



Australia's  
Global  
University

School of Civil and Environmental Engineering  
Term 3, 2020

# GMAT3420 CADASTRAL SURVEYING AND LAND LAW

## COURSE DETAILS

|  |  |                              |
|--|--|------------------------------|
| <b>Contact hours</b>                   | 6 hours per week   |                              |
| <b>Classes</b>                         | Tuesday 4 - 6 pm   | Online – Moodle link to BBCU |
|  | Thursday 11 – 1 pm   | Online – Moodle link to BBCU |
|  | Thursday 2 – 4 pm  | Room CE 201 or online BBCU   |
| <b>Course Coordinator and Lecturer</b> | Bruce Harvey (BRH) email: <a href="mailto:b.harvey@unsw.edu.au">b.harvey@unsw.edu.au</a> office: CE207<br>phone: (02) 9065 6706 (MS Teams) |                              |
| <b>Other Lecturers</b>                 | Cameron Miles (CM), Sandra Hoffmann (SH), Adrian Barden (AB)   |                              |

## INFORMATION ABOUT THE COURSE

The mode of delivery of the course in T3 2020 might change and this course profile will be updated if necessary. The current plans are:

The lectures will all be conducted via Blackboard Collaborate Ultra (BBCU) and can be accessed from the class Moodle site. The lectures will be recorded and available for download, though live participation is preferred. If some students wish to attend campus later in the term and sit in a room while the lecturer presents the lecture on BBCU then that might be possible.

The lab classes will be conducted via BBCU. After week 6 there will be a choice for students. Some students may choose to attend CE201 for the labs while other students participate in a BBCU at the same time – the BBCU will be run from CE201 for those classes.

Cadastral Surveying and Land Law looks at combining legal decisions with the practical side of positioning Land Title boundaries. Calculation methods learnt in Survey Computations courses (GMAT1110 and GMAT2500) will be used. The course will also relate to Land Development course (GMAT4400); and possibly GMAT4150 and thesis that follow in later stages of the degree program.

## HANDBOOK DESCRIPTION

See virtual handbook: [www.handbook.unsw.edu.au/undergraduate/courses/2020/GMAT3420.html](http://www.handbook.unsw.edu.au/undergraduate/courses/2020/GMAT3420.html)

**COURSE PROGRAM TERM 3, 2020**

Some topics may change dates depending on lecturer availability. (Lecturer named below)

| Week               | Tue Lec 4-6pm Topic   | Thu Lecture 11am-1pm Topic   | Thu Lab 2-4pm  |
|--------------------|---|--|--|
| 1<br>15&17<br>Sep  | Introduction to Course.<br>Interpreting a Cadastral Plan of Survey (DP) BRH               | Intro to Cadastral Surveying and the Legal System of NSW. Preparation of manual & electronic field notes for Cadastral Surveys. CM | Reading a Plan of Survey. BRH                                    |
| 2<br>22&24<br>Sep  | Torrens and Old System Land Titles in NSW. Estates in land. CM                            | Investigating Titles and Organising Search. CM   | Computer lab exercises BRH & CM                                  |
| 3<br>29&2<br>Oct   | Boundary Re-location & Identification Surveys. Identification Reports and Calculations CM | Boundaries - General and Fixed, Urban and Rural Boundaries. CM   | Ident Survey ass <sup>t</sup> searching and preparation BRH & CM |
| 4<br>6&8<br>Oct    | Natural Boundaries and Related Survey Practice. SH  | Interests in land: Easements & Restrictions. Preparation of Draft Documents - Sec 88b, Covenants and OS Descriptions. CM           | <b>Mid-term test</b>   |
| 5<br>13&15<br>Oct  | Cadastral Problems. Practical analysis of Cadastral Problems. Urban Surveys SH            | Strata and Community Titles. Preparation & Calculation of Strata Plan (part 1). AB   | Lab exercises BRH & SH   |
| 6                  | <i>No class. Ident Survey fieldwork</i>   | <i>No class. Ident Survey fieldwork</i>  | <i>No class</i>  |
| 7<br>27&29<br>Oct  | Road & Railways. Calculation of impact of road repositioning on Boundaries. SH            | Strata and Community Titles. Preparation and Calculation of Strata Plan (part 2). AB   | Strata Lab and assignment AB                                     |
| 8<br>3&5<br>Nov    | Cadastral Coordinates and LandXML BRH   | Leases of Land, PCA Surveys. CM  | LandXML Computer lab exercises CM                                |
| 9<br>10&12<br>Nov  | Case Study – complex boundary definition. BRH & SH  | Student presentations BRH  | Student presentations BRH  |
| 10<br>17&19<br>Nov | Prac: Boundary Location in the Field BRH  | Discussions, Ethics & Revision BRH   | Computer lab exercises BRH                                       |

**OBJECTIVES**

The aims of the course are to introduce the principles of land law and cadastral surveying. In particular to assist students to learn factors that lead to the redefinition of boundaries in NSW and to guide students on the educational requirements that meet the registration requirements of the Board of Surveying & Spatial Information (BOSSI) for registration as a Cadastral Surveyor in NSW.

List of programme attributes:

- The skills involved in scholarly enquiry
- An in-depth engagement with the relevant disciplinary knowledge in its inter-disciplinary context
- Capacity for analytical and critical thinking and for creative problem solving
- Ability to engage independent and reflective learning
- Information literacy
- Skills for collaborative and multi-disciplinary work
- A respect for ethical practice and social responsibility
- Skills for effective communication
- An appreciation of, and a responsiveness to change
- A respect for ethical practice and social responsibility

**TEACHING STRATEGIES**

Lectures will be combined with discussion classes based on problems that are encountered in practice and field/site visits. A team of industry based experts teach this course with one UNSW academic.

Lists of reading material will be provided in lectures together with Moodle files related to specific topics. Students should read the relevant material prior to the lecture and should then be in a position to ask questions to clarify and ensure their understanding of each topic.

Students are encouraged to bring laptops (or tablets or smart phones) to those classes not held in our computer lab (CE201 or 611) so that they can view the class Moodle site to access relevant materials and tasks. Students unable to do so should discuss this with the course coordinator.

Recommended approaches to learning are:

|                                  |  |
|----------------------------------|--|
| <b>Private Study</b>             | <ul style="list-style-type: none"> <li>• Review lecture material</li> <li>• Do set problems and assignments</li> <li>• Reflect on class problems and assignments</li> <li>• Download materials from Moodle</li> <li>• Keep up with notices and find out marks via Moodle</li> </ul> <p>For each hour of contact it is expected that you will put in at least 1.5 hours of private study.</p> |
| <b>Lectures</b>                  | <ul style="list-style-type: none"> <li>• Find out what you must learn</li> <li>• See methods that are not in the reference books</li> <li>• Follow worked examples</li> <li>• Hear announcements on course changes</li> </ul>  |
| <b>Discussion classes</b>        | <ul style="list-style-type: none"> <li>• Be guided by staff</li> <li>• Practice solving set problems</li> <li>• Ask questions</li> </ul>   |
| <b>Assessments</b>               | <ul style="list-style-type: none"> <li>• Demonstrate your knowledge and skills</li> <li>• Demonstrate higher understanding and problem solving</li> </ul>  |
| <b>Laboratory and Field Work</b> | <ul style="list-style-type: none"> <li>• Hands-on work, to set studies in context</li> </ul>   |

#### EXPECTED LEARNING OUTCOMES

By the end of this term students should be able to understand the legal and practical principles that assist in the shaping of the cadastre, original definition and relocation of various land title boundaries in NSW. Students should also understand the impact of such decisions on society. Students should develop an understanding of professional and ethical responsibilities, and demonstrate a commitment to uphold them. The ability to function effectively as an individual and in multidisciplinary and multicultural teams, as a team leader or manager as well as an effective team member, is also an outcome of this course.

This course is designed to address the learning outcomes below and the corresponding 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.

After successfully completing this course, you should be able to:

| Learning Outcome |   | EA Stage 1 Competencies    |
|------------------|---|----------------------------|
| 1.               | Understand the legal and practical principles that assist in the original definition and relocation of various land title boundaries in NSW. Students should also understand the impact of such decisions on society.     | PE1.1, PE1.3               |
| 2.               | Understanding of professional and ethical responsibilities, and a demonstration of a commitment to uphold them.   | PE3.1, PE3.3               |
| 3.               | Ability to function effectively as an individual and in multidisciplinary and multicultural teams, as a team leader or manager as well as an effective team member.   | PE2.4, PE3.2, PE3.5, PE3.6 |
| 4.               | Learn factors that lead to the redefinition of boundaries in NSW and to be aware of the educational requirements of the Board of Surveying & Spatial Information (BOSSI) for registration as a Cadastral Surveyor in NSW. | PE1.3, PE2.3, PE3.1, PE3.4 |

#### ASSESSMENT AND ASSIGNMENTS

This course expects students to attend at least 80% of scheduled classes. The final grade for this course will normally be based on the sum of the scores from each of the assessment tasks. The Final Examination is worth 40% of the Final Mark. This test (in the exam period) will cover the whole term's work. The formal exam scripts will not be returned, however students are welcome to visit the course coordinator to review their exam script and marking after the exam has been marked. Students who perform poorly in the mid-term assessments are recommended to discuss progress with the lecturer during the semester.

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.

- |                                      |     |   |
|--------------------------------------|-----|---|
| 1. Computer labs                     | 30% | Includes: wk4 test = 15%, 7 labs = 10%, Wk9 presentation = 5% |
| 2. Assignment: Identification Survey | 15% | Group work, Due: < 9am 5 Nov                                  |
| 3. Assignment: Strata Plan           | 15% | Group work, Due: < 9am 10 Nov                                 |
| 4. Final exam                        | 40% | In the formal exam period                                     |

Assessment task and feedback before the census date (11<sup>th</sup> Oct): Computer lab exercises weeks 1, 2, 3. Any changes to the above assessment details will be notified in class and on the class Moodle web site.

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

Supplementary Examinations for Term 3 2020 will be held on Monday 11<sup>th</sup> January – Friday 15<sup>th</sup> January 2021 (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.

**Penalties for late submissions/completion:** Late work will be penalised at the rate of 10% per day after the due time and date have expired, unless specified specifically below. For information regarding the process of requesting extensions and applying for special consideration read: <https://student.unsw.edu.au/special-consideration>

#### Assessment Criteria for: Assignments

*Comments:* There are two assignments worth 15 marks each. They are designed to give students experience with real cadastral surveys. The assessment criteria are similar for both. They are group work, usually groups of 2 or 3 students. The reports are group submissions and should be submitted for marking by the time and dates given above. It is strongly recommended that each student in a group contributes to each aspect of the assignment. The ident survey includes field work, the strata survey uses architectural plans provided.

Further details about the assignments are given separately during the course.

Identification Survey: students will be required to complete a field survey of a selected urban property that is to be approved by the course coordinator. This assignment will be completed outside of the time allocated for classes and students must obtain their own title and plan searches. The quality of these searches will be assessed and graded. Access is available to a limited range of the School's surveying instruments and equipment for these exercises and is subject to the approval of the lecturer-in-charge of the course. Further information about the practicals will be distributed during the lectures. Rules for practicals are given in a section below.

Strata Plan: students will be required to prepare a Strata Plan to standards required by NSW Legislation.

#### Marking scheme:

*Ident survey:* Max 15 marks.

Marks are assigned for the quality of each of the following components: Quality of search; Letter to client; Plan to client; Report quality; a Plan showing lines measured, e.g. traverse and radiations; Survey checks and redundancy described; Site photos and or Aerial photos (not essential, but useful); PO comparisons; Quality of survey e.g. design, closes; Field notes included and quality; Job costing (hours spent); and DP and title in appendix to report. There should also be some discussion of the learning outcomes achieved in this assignment. Spelling mistakes in the letter to client or poor grammar will detract from your mark.

*Strata survey:* Max 15 marks.

Marks are assigned for the quality of each of the following components:

**Location plan and floor plan** to be drawn on plan form 1.

Floors, ceilings and the external walls of the building to form part of common property.

Check against the requirements for plan preparation to make sure all necessary line work, offsets and statements appear on the plan. Any dimensions not shown on the architectural plans can be scaled or guessed.

The plan must be in a registrable form. The location plan and floor plan sheets must state the reduction ratio and have a north point directed upwards.

Details of Plan Preparation for the **Location Plan:** The external boundaries of the land being subdivided and their lengths; The external limits of the building and any other structures used to define the lots on the floor plan; The identity of the building by indicating the street number, the number of levels and the materials of its external construction; The boundaries of any lots not within the building (these should not be dimensioned); When a building containing lots within 2 metres of a parcel boundary, connections must be provided from the building to the parcel boundary; When a lot external to a building is within 2 metres of a parcel boundary, connections must be provided from the structural feature used to define the lot to the parcel boundary. These connections should correspond to

those used on the floor plan to define the lots. The connections must be sufficient to establish that any lot boundaries are along or within the parcel boundaries. Connections are not required on the location plan if the lot boundaries are coincident with the parcel boundary. In this instance a note should be added to the relevant boundary; All connections must be perpendicular from specific points on a structure or prolongations of the face of the structure; The identity of any other structural feature used on the floor plan to define lots by reference to its nature and material of its construction; The identities of the adjoining lands; If an encroachment exists sufficient information to indicate the extent and nature of the encroachment.

Details of Plan Preparation for the **Floor Plan**: Stratum statements for those parts of the lots which do not have structural cover and or a structural base to define their horizontal boundaries (ie upper and lower limits); The lot number for each lot or part lot. Part lots must be identified as such. Lot numbering must be consecutive and commence with lot 1; An area for each lot or part lot. Part lot areas should be shown in brackets and a total area must be shown within or relevant to the most significant part of the lot. Thick lines for structural boundaries. Thin lines with sufficient connections from walls and other structural features to define those lines. The plan may include a statement indicating the areas are approximate.; The site and description of all easements which affect the lots and are to be created upon registration of the plan; Separate floors of the building must be shown from the lowest level to the highest level; notations to clearly identify any encroachment that is designated for use with a lot; Show all structures on a lot that are outside a building and within 1 metre of the boundary of the lot and include notations to clearly identify whether each such structure is common property or part of the lot. This is not required for fencing within the meaning of the Dividing Fences Act 1991; Any other notes which indicate items which are within the air space of a lot are to form common property and not part of the lot. For example "The hot water service within the courtyard of lot 1 is common property and not part of the lot." See Lodgement Rules Schedules 10 to 14 for full requirements.

**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 a significantly reduced mark. Plagiarism statements are required.

**Feedback:** Will be given to your group verbally by the course coordinator in a lab class soon after the exercise has been submitted.

**Objectives and Learning outcomes:** These practical assignments form an important part of the subject. It is important that each student within a group gets experience in each aspect of each assignment. They also contribute toward the attributes: an in-depth engagement with relevant disciplinary knowledge; the capacity for analytical and critical thinking and for creative problem solving in the field; the skills required for collaborative work; an appreciation of and respect for, diversity; and the skills of effective communication.

#### **Assessment Criteria for: Computer lab tasks**

**Comments:** There will be a variety of lab tasks in GMAT3420. The computer lab tasks 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 term. Students will be required to demonstrate their knowledge in a seminar presentation to the class.

**Marking:** Max 30 marks. The marks for each task are included in the quiz questions.

There are a few types of lab tasks in this course. In 2020 the Computer lab quizzes will include a presentation by each student (5% of course mark) in week 9, and a larger quiz in **week 4** (15% of course mark). These will be marked by the supervisor in the usual way and with marking schemes provided separately.

The other 10 marks will be formed by the online weekly Moodle quiz questions. Each question will include how many marks are available for that question. 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.

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 10, not later, and will be based on the course coordinators 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 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 specific aspects of cadastral surveying and land law. 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. A sample 'past paper' will be supplied well before the exam. 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 40 marks.

The marking criteria will place a strong emphasis on the student's understanding of the concepts and how they are applied to cadastral surveying. There will also be some questions on relevant land law. 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 cadastral surveying to be a useful participant in cadastral surveys during industrial training and to be ready to become a candidate surveyor with BOSSI. It will cover all the learning outcomes of the course (described below).

#### **RELEVANT RESOURCES**

- Lists of reading material will be made available together with handouts on the class Moodle site, related to specific topics in relevant weeks. Students should read the relevant material prior to the lecture and should then be in a position to ask questions to clarify and ensure their understanding of each topic.
- Additional materials will be provided on Moodle.

#### **RULES FOR PRACTICAL / FIELD CLASSES**

Do not assume a field class will be cancelled because of poor weather conditions attend on time and ask the supervisor. Practical classes take place in a variety of weather. Do not forget umbrellas, water proof jackets, hats, sun cream, sturdy footwear (thongs or sandals are not acceptable), warm clothes, etc. There will be a briefing session prior to each practical class. Punctual attendance at the briefing is essential. All group members are expected to attend the briefings.

The practical exercises form an important part of learning in this course. Most practicals will be done in groups of students; however the calculations and reports require individual work. It is important that each student within a group gets experience in each aspect of each practical. Students should be aware of H&S matters to be adopted when completing any field work. If you have any questions or doubts about an H&S matter discuss it with your supervisor.

#### **ISSUING OF EQUIPMENT**

As the issue of equipment is not at any set time, students should ensure that the store is scheduled to be open when seeking equipment. Only specific pieces of equipment will be available for tasks to be completed off campus. If the equipment is borrowed for use by more than one student, the group is responsible for all equipment issued to it, with the student signing for the equipment as the representative.

1. *You should first inspect all equipment and make sure that it is in working order otherwise you will be held responsible.* When returning equipment at the end of the field class, it should be handed back to the Stores Officer, piece by piece, so that it can be checked off. A student's responsibility for borrowed equipment does not end until all your equipment has been returned and signed off.

2. ***It is not sufficient to leave the equipment near the store and depart.***

3. ***Any equipment lost or damaged will have to be paid for by the group.*** In the field, there is less danger of losing items if everything is kept together and close to the group and where pedestrians can safely bypass it.

#### **INSTRUMENTS**

The equipment used in surveying is sometimes delicate and often valuable (> \$10,000). Please make sure that you take due care of the equipment and give some thought to the way in which you handle it. Theodolites and electronic measuring equipment have fragile optical, mechanical and electronic components and are delicately adjusted. **Shut**



**instrument boxes immediately after removing/replacing the instrument.** Carrying instrument on tripods will not be tolerated in this School. Do not force any parts to move, ensure clamps that lock the instrument to the tripod are set and do not over tighten clamps. No equipment is to be left unattended in the field at any time.

### IN THE PUBLIC EYE

It is hoped that students taking part in surveying practicals on or off the campus will create a favourable impression on the public and fellow students – and **so behave in a professional manner**. The field classes give you an opportunity to experience practical problems in a learning environment and should be a welcome break from lectures. It is hoped you find them enjoyable as well as instructive.

### SUBMISSION OF REPORTS ON PRACTICAL WORK

**Time:** Reports may be submitted at any time prior to the due date. **Late submissions will not be marked**, unless accompanied by an appropriate reason. Reports should be submitted to the lecturer unless otherwise advised by the lecturer.

**Contents of Reports:** Your report should have a front/title page, a summary of results page and then the rest of the report including computations and plans. Reports must contain original field notes or a photocopy of the originals, but not rewritten field notes. The requirements for each practical will be discussed at the briefings before the practicals, if in doubt ask the supervisor. The front cover of all submissions should include: Course number and name, your name and the title of exercise

**Field Notes:** On the first page of your field notes for a particular exercise the following information should be given: Title of Exercise, Date, your name and others present in the group, instrument make and number if the School's equipment is used.

Field notes should be neatly written, not overcrowded and pencils are recommended. Use diagrammatic and tabular form where required, drawing neat sketches or diagrams where applicable. Overwriting is not permissible in the field notes and wrong figures or words should be crossed and the true one written above it and initialled by the booker whose name must appear at the top of each page.

**Computations:** Computations must be done by each individual.

### 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>

### ACADEMIC ADVICE

For information about:

- Notes on assessments and plagiarism
- School policy on Supplementary exams
- Special Considerations : [student.unsw.edu.au/special-consideration](https://student.unsw.edu.au/special-consideration)
- Solutions to Problems
- Year Managers and Grievance Officer of Teaching and Learning Committee
- CEVSOC and SURVSOC

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>

## Appendix A: Engineers Australia (EA) Competencies

### Stage 1 Competencies for Professional Engineers

|  | <b>Program Intended Learning Outcomes</b>   |
|--|---|
| <b>PE1: Knowledge and Skill Base</b>             | 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 |
| <b>PE2: Engineering Application Ability</b>      | 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      |
| <b>PE3: Professional and Personal Attributes</b> | 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   |