School of Civil and Environmental Engineering

Term 2, 2020

GMAT2500 SURVEYING COMPUTATIONS A

COURSE DETAILS

Contact hours	6 hours per week	
Lecture Class	2 hrs Tuesday, 12 – 2pm	On line via Moodle, BB Collaborate
	1 hr Thu, 9am -10	
Computer Lab	3 hrs Thursday, 11 - 1pm	
Coordinator & Lecturer	Dr Bruce Harvey, email: B.Harvey@unsw.edu.au	
Tutor / Demonstrator	Dr Bruce Harvey	Enrolled students: ≈ 20

SUMMARY OF ONLINE DELIVERY MODE TERM 2, 2020

This version of the course profile is dated 8/05/2020 7:38 AM. It is possible that circumstances may change the way this course runs. Initially it is intended to be fully on line with on line assessment. However, if on campus classes and assessment are allowed at some stage during T2 and all students enrolled in the course are in Sydney during T2, then the course delivery mode will change. Changes will be notified in class and on the class Moodle web site.

	On line mode
Lectures	Lectures will be delivered via BlackBoard Collaborate Ultra (BBCU) software. A link to each class will be provided in Moodle. Lectures will be recorded and available in BBCU. A pdf copy of the lecture slides will be provided in Moodle after each lecture. Attendance at lectures is highly recommended but not compulsory. Students are encouraged to ask questions during the lecture, and to answer my questions, by using a microphone if they have one or typing in the chat section as the class progresses. We will be joined by Wilson who monitors the chat.
Tutorials and computer labs	Tutorial and computer lab questions will be provided for each week via Moodle quiz or a step by step instruction file also in Moodle. The computer lab timeslot will run in a BBCU session. I can answer questions verbally, via chat, or by allowing you to show me your computer screen and talk you through debugging etc. The main software used in this course are MS Excel (which you will be expected to have at home) and Magnet Office (MO), a CAD software that you can run at home via a link to UNSW. Details on how to do that are on page 9.
Fieldwork	Field practicals will be replaced by two small assignments. The assignments will use virtually the same instructions as practicals in previous years, except that instead of taking measurements yourselves you will be given copies of the measurements taken by students in previous years. Real data, not simulated computer generated data.
Assessment	A mid-term exam and a final exam will be run in online mode. You will be sent an exam paper and data files by email at the start time. You process the data on the computer using Excel and MO. MO is not needed in the mid-term exam. You also type your written answers. You email your answers to me before the exam end time. We have operated in this mode in T1. The mid-term exam does not require continuous internet connection during the exam. It does not run through Moodle. I am available for questions during the exam time.
My teaching experience	I have run half the term of GMAT3100 and GMAT3150 in T1 2020 in this mode and I am suitably experienced with BBCU software. It appears that BBCU works best with the Chrome browser on PCs, and Safari on iPads.

COURSE PROGRAM WEEK BY WEEK TERM 2, 2020

If any changes to the table below occur, then they will be notified in lecture class and on the class Moodle web site.

Week	Tuesday Lecture 2h	Thu Lecture 1h	Thu Computer Lab 3h
1 2 Jun	Intro to Course. Principles of Calculation. Revision of survey calculations.	Intersection calculations.	Revision of year 1 calculations lab. Intersection.
2	Resection. Loop Close "Missing Data" Problems.	Traverse Field Method	Resection: graphical & numerical.
3	Traverse Adjustment Calculations. Blunder detection. Developing 2D - 3D Spatial Skills, Visualisation.	Cartography. Intro to digital mapping.	Missing Data Problems Traverse Calculations
4	Terrain modelling, contouring, and break-line in CAD.	CAD: Map editing, feature coding. Prep for CAD lab 1.	**CAD Lab1** – Familiarise with Magnet Office (MO). Feature point survey, entry of codes, electronic recording using TS and data transfer to MO
5	Revision of weeks 1-4. Detail Surveys & CAD	No lecture	**MID TERM TEST**
6	No lecture or lab this week. Work on assignments		
7	Plan Editing, text annotation. Data types and subdivision in MO. CoGo in CAD	Lab: CoGo questions.	**CAD Lab 2** – MO setup, plan editing, terrain modelling, annotation
8	Cadastral calculations: areas, rural roads, subdivisions (not CAD), PO comparison. Traditional Road Curve Calculations.	Lab: Cadastral calculations Moodle Quiz	**CAD Lab 3** - subdivision parcel design.
9	Road design in MO, alignment, cross section, long section, volume calculations. Autodesk Civil3D intro to electronic detail survey, road design and parcel design	Lab: CAD lab 4	**CAD Lab 4** - Road design - centreline alignment, cross section, and long section and construction volume calculation
10	Problem solving. Future of survey computations. Course summary	Lab: "Horner's" problems	**CAD Lab 5** - Survey plan editing, road design and parcel design using Civil3D

HANDBOOK DESCRIPTION

Virtual handbook: **www.handbook.unsw.edu.au/undergraduate/courses/2020/GMAT2500.html**

INFORMATION ABOUT THE COURSE

This course builds on previous surveying calculation courses in first year, especially GMAT1110. You should have already passed or been exempt from that course. If you have not attempted GMAT1110 or attempted it but failed, then you should contact the course convenor. The course also builds on MS Excel knowledge and skills learnt in ENGG1811. Most of the topics in this course are useful for future survey courses: GMAT- 2120, 2550, 3150, 4150, and 4400.

ASSESSMENT

Assessment criteria and methods used will be discussed in class, including reasons for the educational approach taken. We have small class sizes so we have considerable flexibility with assessment methods. For example tests can be conducted in our computer lab with all students present at one time. Computers used in tests will not have network or email access. Students will get more details on assessment content, criteria, and mode in the handouts for each assessment task via class discussions and/or discussions with the course convenor.

Assessment for the course includes:
- Mid-term test   25%   Thursday, Week 5
- Computer Lab tasks   18%   Details below and on Moodle
- Field Practicals assignments   12%   Group work
- Final Exam   45%   In formal exam period

Any changes to the above assessment details will be notified in class and on the class Moodle web site.

Assessment tasks and feedback completed are required before the census date (28th June). In this course they are the Moodle based computer lab tasks weeks 1 to 4.

The final grade for this course will normally be based on the sum of the scores from each of the assessment tasks. However, in 2020, if a student's mark in the exams (mid-session test plus final exam) is less than 28 out of 70 then the computer lab and field practical/assignment marks will not contribute to the student's final mark in the course.

The formal exam scripts will not be returned, but students are welcome to visit the course coordinator after exams to discuss their exam performance and view the marking of their exam 'paper'. Students who perform poorly in the mid-session test are recommended to discuss progress with the lecturer during the semester.

Further details of assessment and exam rooms will be given in classes, if in doubt contact the lecturer.

Supplementary Examinations for Term 2 2020 will be held on Monday 7th – Friday 11th September (inclusive) should you be required to sit one. You are required to be available during these dates. Please do not to make any personal or travel arrangements during this period.

If something prevents you from performing an assessment task (illness, etc.), complete a UNSW "Special Consideration Form".

Penalties for late submissions/completion: For information regarding the process of requesting extensions and applying for special consideration read: **https://student.unsw.edu.au/special-consideration**

Assessment Criteria for: **Field Practical Assignments**
Two assignments worth 6 marks each. Based on the instructions for fieldwork practicals but with data supplied by course coordinator using previous students observations.
Marking scheme: OK: Submitted a report on time, with plagiarism statement, which presented your results.   Better: as above, plus the report included evidence of independent checks of the calculations and is well written   Best: as above, plus a plan of the surveys and the report included thoughtful comments and discussion of the possible error sources involved, how the survey could be improved if a similar task was done in future, and any other interesting aspects of the task.
Penalties: For each day late (or part thereof) lose 1 mark. If a student participates in the field work but does not make a significant contribution to the report then that student gets the mark for the field component only.
Feedback: Will be given verbally by the course coordinator in a lab class soon after the exercise has been submitted.
Objectives and Learning outcomes: The practical exercises form an important part of the subject. A good deal of time and care has gone into the organisation of these classes to ensure that you get the maximum benefit. It is important that each student understands the field process.

Assessment Criteria for: **Mid term test**
Comments: The topics are surveying computations part of the course, not CAD. The test is conducted "at home" on the student's computer via emails. The test environment and conditions will be discussed with students well before the test. A sample 'past paper' will be supplied well before the exam.
Marking: Max 25 marks.   The marking criteria will place a strong emphasis on correct answers for calculation style questions, so students will be advised in this course on how to provide independent checks for their work and sufficient time will be provided in the examination to do the check calculations.   There is usually a large range of marks in this test. Marks are awarded for correct answers and for proper checking.   Students who get high marks in this test have been well prepared for the test by practising the computer lab exercises and they have included independent checks by a second calculation method. They leave the test knowing they have got the calculation answers correct. They have coped well with time constraints and pressures of consequences of wrong answers – these are abilities that will serve them well in the workplace later on.   Students who score mid range in the test have answered the calculation questions with one method only (no second method as a check), or have done well on some topics but not on other topic / questions.

Students who score very low marks are usually poorly prepared. They have not done the lab questions or have simply read the textbook, lecture slides or worked solutions. The test does not require extensive memory skills – all the equations are given in the paper.
Penalties: Cheating in the test will be dealt with by the usual UNSW procedures. There is no need to cheat, instead prepare by doing the lab exercises and asking for help when you need it.
Feedback: After each test the marks obtained by each student will be available in Moodle. Each student will be given individual and detailed feedback on their exam paper soon after the exam has been marked by visiting the office of the course convenor.
Objectives and Learning outcomes: Primarily we test whether you can do survey computations yourself in exam conditions. An important learning outcome is to be able to reliably check your calculations, so you know they are correct and not just hope they are correct. Students should be able to solve the following calculation problems using a variety of approaches and computing resources including manual calculation, calculators, spreadsheets (MS Excel or open source equivalents): Bearing and Distance, Coordinates; Intersection and Trilateration; Resection; Traverse Adjustment Calculations; and Missing Data Problems. Also the test links to attributes: an in-depth engagement with relevant disciplinary knowledge; and the capacity for analytical and critical thinking.

Assessment Criteria for: **Computer lab tasks**
Comments: The computer lab tasks in this course will be delivered, managed and assessed via Moodle quizzes and auditing. Using Moodle to administer the tasks will enable students to see their progress and to work on the tasks at a pace that suits them. The requirements for lab work are given in the Moodle quizzes and assistance is available in the textbook files. Students are urged to manage their workload and make regular submissions during session. It is possible for students to do the computer lab tasks at home.
Marking: Max 18 marks. The marks for each task are included in the quiz questions.   There are two types of lab tasks in this course. The survey computations topics have 6 weekly quizzes of about 5 questions worth a total one mark each quiz. Students are allowed multiple attempts at these questions. The mark for each individual question is shown in the question. They are mostly multiple choice answer style, with some T/F questions.   The Survey CAD part of the course has tasks worth a total of 12 marks. These will be marked on the basis that if each aspect of the task is completed successfully full marks will be awarded, if some aspects of the task are not completed then a proportion of the marks will be awarded and recorded.   Students will be treated in this assessment component like professional surveyors. You will record whether you have completed the task yourself or not, and you may have multiple attempts at a task until you have mastered it. So that component depends on your honesty. However, as with surveyors you will be required to undergo random audits where you show or demonstrate evidence of your work to the supervisor. The lab work will be audited in the student's presence by viewing the students' notes or computer screens and immediate feedback will be given. There is no need to rewrite the work or to submit formal well written reports. Generally the work will not be collected or be examined in detail unless a student has had difficulties getting correct or good quality output. Generally, lab marks will be assigned using a mastery scheme, i.e. if the work is acceptable it will get full marks if it is not acceptable it will get zero marks, students can resubmit in this case.   Note that the final lab marks will be determined at the end of week 11, not later, and will be based on the course coordinator's record of your marks – not necessarily what is shown in Moodle for the quizzes. If you have had a successful audit the Moodle quiz marks will be used.
Penalties: You are allowed to help each other learn in lab classes but are not allowed to blindly copy someone else's work. Cheating in the lab tasks will be dealt with by the usual UNSW procedures. There is no need to cheat, instead prepare by doing the lab exercises and asking for help when you need it.
Feedback: Feedback is built into the quiz questions. Each wrong answer produces an immediate feedback to the student saying what they did wrong and or how to work correctly. In addition feedback will be given by the teacher to any student who requests it by viewing the student's notes or computer screens.
Objectives and Learning outcomes: This component of assessment is designed to ensure students have sufficient practice at surveying computations and using surveying CAD. It will cover all the learning outcomes of the course (described below).

Assessment Criteria for: **Final exam**
Comments: The **Final exam** will be in the exam period online and details will be supplied separately later. It will involve

written questions on the exam paper plus use of software on a computer. A sample 'past paper' will be supplied well before the exam. Large data sets are usually supplied to the students on computer files and CAD software is available and expected to be used in the exam. The test environment will be similar to the mid-term test. Further details will be given and discussed in class about the type of questions that might be in the exams and which parts (topics and expected outcomes) of the course are related to the exam. The exams are set by the course convenor and reviewed by another staff member of the school.

Marking: Max 45 marks.

The marking criteria will place a strong emphasis on the student's ability to use CAD. There will also be some questions on surveying computations that involve creative problem solving.

Marks are awarded for successful completion of each component of each question.

A sample 'past paper' will be supplied with included marking scheme.

Penalties: Cheating in the exam will be dealt with by the usual UNSW procedures.

Feedback: Each student will be given individual and detailed feedback on their exam paper soon after the exam has been marked by visiting the office of the course convenor.

Objectives and Learning outcomes: This component of assessment is designed to ensure students have sufficient competence at challenging surveying computations and at using surveying CAD. It will cover all the learning outcomes of the course (described below).

COURSE OBJECTIVES

Calculations and plan drawing are a traditional part of surveyors' work and many fields of surveying involve data collection, calculations and presentation of results using computers. Computers make our work easier and usually better quality.

Using computer aided drafting (e.g. Magnet Office and AutoCAD) software to process surveying data for design and plan production purposes is an important and essential skill for surveying graduates. This course introduces surveying/civil CAD packages commonly used in engineering surveying. Instructions are given in data entry, data reduction, graphics and attributes editing, contouring and plan drawing for detail survey, subdivision and road design.

The aim of this course is **not** to acquire a vast knowledge of all the options/steps available in Magnet Office nor is it to remember all the equations used in plane survey computations. The aim of the course **is** to enable students to solve plane survey computation problems and to be able to learn to use any of the currently available surveying CAD packages or those developed in the future.

This course provides an environment that fosters in our students the following attributes, those not covered in this course are dealt with in other courses in your program:

the skills involved in scholarly enquiry	Significant. For example, you will learn "how to learn" a software package that is new to you.
an in-depth engagement with relevant disciplinary knowledge in its interdisciplinary context	Significant, at the level of competence with survey calculations and CAD that would enable summer employment in this field
the capacity for analytical and critical thinking and for creative problem solving	Significant. You are especially encouraged to find more than one way to solve the problems and ways to check or know that our answers are correct or valid.
the ability to engage in independent and reflective learning	Optional. There is opportunity for students to learn more about the CAD software, to try alternative solutions to those presented in class, to read ahead through the text book, or to write their own computer programs for some of the tasks.
the skills to locate, evaluate and use relevant information (Information Literacy)	Minor. Study the textbook provided and explore the software options and its own Help.
the capacity for enterprise, initiative and creativity	Significant – find alternative solution methods to some challenging problems.
the skills required for collaborative and multidisciplinary work	The field practical exercises will be done as group work. Importantly note that the exercises cannot physically be done by one person "doing all the work", so quality results depend on good collaboration
an appreciation of, and a responsiveness to, change	Significant. You will not pass this course if you are not willing to learn new techniques and new software.
a respect for ethical practice and social responsibility	Important. For example, it will be stressed that you are able to know you are giving a client correct answers to calculation and measurement tasks and not simply "hoping" your answers are correct.

Former students have asked me to keep the course profile as short as possible, others want details. However, UNSW does require detailed discussions of educational aspects. Be assured that personally the course convenor and the other lecturers do treat the educational aspects as very important and spend considerable effort designing and improving the course. So in order to keep this document short, the aims objectives goals expectations and outcomes of the various class topics and assessment tasks will be discussed in class and/or within the individual documents for the assignments, lecture notes etc. An advantage of our small class enrolment is that each individual student can have many one to one discussions with the course convenor in his office or by phone or email. These discussions can be at the level of for example "why are we learning this topic" to the level of "I get the wrong answer or I don't know how to do the calculations for this question, please help me".

Feedback from the students via the myExperience process. In previous years the ratings of all questions were very high, well above School and Faculty averages. The written comments were all very positive and pleasing. There weren't many suggestions for improvements.

TEACHING STRATEGIES

In 2020 only one lecturer is involved. The weekly teaching will include a 2 hour lecture, a 1 hour lecture and 3 hours of guided / instructed practice online. There is a long history of teaching the computations and the CAD topics in our school. We will use surveying software that is up to date and is used in the surveying profession.

We encourage students to think and try to solve the problems themselves and avoid the act of simply reading a solution. Reading a solution, without attempting your own solution first, can lead you into a false confidence.

A textbook has been written by the course coordinator specifically for this course and is available for free, in pdf format on the class Moodle site.

We will use the BBCU recording system in this course. The recordings of lectures are not intended to be a substitute for class attendance but may be useful for students who can't avoid missing a class and for those who attend the class but want to rehear part of it to aid their understanding. Of course, the recorded files are copyright and are not to be distributed beyond the enrolled students in the class. UNSW does not guarantee that the recording system will correctly record every lecture.

The lecturer will also attend all computer laboratory and field classes. Some of the lectures will include discussions interspersed with traditional PowerPoint based lecturing. Generally pdf files of the lecture slides will be available on the class web site after the lectures. Sometimes we like to change the content slightly during the lecture in response to student learning at the time. Sometimes questions are asked in the lecture to promote student involvement in the learning – in these cases if the pdf files were available before the lecture may not reveal the 'answers' to the questions. Students are asked to consider the environment before printing files onto paper.

A significant effort is being made to improve the CAD part of the course. The lab questions are now less detailed and should lead to more understanding of the process. In earlier years teachers have given 'hundreds' of step by step instructions for some exercises. Whilst this does make the students more productive, the concentration on such detail can lead to lack of confidence and understanding.

Each year we change the contents and teaching methods of this course based on student's performance at assessment and their feedback.

Suggested Learning Methods

This is a practical course, the more practice and experience you get the better you will understand the topic and the faster you will be able to solve problems. We suggest you spend some of your 6 hours per week study time (in addition to class time) using a computer at home as well as the usual study methods. There will be a lot of practical surveying data calculations and map editing work in lab exercises. In the CAD section we will have an instructed practice following each lecture to lead you go through a CAD software package.

The workload is reasonably constant during the session and starts at a considerable rate in the first week to revise material learnt in previous courses. Intentionally, there are no extremely heavy loaded weeks or easy weeks after that.

It is strongly recommended that students: attend all classes; do not get too far behind with the lab work; and ask for help if you need it. It is not necessary to take detailed notes in lectures. However, it is important to complete all the lab tasks and to keep up to date. Also feel free to work independently - read references and try to solve problems yourself, do not just sit in class and follow the leader.

EXPECTED LEARNING OUTCOMES

At UNSW we currently teach CAD with Magnet Office. There are a few, mostly historical, reasons for the use of Magnet Office. We don't have to have the best software, and how do you define that anyway? We do not have time to teach more than one package and we do not try to teach all aspects of the software. We aim to make students aware of some features of CAD and to gain some experience. Further training can often be obtained during students work experience e.g. summer employment. The lab exercises and assessment tasks in this course will use Magnet Office. Students who already have experience and access to other CAD software may use it, but staff may not be able to assist with specific technical and debugging style questions.

By the end of this course students should be able to solve the following calculation problems using a variety of approaches and computing resources including manual calculation, calculators, spreadsheets (MS Excel or open source equivalents) and CAD software with surveying modules:

- Bearing and Distance, Coordinates
- Intersection and Trilateration
- Resection
- Traverse Adjustment Calculations
- Missing Data Problems
- Calculations commonly used in cadastral surveying
- Road Intersections
- Subdivision calculations
- More complex road calculations

You will also have some experience with upload and download of Survey Instrument data to computers.

By the end of this course students should be able to produce surveying, road design and subdivision drawings/plans using Magnet Office software package including:

- Import and edit surveying data: manually booked and electronic downloads from Total Stations
- Traverse data entry, reduction and adjustment
- Draw detail survey plans with contours using DTM/TIN methods
- Perform surveying plan editing and plotting including annotation
- Subdivision calculations and prepare subdivision plans
- Road alignment, cross sections extraction and level book data entry
- Perform basic road design principles including template design, and long and cross section plotting.

For each hour of contact it is expected that you will put in at least 1.5 hours of private study. Classes plus private study give a total of about 150 hours learning in this course.

ALIGNMENT OF THE ASSESSMENT TASKS TO THE COURSE AND PROGRAM LEARNING OUTCOMES

The learning outcomes that students should achieve upon successful completion of this course are listed in the table below. This course is designed to address the Engineers Australia Stage 1 Competency Standards for Professional Engineers as shown. The full list of Stage 1 Competency Standards may be found in Appendix A.

	Learning Outcome	Assessment Methods	EA Stage 1 Competencies
1.	By the end of this course students should be able to solve the following calculation problems using a variety of approaches and computing resources including manual calculation, calculators, spreadsheets (MS Excel or open source equivalents) and CAD software with surveying modules: • Bearing and Distance, Coordinates • Intersection and Trilateration • Resection • Traverse Adjustment Calculations • Missing Data Problems • Road Intersections • Subdivision calculations	Test 1, and labs	PE1.1, PE1.2, PE1.3, PE2.1

	• More complex road calculations • Theodolite, level, GPS. They will also have some experience with upload and download of Survey Instrument data to computers.			
2.	By the end of this course students should be able to produce surveying, road design and subdivision drawings/plans using Magnet Office software package including: • Import and edit surveying data: manually booked and electronic downloads from Total Stations • Traverse data entry, reduction and adjustment • Draw detail survey plans with contours using DTM/TIN methods • Perform surveying plan editing and plotting including annotation • Subdivision calculations and prepare subdivision plans • Road alignment, cross sections extraction and level book data entry • Perform basic road design principles including template design, and long and cross section plotting.	Final exam, and labs	PE1.3, PE1.5, PE2.2	
3.	Ability to function effectively as an individual and in multicultural teams, as a team leader or manager as well as an effective team member. * This outcome may not occur in T2 2020, but will occur in later courses.	Field practicals	PE1.3, PE3.1, PE3.2, PE3.5, PE3.6	

Assessment task	Learning Outcomes. Competence and experience in:
Intersection & Resection lab	Bearing and Distance, Coordinates, Intersection and Trilateration, Resection
Field Prac Assignment 1: EDM Loop Traverse	Traverse Adjustment Calculations.
Field Prac Assignment 2: MGA Traverse	Traverse Adjustment Calculations.
Missing Data & Traverse Calculations lab	Traverse Adjustment Calculations. Missing Data Problems
MID SESSION TEST	All the above
CAD Lab 1: Sokkia – Magnet Office	CAD. Import and edit surveying data
CADLab 2 Magnet Office, data entry, editing, plan drawing	CAD. Traverse data entry, reduction and adjustment. Draw detail survey plans with contours using DTM/TIN methods. Perform surveying plan editing and plotting including annotation
Cadastral and road calculations lab	Calculations commonly used in cadastral surveying. Road Intersections
CADLab 3 Subdivision	CAD Subdivision calculations and prepare subdivision plans
CADLab 4 and 5 Magnet Office Road and Civil3D	More complex road calculations Road alignment, cross sections extraction and level book data entry. Perform basic road design principles including template design, and long and cross section plotting. Familiarisation with a second CAD software package
Problem solving lab	More complex calculations

Course Objective	Assessment task
the skills involved in scholarly enquiry	Most of the computer lab tasks
an in-depth engagement with relevant disciplinary knowledge in its interdisciplinary context	Most of the computer lab tasks
the capacity for analytical and critical thinking and for creative problem solving	Most of the computer lab tasks and the field assignment
the capacity for enterprise, initiative and creativity	Week 10 lab questions
an appreciation of, and a responsiveness to, change	Computer labs on CAD = new techniques and new software.

RELEVANT RESOURCES AND BLENDED LEARNING

This is an on campus course. Students are encouraged and expected to attend all classes. Students are encouraged to assist each other's learning and to discuss with the teachers. It is not a distance education course but aspects of blended learning that are currently included in the course via Moodle are: lecture pdfs, computer lab quizzes, and textbook. CAD software may also be available for student home use.

Lecture Material
The lecture slides are available for download as pdf files at the course website: **http://moodle.telt.unsw.edu.au** Monitor the site during session because it will be updated regularly. The website material is only for use by students enrolled in this course.

Text Book

A text book has been written specifically for this course by the main lecturer. It is available in pdf form on the class website. The contents of the book change as the software and instruments change, and as the lecturer learns better ways to communicate the material. If you want a paper copy you organise that yourself, but note that some pages may change during session.

Computational Aids

Students are expected to have a calculator of the type that is allowed in UNSW exams. Students may use any calculator they wish in this course, however in examinations they may not use pre-programmed calculators with, for example, close or resection programs. A computer based Calculator application program specially written for surveying calculations will be provided to students in our lab and on the class Moodle website. Computer software relevant to this course is available in the School's computer lab. We will use MS Excel spreadsheets in the lab; students who do not have that software on their home computers will be advised on how to get free open source equivalent software and how to use it. We will use CAD software that is installed in our labs. Magnet Office CAD software is too expensive for most students to buy.

How to use Magnet Office v5.1 Off-campus (we are not going to use newer versions this year)

Many software packages including Magnet Office can be accessed through **https://aaa-access.unsw.edu.au/Citrix/aaaWeb/** in a web browser (MacOS or Windows). No VPN or License is required. Need fast Internet for this method

Alternatively, to run MO on your computer without going through the aaa and a browser you can install MO on your computer. This install only needs to be done once. If you want to install a local copy (Windows only), MO5.1 can be downloaded via the link **https://cloudstor.aarnet.edu.au/plus/s/Hxd17YXHT3ToXu0** (Zip file, 1.4GB). To use MO from home, an Internet connection and UNSW VPN are required. Follow the "Installing the UNSW VPN Software" guide on the MyIT page: **https://www.myit.unsw.edu.au/services/students/remote-access-vpn** . The VPN you need to connect to is vpn.unsw.edu.au/feng_adhoc for using MO5.1 rather than vpn.unsw.edu.au. [You can connect to vpn.unsw.edu.au to use UNSW IT resources but not MO5.1.]
Start MO, select Network license, server: **ENGPWLICCVE580**, Port: **54873**, leave Secure Connection *unticked*.

DATES TO NOTE

Refer to MyUNSW for Important Dates available at: **https://student.unsw.edu.au/dates**

PLAGIARISM

Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise are also liable to disciplinary action, including exclusion from enrolment.

Plagiarism is the use of another person's work or ideas as if they were your own. When it is necessary or desirable to use other people's material you should adequately acknowledge whose words or ideas they are and where you found them (giving the complete reference details, including page number(s)). The Learning Centre provides further information on what constitutes Plagiarism at:

https://student.unsw.edu.au/plagiarism

All practical reports should be submitted with a signed Plagiarism / Assessment Cover Sheet, e.g.

I/We declare that this assessment item is my/our own work, except where acknowledged, and has not been submitted for academic credit elsewhere, and acknowledge that the assessor of this item may, for the purpose of assessing this item:

Reproduce this assessment item and provide a copy to another member of the University; and/or,

Communicate a copy of this assessment item to a plagiarism checking service (which may then retain a copy of the assessment item on its database for the purpose of future plagiarism checking).

I certify that I have read and understood the University Rules in respect of Student Academic Misconduct.

Signed: ....date: ☐☐☐☐☐☐

I certify that I have read and understood the University Rules in respect of Student Academic Misconduct.

Signed: ....date: ☐☐☐☐☐☐

I certify that I have read and understood the University Rules in respect of Student Academic Misconduct.

Signed: ....date: ☐☐☐☐☐☐

I certify that I have read and understood the University Rules in respect of Student Academic Misconduct.

Signed: ....date: ☐☐☐☐☐☐

ACADEMIC ADVICE

For information about:
- Notes on assessments and plagiarism,
- School policy on Supplementary exams,
- Special Considerations: **student.unsw.edu.au/special-consideration;**
- General and Program-specific questions: **The Nucleus: Student Hub**
- Year Managers and Grievance Officer of Teaching and Learning Committee, and
- SURVSOC and CEVSOC.

Refer to Academic Advice on the School website available at:

https://www.engineering.unsw.edu.au/civil-engineering/student-resources/policies-procedures-and-forms/academic-advice

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SUMMARY

Dear Student,

If you have read all the way to here then you have done well. I apologise for making it such a long document. So here is a summary. It is a good course. It is worthwhile to put considerable time and effort into learning this course. If you do well in this course then, in your future career, your boss and your clients will be able to rely on your results. So read the first page, attend all classes, and do the exercises. I will be with you in lectures, in the computer lab, in the field, by email, and you can visit my office for help. Let's get on with the learning ☺.

Bruce.

Appendix A: Engineers Australia (EA) Competencies

Stage 1 Competencies for Professional Engineers

	Program Intended Learning Outcomes
PE1: Knowledge and Skill Base	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing
	PE1.3 In-depth understanding of specialist bodies of knowledge
	PE1.4 Discernment of knowledge development and research directions
	PE1.5 Knowledge of engineering design practice
	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice
PE2: Engineering Application Ability	PE2.1 Application of established engineering methods to complex problem solving
	PE2.2 Fluent application of engineering techniques, tools and resources
	PE2.3 Application of systematic engineering synthesis and design processes
	PE2.4 Application of systematic approaches to the conduct and management of engineering projects
PE3: Professional and Personal Attributes	PE3.1 Ethical conduct and professional accountability
	PE3.2 Effective oral and written communication (professional and lay domains)
	PE3.3 Creative, innovative and pro-active demeanour
	PE3.4 Professional use and management of information
	PE3.5 Orderly management of self, and professional conduct
	PE3.6 Effective team membership and team leadership