



School of Civil and Environmental Engineering
Term 2, 2021

GMAT4150 FIELD PROJECTS II

COURSE DETAILS

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|------------------------|---|
| Units of Credit | 6 |
| Contact hours | |

| Learning Outcome | | EA Stage 1 Competencies |
|------------------|---|-----------------------------------|
| 1. | <i>Apply surveying/geospatial knowledge learnt so far in the program to design surveys using a range of equipment to solve challenging problems.</i> | PE1.1, PE1.5, PE2.1, PE2.2, PE3.3 |
| 2. | <i>Manage a team to solve problems, meet deadlines with appropriate outcomes and communicate these results in report form and/or via a presentation to “clients”.</i> | PE1.5, PE2.4, PE3.2, PE3.5, PE3.6 |
| 3. | <i>Analyse and assess data and produce suitable surveying and geospatial products that are client ready.</i> | PE1.2, PE1.3, PE2.3, PE3.4 |
| 4. | <i>Provide a thorough and critical self-assessment of individual performance and provide this to supervisors.</i> | PE1.6, PE3.1, PE3.3 |

For each hour of all the scheduled activities for the course, it is expected that you will put in at least 1.5 hours of private study.

COURSE PROGRAM

During the week 1 class, students will be given the advice on the details for the project. The students will form groups for the project related activities to perform in Week 1, so make sure you attend. **The most critical activity in Week 1 will be the discussions on the social distancing measures for field work activities.**

The timetabled class is Wednesday 2pm onward each week. The 4-hour timeslot is intended so that you can do fieldwork and or data analysis for this project on some days (not necessarily every week) without interruptions from other classes. Of course you are encouraged to spend some other time on meetings, calculations, report writing, etc. Descriptions of the projects, site photos and maps, H&S forms, etc., will be discussed at the class meeting in Week 1.

The field surveys and mapping activities will be conducted as group work. Students within a group do not necessarily all do the same tasks. For example, one student might take on management duties and organise logistics while other students concentrate on design, pre-fieldwork calculations and preparations, etc. It is up to the groups to ensure all students contribute appropriately, as discussed in ENGG1000. The course coordinator may assign different marks to individual students, at their discretion, based on student performance in the field work and in the class discussions.

Survey Store Equipment

Students wishing to collect survey equipment from the survey store must give a detailed written list of requirements to their supervisor at least one day before its required use, or more as specified by project supervisor for field trips. There is no person permanently in the survey store so students will need to organise times of collection and return of equipment carefully. The supervisor will not be able to come and go from the store frequently during the day or at short notice.

PROJECT A: Forensic surveying (Project Supervisor: Bruce Harvey)

This project in 2021 has been designed to require students to think about how to tackle a problem that they might not have worked on before, or to work on it in a way different to what they might have experienced in part time employment.

This project has been designed to have a flexible implementation. Several options and tasks are described below. Some of those tasks will depend on how much field work we are allowed to do with COVID restrictions and how much equipment we can access. Our intention is to run this project in ‘Face to Face’ mode as much as possible. Students are expected to have regular meetings amongst themselves and with the client (the academic supervisor).

7. Investigate a very old photograph found on Trove. Where was it taken from (standpoint of camera)? Is there any other information we can determine from the photograph using surveying and photogrammetry skills?
8. Crime mapping and GIS. See Position Magazine, April/May 2021. P 17. And use GIS to track criminals: <https://esriaustralia.com.au/locate21-presentations-and-resources>
9. Consider how surveying or geospatial skills can be used in search and rescue for lost people who do not have phones or emergency beacons. How to know you have covered all the ground, like when police form a line and walk a site. Perhaps hit a golf or cricket ball into long grass and try to find it.
10. Mapping visualisation of Sydney midget submarine attack:
<https://www.abc.net.au/radio/programs/conversations/midget-subs-attack-sydney-ww2/12841278> and subsequent bombing
https://www.woollahra.nsw.gov.au/library/local_history/world_war_2/stories_from_woollahra/shelling_of_the_eastern_suburbs.
Try to map where they went, the damage caused and the trajectory of the projectiles.

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| PROJECT B: High Definition (HD) map for automated driving (Project Supervisor: Jinling Wang) |
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Background

c) HD map creation and visualization procedure design and field tests

Based on the analysis of error characteristics of GNSS, RTK, INS, mobile mapping systems, efficient surveying and mapping procedures towards various operating environments and applications are to be designed. Such operational procedures as well as other best practice guidelines are to be analysed in terms of accuracy and reliability. Comparison of various HD map formats and HD map viewing tools; Then some field tests are to be carried out at the Botany St Parking Station, UNSW, and some sections of the roads around the Roland Park field experiment site, close to UNSW campus), and the results will be validated and compared with the results from precise total station survey methods.

Deliverables

The major deliverables from this project are:

a)

ASSESSMENT

Details of each assessment component, the marks assigned to it, the criteria by which marks will be assigned, and the dates of submission are set out below.

| Assessment Items | Length | Weight | Learning outcomes (LO) assessed | Due date* | Deadline for absolute fail* | Marks returned |
|---------------------------------|-------------|--------|---------------------------------|------------------|-----------------------------|----------------|
| Project team (group) report | 15-20 pages | 30% | LO: 1, 2, 3 | 6pm 23 June | Week 4 (6pm, Friday) | Week 4 |
| Class presentation (Individual) | 8-10 mins | 10% | LO: 2, 4 | 2pm 4 August | Week 10 (6pm, Friday) | Week 11 |
| Final (individual) report | 30-40 pages | 50% | LO: 1, 2, 3 | 6pm 11 August | Week 11 (6pm, Friday) | Week 12 |
| Individual self-assessment | 2 -3 pages | 10% | LO: 1, 2, 3, 4 | 6pm 11 August | Week 11 (6pm, Friday) | Week 12 |

*Due date for the assessment item is the first class in the week specified in the above table.

Description of field work issues encountered 10%

RELEVANT RESOURCES

Appendix A: Engineers Australia (EA) Competencies

Stage 1 Competencies for Professional Engineers

| | Program Intended Learning Outcomes |
|--|---|
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PE1.1 Comprehensive, theory-

**PE1: Knowledge
and Skill Base**