

COURSE DETAILS

Units of Credit	6		
Contact hours	6 hours per week		
Class	Monday	3:00pm – 5:00pm	Online
	Wednesday	3:00pm – 5:00pm	Online
Workshop	Tuesday	2:00pm – 4:00pm	Online
Consultation	Monday	2:00pm – 3:00pm	Online
Course Coordinator and Lecturer	Prof. Wei Gao email: w.gao@unsw.edu.au office: Room 608 Civil and Environmental Engineering Building (H20)		
Online Coordinator	Dr. Xiaojun Chen email: xiaojun.chen@unsw.edu.au ; office: CE616		
Postgraduate Teaching Assistant	Dr. Yuguo Yu email: yuguo.yu@unsw.edu.au ; office: CE603		

For issues relating to *Moodle* or the *Online Learning Modules* please contact *Dr. Xiaojun Chen*

For *strictly private or confidential* issues please feel free to email *Prof. Wei Gao*

For issues related to the course content and assistance with solving worked problems and examples, please follow this process to resolve your queries:

1. **Ask your peers!** Collaborating with your fellow peers will help to resolve many problems
2. **Ask your demonstrators!** Take your questions to your next Tuesday Workshop session
3. **Discuss with your lecture!** Do not hesitate to discuss your problems with *Wei* during the Consultation session from 2-3pm on every Monday
4. **Post your problem to the Moodle Forum!** Yuguo and Wei will attempt to answer your problems. You are also encouraged to answer questions for your peers

When posting to the Moodle forum please include screenshot of the problem, and the Topic / Question Number in the title. Example: “Workshop Week 1, Q1”

INFORMATION ABOUT THE COURSE

The aim is to introduce students to the fundamental concepts and principles applied by engineers - whether civil, mechanical, mining, aeronautical, etc. - in the design of structures of all sorts of sizes and purpose. We build upon the mathematics and physics courses, extending Newtonian Mechanics to understand what happens to a body when force(s) is/are applied to it. Statics is a branch of mechanics that deals with the study of objects, structures, fluids in equilibrium. Dynamics is a branch of mechanics that deals with the study of bodies in motion.

This course will continue with and will build on the concepts introduced in Mathematics and Physics. During this course you will be supported in developing the core skills, qualities and understandings needed for more advanced courses in your program, such as Mechanics of Solids, Structural Analysis and Design, Geotechnical Engineering, Civil Engineering Practice and Special Topics in Concrete, Steel and Composite Structures subjects, and associated with your role as a future Civil/Environmental Engineer.

HANDBOOK DESCRIPTION

See link to virtual handbook:

<https://www.handbook.unsw.edu.au/undergraduate/courses/2020/engg1300/>

OBJECTIVES

The objectives of this course are to:

- to build on your knowledge in Mathematics and Physics to encompass the fundamental concepts of Statics and Dynamics
- introduce you to thinking processes for practical Engineering Problems
- give you opportunities to develop and reflect on graduate attributes such as collaborative skills, communication skills, and lifelong learning skills

This course will also provide you with opportunities to develop the following graduate attributes:

- the capacity for analytical and independent critical thinking;
- skills related to lifelong learning, such as self-reflection (ability to apply theory to practice in familiar and unfamiliar situations); and
- collaborative and teamwork skills

TEACHING STRATEGIES

This course is designed for student-centred learning. Students are encouraged to think critically to solve engineering problems and to ask questions. Students should participate both with the online content and in-class in order to best achieve the learning outcomes

The following teaching strategies are implemented in this course:

- **Lectures**

Focus on the development and application of generalised problem-solving processes for engineering mechanics. Lectures will also emphasise the relationship of the content to engineering practice and will provide an opportunity for reflection on learning. The lectures are recorded and should be available on the Moodle course page.

- **Pre-recorded Problem Solving Classes**

Concentrate on developing strategies for solving problems in engineering mechanics. You are expected to watch the pre-recorded problem solving classes and attempt the problems prior to attending workshops.

- **Workshops**

Help you to further develop and consolidate problem solving skills. You will be encouraged, from time to time, to work in small groups to solve problems. The class problem sessions (workshops) **are compulsory** and begin in **Week 1** of term. We encourage you to develop a close working relationship with your demonstrators and the rest of your class.

- **Moodle Course Page**

Provides a step-by-step guide to complete the course. There is a discussion forum to help provide interaction and help from your peers. Links to video recordings and Online Learning Modules to help you learn the solution techniques for many of the subject areas.

- **Recorded Lectures**

Will be uploaded to Moodle to help students to revise. Please note that the recorded lectures are **NOT** substitutes for attending lectures or reading the lecture notes. The quality of the recorded lectures can be poor and are not professional produced. The pace of the recorded lectures can seem very slow because the lecturer is expecting students to take notes in the class and is adjusting their pace accordingly.

Self-centred and self-directed learning (expectations of the students):

In addition to the class problem sessions, you are expected to commit **6 - 8 hours per week** (1.5 hours for each hour of contact) to independent learning and general problem solving.

Suggested approaches to learning in this course include:

- Regular participation in lectures and workshop class problem sessions. *Review lecture and class problem material. Follow worked examples. Reflect on class problems and quizzes.*

- Complete all the required tasks in the Moodle course page for this course.
- Weekly reading and recording of your learning.
- Appropriate preparation for class problem activities.
- Planning your time to achieve all assessment requirements (see assessment).
- We encourage you to work with your peers. A good way to learn the material is in small study groups. Such groups work best if members have attempted the problems individually before meeting as a group. A valued and honest collaboration occurs when, for example, you “get stuck” early on in attacking an exercise and go to your classmate with a relevant question. Your classmate then has the opportunity to learn from your question as well as help you. You then bring something to the collaboration.
- Students who perform poorly in the quizzes are strongly encouraged to discuss their progress with the lecturers during the term. Please do not suffer in silence – seek the help at an early stage! We would like you to make most of this learning process and receive a high grade in the course.

EXPECTED LEARNING OUTCOMES

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.	Demonstrate an understanding of concepts of Engineering Mechanics both for Statics and Dynamics	PE1.1, PE1.2, PE2.1
2.	Show proficiency in developing Free Body Diagrams, Equations of Equilibrium and Internal Actions Diagrams	PE1.1, PE1.2, PE2.1
3.	Interpret and understand the requirements of an engineering problem and identify the potential problems presented by the objectives of the brief	PE1.2, PE2.1, PE2.2
4.	Demonstrate collaborative skills by working with other students in teams	PE3.2, PE3.5, PE3.6
5.	Accomplish hands-on tasks that require the application of knowledge of Engineering Mechanics	PE2.1, PE2.2

COURSE PROGRAM

Term 2 2020

Date	Topic and Content	Assessment (Sydney time)
01/06/2020 (Week 1)	Introduction; Vectors; Concurrent and non-concurrent forces; Forces; Moments and Couples	
10/06/2020 (Week 2)	Equilibrium; Types of Supports; Free Body Diagrams; No lecture on 08/06/2020 (public holiday)	
15/06/2020 (Week 3)	Internal Actions; Axial Force Diagram; Shear Force Diagram; Bending Moment Diagram; Trusses;	QUIZ 1 – Tuesday 3-4pm during Workshop
22/06/2020 (Week 4)	Method of Joints; Method of Sections; 2D Frames; Structures with Internal Hinges	
29/06/2020 (Week 5)	Geometric Properties of Plane Figures; Centroid; Second Moment of Area; Parallel Axis Theorem;	QUIZ 2 – Tuesday 3-4pm during Workshop
06/07/2020 (Week 6)	No classes (lecture or workshop) this week	
13/07/2020 (Week 7)	Friction; Fluid Statics; Introduction to Dynamics; Kinematics of particles;	
20/07/2020 (Week 8)	Motion in One Dimension; Rectilinear Motion; Kinetics of Particles;	QUIZ 3 – Tuesday 3-4pm during Workshop
27/07/2020 (Week 9)	Work and Energy; Impulse and Momentum	
03/08/2020 (Week 10)	Rigid Bodies	QUIZ 4 – Tuesday 3-4pm during Workshop
10/08/2020	Revision and Consultation (no workshop this week)	

Please note the above schedule of Topics covered in each week is a guide only and subject to change based on time constraints. Please attend the lectures each week to ensure you are up to date with the content and know which material to revise prior to the upcoming class

ASSESSMENT

Assessment will be based on 10 Weekly Online Assignments, four Online Quizzes and a Final Exam. The Final Exam will take place in the UNSW examination period. 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 50% of the Final Mark if class work is included and 100% if class work is not included. The class work is worth 50% of the Final Mark if included.

*A mark of **at least 50%** in the final examination is required before the class work (Weekly Online Assignments and Quizzes) is included in the final mark.*

Students who perform poorly in the Online Weekly Assignments, Quizzes and Workshops are recommended to discuss progress with the lecturer. Please do not suffer in silence, we are here to help you perform your best in this course.

Note: The lecturer reserves the right to adjust the final scores by scaling if agreed by the Head of School.

Weekly Online Assignments

These assignments will keep you up-to-date with the course material. They will encourage you to practice some workshop problems on a weekly basis. Each assignment involves a set of calculation problems. Only the final answer is submitted. You have the chance to attempt the solution multiple times in order to receive a full mark of each assignment. You are encouraged to collaborate with your peers in order to discover the solutions. The assignments open each Monday and are **due midnight the following Monday**. The due date for each module is clearly stated on Moodle. No late submissions allowed. **You will lose the mark for any weekly assignment that you do not submit.**

Each assignment's mark will be updated online after its due date

Quizzes

The quizzes are designed as 45-minute Open Book examinations but you are allowed to complete each quiz within 60 minutes online. The quizzes will begin at **3:00pm (Sydney time) sharp** during workshops in weeks 3, 5, 8 and 10 under strict exam conditions. If you are late you do not receive additional time. Content covered in each quiz will be announced during class lectures

You will be assessed based on:

- Technical accuracy of calculations
- Evidence of good engineering practice including sketches, diagrams and correct use of units.
- The entire solution procedure will be marked and not just the final answers.

There will be no supplementary quizzes. If you miss any of the quizzes, please contact with the course coordinator, the quiz weight may be allocated to the Final Exam.

Marks will be available within 3 days of each quiz through Moodle

Final Exam

The final exam is a **2hr Open Book examination**. Further information on how to run the Final Exam (such as Online or in Campus) will be announced in due course. You need to score at least 50% in the final exam to be able to pass the course.

The exam covers all course content delivered during class. You will be assessed based on:

- Technical accuracy of calculations
- Evidence of good engineering practice including sketches, diagrams and correct use of units.
- The entire solution procedure will be marked and not just the final answers.

Other Important Information:

Supplementary Examinations for Term 2 2020 will be held on Monday 7th September – 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.

ASSESSMENT OVERVIEW

Item	Length	Weighting	Assessment Criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned
1. Online Learning Modules	Weekly Assignment	10% (1% each)	Continued learning Demonstrate understanding of concepts by applying problem solving and critical thinking	Midnight Monday of each relevant week (see Moodle for details)	No late submissions	Immediately following due date
2. 4x Online Quiz	Designed for 45 minutes each (allowed to complete within 60 minutes)	40% (10% each)	Solve problems and demonstrate good engineering practice in an exam environment	During second hour of workshop: Tuesday 3-4pm Weeks 3, 5, 8, 10	N/A	Within 3 days of each quiz
3. Final Exam	2 hours	50%	Demonstrate understanding of the total course content	Exam period: Date TBC	N/A	Release of final results

Note: You must achieve greater than 50% in the final exam in order to pass the course

The examinations and online problems show evidence of application of theoretical concepts to solving problems. There are no exemptions from any part of this assessment. If you are repeating the course, you must complete all components this year. Students who perform poorly in the quizzes are recommended to discuss progress with the lecturer during the term.

PENALTIES

No late submissions allowed for the Weekly Assignments. You will lose the mark for any weekly assignment that you do not submit.

There will be no supplementary quizzes. If you miss any of the quizzes, please contact with the course coordinator, the quiz weight may be allocated to the Final Exam.

RELEVANT RESOURCES

Textbooks:

- R.C. Hibbeler, "Engineering Mechanics: Statics" – 14th Edition in SI Units
- R.C. Hibbeler, "Engineering Mechanics: Dynamics" – 14th Edition in SI Units

or

- Bedford and Fowler, "Engineering Mechanics Statics", 8th Edition, Prentice Hall, 2008.
- Bedford and Fowler, "Engineering Mechanics Dynamics", 8th Edition, Prentice Hall, 2008.

Additional relevant materials may include:

- Hall, Archer, Gilbert, "Engineering Statics", 1999.
- Additional materials will be provided on Moodle

Pearson Mastering Engineering:

<http://www.pearsonmylabandmastering.com/northamerica/masteringengineering/>

Moodle site may be accessed through: <http://moodle.telt.unsw.edu.au>

School's website: <https://www.engineering.unsw.edu.au/civil-engineering/>

School's student intranet: <http://intranet.civeng.unsw.edu.au/student-intranet>

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;
- 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
- CEVSOC/SURVSOC/CEPCA

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

	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