



Course Outline (Higher Education)

Institute / School: Institute of Innovation, Science & Sustainability

Course Title: ADVANCED STRUCTURAL ANALYSIS I

Course ID: ENGIN5202

Credit Points: 15.00

Prerequisite(s): (ENGIN3201)

Co-requisite(s): Nil

Exclusion(s): Nil

ASCED: 030903

Description of the Course:

This course equips participants with advanced theoretical and technical knowledge and skills in the area of structural design. After having successfully completed the sequence of advanced courses (ENGIN5202 and ENGIN5203), participants will be capable of undertaking highly-skilled structural engineering work.

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 type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Learning Outcomes:

Upon successful completion of this course, students should be able to:

Knowledge:

- K1.** Discern the principles of design of steel frame buildings, as total systems and with regard to the design of individual components
- K2.** Identify the considerations and processes in the design of various types of reinforced concrete slab systems, foundations and columns for strength
- K3.** Identify the considerations and processes in the design of reinforced concrete beams and slabs for deflection control
- K4.** Recognise methods of construction, design principles and the approaches to the design of prestressed concrete

Skills:

- S1.** Create well-communicated and professional high-quality documents presenting analysis and design computations and computer modelling details and outcomes.
- S2.** Develop computer models of complex structural systems and validate the results by independent manual means
- S3.** Exercise informed judgement in making structural design decisions
- S4.** Demonstrate effective teamwork in the completion of structural design tasks

Application of knowledge and skills:

- A1.** Design steel/portal frame buildings, with due regard for relevant Australian Standards and contemporary construction practices
- A2.** Design reinforced concrete flat slab floors and foundations for buildings, on the basis of flexure and two-way shear
- A3.** Produce calculations and checks which will ensure that reinforced concrete beams and slabs comply with appropriate deflection controls
- A4.** Design all aspects of reinforced concrete columns under given loads, on the basis of AS3600
- A5.** Develop the preliminary design of the prestressing requirements for concrete floors in buildings, on the basis of AS3600 and with due regard for current industry practice

Course Content:

Topics may include:

- Design of steel members under combined actions and steel frame buildings
- Design of reinforced concrete two-way and flat slabs for flexure and shear

- Deflection of reinforced concrete beams and slabs

- Design aspects of reinforced concrete foundations
- Introduction to design of prestressed concrete

Values:

- V1.** Appreciate that, above all else, the minimization of risk to human safety is the primary goal of structural design

- V2.** Appreciate the importance of considering `buildability` during the engineering design stage
- V3.** Recognise that codes and standards have evolved from a history of research, practical experience and that 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-K4, S1-S3, A1-A5	1, 2
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-K4, S1-S3, A1-A5	1
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-K4, S1-S3, A1-A5	1
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-K4, S1-S3, A1-A5	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-K4, S1-S4, A1-A5	Design exercises	Design reports	30%-50%
K1-K4, S3, A1-A5	Tutorial problems	Examination or Class Tests	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](#)