



UNSW Course Outline

CVEN4301 Advanced Concrete Structures - 2024

Published on the 07 Feb 2024

General Course Information

Course Code : CVEN4301

Year : 2024

Term : Term 1

Teaching Period : T1

Is a multi-term course? : No

Faculty : Faculty of Engineering

Academic Unit : School of Civil and Environmental Engineering

Delivery Mode : In Person

Delivery Format : Standard

Delivery Location : Kensington

Campus : Sydney

Study Level : Postgraduate, Undergraduate

Units of Credit : 6

Useful Links

[Handbook Class Timetable](#)

Course Details & Outcomes

Course Description

A course on the advanced analysis and design of concrete structures for students looking towards a career in Structural Engineering. The course deals with the design and behaviour of the following fundamental aspects for reinforced and prestressed concrete member design: one-

way and two-way concrete slabs (including the direct design, equivalent frame and simplified strip methods); retaining walls, strip, pad and pile footings; and determinant prestressed concrete members. Additional topics may be drawn from the following: design for torsion, detailing; ductility; preliminary sizing of members and frames; design with high strength and fibre reinforced concretes.

Course Aims

The aim of this elective course is to provide final year students with a more advanced coverage of various topics relating to the design of concrete structures. The course is targeted at students who wish to specialize in Structural Engineering and are planning a career in structural design. The course will build on and reinforce the material covered in the core structural engineering courses.

During this course students will be supported in polishing the core skills, qualities and understandings developed in previous courses and hone their structural engineering skills associated with their role as a future Civil Engineer.

Relationship to Other Courses

This course will continue with and build on the concepts introduced in Structural Analysis and Modelling (CVEN2303) and Concrete Structures (CVEN3304).

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Design Reinforced Concrete (RC) structures with two-way actions utilizing AS 3600 and AS 1170
CLO2 : Describe and apply RC design principles to the design of members subjected to ultimate limit states of flexure, shear, and punching shear.
CLO3 : Interpret structural design requirements, specifications, documents, and drawings and utilize them appropriately in design
CLO4 : Explain the limit state design concepts, specifically recognising the difference between strength and serviceability limit states
CLO5 : Analyse short and long-term deflection effects of RC structures and deflection control

Course Learning Outcomes	Assessment Item
CLO1 : Design Reinforced Concrete (RC) structures with two-way actions utilizing AS 3600 and AS 1170	<ul style="list-style-type: none">• Final Exam
CLO2 : Describe and apply RC design principles to the design of members subjected to ultimate limit states of flexure, shear, and punching shear.	<ul style="list-style-type: none">• Assignments• Final Exam
CLO3 : Interpret structural design requirements, specifications, documents, and drawings and utilize them appropriately in design	<ul style="list-style-type: none">• Quiz• Assignments• Final Exam
CLO4 : Explain the limit state design concepts, specifically recognising the difference between strength and serviceability limit states	<ul style="list-style-type: none">• Quiz• Assignments• Final Exam
CLO5 : Analyse short and long-term deflection effects of RC structures and deflection control	<ul style="list-style-type: none">• Quiz• Assignments• Final Exam

Learning and Teaching Technologies

Moodle - Learning Management System

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Quiz Assessment Format: Individual	15%	
Assignments Assessment Format: Individual	25%	
Final Exam Assessment Format: Individual	60%	

Assessment Details

Quiz

Assessment Overview

The quiz will be assessed on the basis of technical accuracy of calculations and evidence of good engineering judgment. The quiz will be held under open book conditions.

Marking will be against specific criteria in a marking guide and formal feedback on your assessment task will be provided within ten days of the relevant submission date.

Course Learning Outcomes

- CLO3 : Interpret structural design requirements, specifications, documents, and drawings and utilize them appropriately in design
- CLO4 : Explain the limit state design concepts, specifically recognising the difference between strength and serviceability limit states
- CLO5 : Analyse short and long-term deflection effects of RC structures and deflection control

Assignments

Assessment Overview

8 Assignments (7x 3% each & 1x 4%) will be available online on moodle. They need to be submitted online by the due date shown on moodle. These assignments will keep you up-to-date with the course material, and will encourage you to practice some problems on a weekly basis. Each assignment includes a number of questions. Only final answer is needed and it is checked online. You have the chance to attempt the solution as much as you want to get a full mark of each assignment.

Course Learning Outcomes

- CLO2 : Describe and apply RC design principles to the design of members subjected to

ultimate limit states of flexure, shear, and punching shear.

- CLO3 : Interpret structural design requirements, specifications, documents, and drawings and utilize them appropriately in design
- CLO4 : Explain the limit state design concepts, specifically recognising the difference between strength and serviceability limit states
- CLO5 : Analyse short and long-term deflection effects of RC structures and deflection control

Final Exam

Assessment Overview

The exam will be 2 hours in duration and will take place in the formal exam period.

Course Learning Outcomes

- CLO1 : Design Reinforced Concrete (RC) structures with two-way actions utilizing AS 3600 and AS 1170
- CLO2 : Describe and apply RC design principles to the design of members subjected to ultimate limit states of flexure, shear, and punching shear.
- CLO3 : Interpret structural design requirements, specifications, documents, and drawings and utilize them appropriately in design
- CLO4 : Explain the limit state design concepts, specifically recognising the difference between strength and serviceability limit states
- CLO5 : Analyse short and long-term deflection effects of RC structures and deflection control

Detailed Assessment Description

The course learning outcomes include a significant level of technical learning, calculations, and engineering understanding of problems. These outcomes can be effectively and ideally assessed in an exam environment that can reflect the students' understanding of concepts, and the students' abilities to make decisions and solve problems within limited time.

The final exam will be held under open book conditions.

Hurdle rules

A mark of at least 40% in the final examination is required before the class work and quiz are included in the final mark.

General Assessment Information

Grading Basis

Standard

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 0 : 5 February - 11 February	Other	
Week 1 : 12 February - 18 February	Lecture	Introduction to slabs, Stress resultants & elastic solution, Methods of analysis, Design requirements, Deflection control using deemed-to-comply
Week 2 : 19 February - 25 February	Lecture	Deflection control of slabs according to simplified method
Week 3 : 26 February - 3 March	Lecture	Time effects of creep and shrinkage in slabs, long-term deflections, crack control
Week 4 : 4 March - 10 March	Lecture	Design for strength of two-way slabs
Week 5 : 11 March - 17 March	Lecture	Design for strength of flat slabs using direct (simplified) method
Week 6 : 18 March - 24 March	Other	Mid-Term break
Week 7 : 25 March - 31 March	Lecture	Design and analysis of flat slabs using equivalent frame method, Design flat slabs for punching shear
Week 8 : 1 April - 7 April	Lecture	Analysis and design of footings
Week 9 : 8 April - 14 April	Lecture	Analysis and design of retaining walls
Week 10 : 15 April - 21 April	Lecture	Introduction to prestressed concrete members

Attendance Requirements

For undergraduate courses with Workshops and/or Labs, attendance for those classes is a necessary part of the course. You must attend at least 80% of the workshop/lab in which you are enrolled for the duration of the sessions.

Course Resources

Recommended Resources

1. Foster, Kilpatrick and Warner, **Reinforced Concrete Basics**, 3rd Edition, Pearson Prentice Hall, 2021.
2. Warner R.F., Foster S.J., Gravina, R., and Faulkes, K.A., "Prestressed Concrete", 4th Ed., Pearson Australia, 2017, 609 pp., ISBN: 978 1 4860 1897 0.
3. R. Warner, B. Rangan, A. Hall, Ken Faulkes, **Concrete Structures**, Longman Australia, 1998.
4. James K. Wight and James G. MacGregor, **Reinforced Concrete: Mechanics and Design**, Pearson, 2012.

Print:

<https://www.bookshop.unsw.edu.au/details.cgi?ITEMNO=9780655706397>

<https://www.bookshop.unsw.edu.au/details.cgi?ITEMNO=9780582802476>

<https://www.bookshop.unsw.edu.au/details.cgi?ITEMNO=9781292106007>

<https://www.bookshop.unsw.edu.au/details.cgi?ITEMNO=9780655703662>

Digital:

<https://unswbookshop.vitalsource.com/products/-v9780655703679>

<https://unswbookshop.vitalsource.com/products/-v9780655706403>

<https://unswbookshop.vitalsource.com/products/-v9781292106014>

Course Evaluation and Development

myExperience feedback will be used to evaluate the student experience and help develop future deliveries of this course. The feedback will be used to implement changes in the structure of the course and its delivery mode.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
	Ehab Hamed					No	Yes

Other Useful Information

Academic Information

I. Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to, or within 3 working days of, submitting an assessment or sitting an exam.

Please note that UNSW has a Fit to Sit rule, which means that if you sit an exam, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's [Special Consideration page](#).

II. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and polices. In particular, students should be familiar with the following:

- [Attendance](#)
- [UNSW Email Address](#)
- [Special Consideration](#)
- [Exams](#)
- [Approved Calculators](#)
- [Academic Honesty and Plagiarism](#)
- [Equitable Learning Services](#)

III. Equity and diversity

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equitable Learning Services. Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

IV. Professional Outcomes and Program Design

Students are able to review the relevant professional outcomes and program designs for their streams by going to the following link: [https://www.unsw.edu.au/engineering/student-life/
student-resources/program-design.](https://www.unsw.edu.au/engineering/student-life/student-resources/program-design)

Note: This course outline sets out the description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published. Moodle or your primary learning management system (LMS) should be consulted for the up-to-date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline/Moodle/LMS, the description in the Course Outline/Moodle/LMS applies.

Academic Honesty and Plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at*

UNSW is defined as using the words or ideas of others and passing them off as your own.

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit: student.unsw.edu.au/plagiarism. The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis or contract cheating) even suspension from the university. The Student Misconduct Procedures are available here:

www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Submission of Assessment Tasks

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of five percent (5%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day. This is for all assessments where a penalty applies.

Work submitted after five days (120 hours) will not be accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These will be clearly indicated in the course outline, and such assessments will receive a mark of zero if not completed by the specified date. Examples include:

- Weekly online tests or laboratory work worth a small proportion of the subject mark;
- Exams, peer feedback and team evaluation surveys;
- Online quizzes where answers are released to students on completion;
- Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date; and,
- Pass/Fail assessment tasks.

Faculty-specific Information

[Engineering Student Support Services](#) – The Nucleus - enrolment, progression checks, clash requests, course issues or program-related queries

[Engineering Industrial Training](#) – Industrial training questions

[UNSW Study Abroad](#) – study abroad student enquiries (for inbound students)

[UNSW Exchange](#) – student exchange enquiries (for inbound students)

[UNSW Future Students](#) – potential student enquiries e.g. admissions, fees, programs, credit transfer

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

School-specific Information

Final Examinations

Final Exams in T1 2024 will be held on campus between the 26th April and 9th May, and Supplementary Exams between the 20th - 24th May 2024. You are required to be available on these dates. Please do not make any personal or travel arrangements during this period.

School Contact Information

For assistance with enrolment, class registration, progression checks and other administrative matters, please see [the Nucleus: Student Hub](#). They are located inside the Library – first right as

you enter the main library entrance. You can also contact them via <http://unsw.to/webforms> or reserve a place in the face-to-face queue using the UniVerse app.

For course administration matters, please contact the Course Coordinator.

Questions about this course should normally be asked during the scheduled class so that everyone can benefit from the answer and discussion.