



# Course Outline (Higher Education)

<b>Institute / School:</b>	Institute of Innovation, Science & Sustainability
<b>Course Title:</b>	STRUCTURAL DESIGN
<b>Course ID:</b>	ENGIN3201
<b>Credit Points:</b>	15.00
<b>Prerequisite(s):</b>	(ENCIV2310 or ENGIN2203)
<b>Co-requisite(s):</b>	Nil
<b>Exclusion(s):</b>	(ENCIV3310)
<b>ASCED:</b>	030903

## Description of the Course:

This course 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 course, 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: Student is not undertaking work experience in industry.

**Placement Component:** No

**Supplementary Assessment:** Yes

Where supplementary assessment is available a student must have failed overall in the course but gained a final mark of 45 per cent or above and submitted all major assessment tasks.

## Program Level:

Level of course in Program	AQF Level of Program					
	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 checked="" 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.** Discern the principles underpinning some of the design requirements of the AS1720 Timber Structures code
- K2.** Identify the types of failures possible in steel and reinforced concrete structural elements and connections
- K3.** Apply the principles of strength limit state design to the design of steel beams and columns
- K4.** Apply the principles of strength limit state design to the design of reinforced concrete beams and slabs.
- K5.** 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, relevant design guidelines and design handbooks 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, by graphical means, the results of the design process in a way which is useful and convenient for those required to transform the design onto reality
- S4.** Demonstrate effective teamwork in the completion of structural design tasks

**Application of knowledge and skills:**

- A1.** Design simple timber beams and columns within the context of practical applications, in accordance with AS1720 Timber Structures and present the computations and drawings to a professional standard
- A2.** Propose structural designs for steel beams and columns 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.

**Course Content:**

Topics may include:

- Introduction to timber and design of timber structures to AS1170
- Design of steel beams to AS4100 on the basis of stiffness and strength (bending, shear, bearing, deflection)
- Design of simple steel members under compression or tension to AS4100
- Design of reinforced concrete beams for flexural and shear strength to AS3600
- Design of reinforced concrete slabs to AS3600

**Values:**

- V1.** Appreciate that, above all else, the minimisation of risk to human safety is the primary goal of structural design
- V2.** Recognise the responsibility that goes with the trust placed in engineering designers by the community
- V3.** Appreciate that uncertainty in analysis and design must be recognised and allowed for in a rational and appropriate way
- V4.** Understand that code requirements have evolved from a history of research, practical experience and the application of prudent and responsible reasoning.

### Graduate Attributes

The Federation University Federation graduate attributes (GA) are entrenched in the [Higher Education Graduate Attributes Policy](#) (LT1228). FedUni graduates develop these graduate attributes through their engagement in explicit learning and teaching and assessment tasks that are embedded in all FedUni programs. Graduate attribute attainment typically follows an incremental development process mapped through program progression. **One or more graduate attributes must be evident in the specified learning outcomes and assessment for each FedUni course, and all attributes must be directly assessed in each program**

Graduate attribute and descriptor		Development and acquisition of GAs in the course	
		Learning Outcomes (KSA)	Assessment task (AT#)
GA 1 Thinkers	Our graduates are curious, reflective and critical. Able to analyse the world in a way that generates valued insights, they are change makers seeking and creating new solutions.	K1-K5, S1, S2, A1-A3	1-3
GA 2 Innovators	Our graduates have ideas and are able to realise their dreams. They think and act creatively to achieve and inspire positive change.	K1-K5, S1, S2, A1-A3	1-3
GA 3 Citizens	Our graduates engage in socially and culturally appropriate ways to advance individual, community and global well-being. They are socially and environmentally aware, acting ethically, equitably and compassionately.	K1-K5, S1, S2, A1-A3	1-3
GA 4 Communicators	Our graduates create, exchange, impart and convey information, ideas, and concepts effectively. They are respectful, inclusive and empathetic towards their audience, and express thoughts, feelings and information in ways that help others to understand.	K1-K5, S1, S2, A1-A3	1
GA 5 Leaders	Our graduates display and promote positive behaviours, and aspire to make a difference. They act with integrity, are receptive to alternatives and foster sustainable and resilient practices.	Not applicable	Not applicable

### Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K3, K4, S1-S4, A1-A3	Laboratory or problem based assignment.	Report	20 - 40%
K1, K3, S1, S2, A1, A2	Open book mid-semester test	Class test/Quiz	10 - 30%
K1-K5, S1, S2, A1-A3	An examination on any or all of the material covered in the course.	Examination / Final test	40 - 60%

### Adopted Reference Style:

Other (IEEE: Refer to the library website for more information)

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

Fed Cite - [referencing tool](#)