class. Students can arrange a time to meet with the Course Lecturer to receive individual feedback on their quiz result.

Assessment 7 - Class Quiz 2

Assessment Type	Quiz
Purpose	To assess material covered in week 8-12 of the course.
Description	An in class supervised quiz will be conducted during the scheduled lecture session for week 13.
Weighting	25%
Length	n/a
Due Date	Quiz answers will be submitted during the schedule lecture class session.
Submission Method	In Class Answers will be submitted in the Schedule lecture session.
Assessment Criteria	
Return Method	Not Returned
Feedback Provided	In Person - Two weeks after quiz is completed. Students can arrange a time to meet with the Course Lecturer to receive individual feedback on their quiz result.

ADDITIONAL INFORMATION

Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

*Skills are those identified for the purposes of assessment task(s).

Attendance

Attendance/participation will be recorded in the following components:

- Field Study (Method of recording: Manual Recording during equipment collection at start of class)
- Tutorial (Method of recording: Student to record using University Attendance App)

Attendance at fieldwork sessions will be recorded manually when collecting equipment. Failure to attend your scheduled fieldwork session may lead to a 0% return on the assessment item.

WH&S Requirements The issue of safety for staff and students is taken very seriously by the University.

All students in this course must complete an induction before any Laboratory work or fieldwork can be undertaken. This induction quiz - and a safety booklet - can be found on the course Canvas site. You must pass this quiz (all questions correct) before you can undertake any fieldwork or undertake any work in the Laboratory (which includes access to Building ED). Any student who fails to complete this Induction will not be permitted to participate in the exercise and will be given a zero mark for the exercise and related assignment. Multiple attempts of the quiz are permitted, until you successfully complete the quiz.

Currently, you only have to complete this Induction once during your degree program.

A register will be maintained of students who have completed the induction. Only students on the register will be permitted to undertake any fieldwork or laboratory exercise.

In general when doing field work:

All students must wear shoes/boots which enclose your feet.

All students must wear a hi visibility vest during field work. (All students MUST provide their own safety vest, or Hi Vis work shirt)

Field work occurs outside, resulting in exposure to the sun. Students must implement sun protection - a hat, long sleeves, and sunscreen is recommended.

On hot days ensure hydration levels are maintained by bringing adequate water to the class.

Trips and falls can occur on uneven ground. Watch your footing while moving around the fieldwork sites.

Do not place any equipment on a road, and do not stand or survey on a road.

All students accessing laboratory buildings must wear boots which enclose your feet.

You should be careful with the sharp points on survey tripods. Ensure they point towards the ground when carrying them.

Beware of power lines when using or carrying equipment, especially levelling staves.

In the field you should be on notice for snakes, spiders, and other dangerous creatures.

In the field you should take note of any fences, particularly electrified and barbed wire fences.

When accessing and using laboratory buildings, you must be supervised at all times.

Access to laboratory buildings after normal working hours is normally not permitted.

Never point a telescope towards the sun.

Working alone is also NOT permitted.

If you are surveying close to a road, or other traffic thoroughfares, you must wear a safety vest and use warning signs.

Doing any observations near machinery or electrical equipment is not permitted except under the direction/approval of staff.

Communication Methods	Communication methods used in this course include: <ul style="list-style-type: none">- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.- Email: Students will receive communications via their student email account.- Face to Face: Communication will be provided via face to face meetings or supervision.
Course Evaluation	Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.
Oral Interviews (Vivas)	As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the Oral Examination (viva) Procedure . In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the Student Conduct Rule .
Academic Misconduct	All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to https://policies.newcastle.edu.au/document/view-current.php?id=35 .
Adverse Circumstances	The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where: <ol style="list-style-type: none">1. the assessment item is a major assessment item; or2. the assessment item is a minor assessment item, and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system;3. you are requesting a change of placement; or4. the course has a compulsory attendance requirement. Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at: https://policies.newcastle.edu.au/document/view-current.php?id=236
Important Policy Information	The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures that support a safe and respectful environment at the University.

Graduate Profile Statements

This course builds students' capacity in the following University of Newcastle Bachelor of Engineering Graduate Profile Statements (based on 2011 Engineers Australia revised Stage 1 Competency Standards for Professional Engineers):

UON Att.	University of Newcastle Bachelor of Engineering Graduate Profile Statements/ Engineers Australia Stage 1 competency statements	Taught	Practised	Assessed	Skill Level (1-4)
	Professional Attributes				
11	3.1. Ethical conduct and professional accountability	X			1
12	3.2. Effective oral and written communication in professional and lay domains.	X	X	X	1
13	3.3. Creative, innovative and pro-active demeanour.				
14	3.4. Professional use and management of information.	X	X	X	1
15	3.5. Orderly management of self, and professional conduct.	X	X	X	1
16	3.6. Effective team membership and team leadership.	X	X		1
	Engineering Ability				
7	2.1. Application of established engineering methods to complex engineering problem solving.				
8	2.2. Fluent application of engineering techniques, tools and resources.	X	X	X	1
9	2.3. Application of systematic engineering synthesis and design processes.	X	X	X	1
10	2.4. Application of systematic approaches to the conduct and management of engineering projects.				
	Knowledge Base				
1	1.1. Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.	X	X	X	1
2	1.2. Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.	X	X	X	1
3	1.3. In-depth understanding of specialist bodies of knowledge within the engineering discipline.				
4	1.4. Discernment of knowledge development and research directions within the engineering discipline.				
5	1.5. Knowledge of contextual factors impacting the engineering discipline.	X	X	X	1
6	1.6. Understanding of the scope, principles, norms, accountabilities and bounds of contemporary engineering practice in the specific discipline.	X	X	X	1

This course outline was approved by the Head of School on the 30/01/2024. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.

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