

Unit Outline (Higher Education)

Institute / School: Institute of Innovation, Science & Sustainability

Unit Title: Structural Engineering 2

Unit ID: ENGRG3101

Credit Points: 15.00

Prerequisite(s): (ENGRG2104)

Co-requisite(s): Nil

Exclusion(s): (ENGIN3201)

ASCED: 030999

Description of the Unit:

This unit introduces students to the structural design of steel beams and columns and reinforced concrete beams and slabs, in accordance with applicable Australian Standards. The design principles which underpin the code provisions are described and explained and, upon completion of the unit, students should be able to competently undertake design of simple steel and reinforced concrete elements in practical situations.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment

Course Level:

| Level of Unit in Course | AQF Level of Course | | | | | |
|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | 5 | 6 | 7 | 8 | 9 | 10 |
| Introductory | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Intermediate | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Advanced | <input type="checkbox"/> | <input type="checkbox"/> | ✓ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Learning Outcomes:

On successful completion of the course the students are expected to be able to:

Knowledge:

- K1.** Identify the types of failures possible in timber, steel and reinforced concrete structural elements.
- K2.** Apply the principles of strength limit state design to the design of timber and steel beams and columns.
- K3.** Apply the principles of strength limit state design to the design of reinforced concrete members under bending.
- K4.** Recognise and explain the design factors which need to be considered in order to achieve durable reinforced concrete structures in a range of environmental conditions.

Skills:

- S1.** Demonstrate competence in utilizing Australian Standards and relevant design guidelines where they are appropriate and applicable.
- S2.** Create a report outlining the outcomes of engineering design computations to a professional standard.
- S3.** Produce and communicate, the results of the design process in a way which is useful and convenient for those required to transform the design onto reality.

Application of knowledge and skills:

- A1.** Propose structural designs for timber beams and columns in accordance with AS1720.1 with regard to various requirements such as safety, economy and durability
- A2.** Propose structural designs for steel beams, columns and connections in accordance with AS4100 with regard to various requirements such as safety, economy and durability.
- A3.** Propose structural designs for reinforced concrete beams and slabs in accordance with AS3600 and with regard to various requirements such as safety, economy and durability.

Unit Content:

Topics may include:

1. Design of timber beams under flexure and timber columns under compression.
2. Design of steel beams to AS4100 on the basis of stiffness and strength (bending, shear, bearing, deflection).
3. Design of simple steel members under compression or tension and design of simple connections in accordance to AS4100.
4. Design of reinforced concrete members under bending actions according to AS3600

Learning Task and Assessment:

| Learning Outcomes Assessed | Assessment Tasks | Assessment Type | Weighting |
|----------------------------|--|---------------------------|-----------|
| K1-K4, S1-S3, A1-A3 | Laboratory or problem based design assignment. | (Design) Report | 30-50% |
| K1-K3, S1, S3, A1-A3 | Assessment on parts of covered topics. | Tutorial assessment, quiz | 10-30% |
| K1-K3, S1, S3, A1-A3 | Test or examination. | Final test/exam | 40-60% |

Adopted Reference Style:

IEEE

Refer to the [library website](#) for more information

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