

## ARBE4102: Construction Technology and Services

Callaghan and Online

Semester 1 - 2024



THE UNIVERSITY OF  
NEWCASTLE  
AUSTRALIA

## OVERVIEW

<b>Course Description</b>	This course develops an understanding of key concepts associated with the construction of high-rise buildings. The course provides a vehicle to develop the knowledge and skills needed to comprehend the design of services in major buildings, and, in so doing, engenders a lifelong interpretation of the intricacies of physical installation and their critical sequence in the construction process.
<b>Academic Progress Requirements</b>	Nil
<b>Assumed Knowledge</b>	ARBE1102 Construction Ecology
<b>Contact Hours</b>	<b>Lectorial</b> Face to Face On Campus 3 hour(s) per Week for 13 Weeks Distance learning students will receive equivalent instruction through online or other distance education strategies.
<b>Unit Weighting Workload</b>	10 Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

# COURSE OUTLINE

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# CONTACTS

<b>Course Coordinator</b>	<b>Callaghan and Online</b> Dr Sittimont Kanjanabootra Sittimont.Kanjanabootra@newcastle.edu.au  Consultation: By email appointment
<b>Teaching Staff</b>	Other teaching staff will be advised on the course Canvas site.
<b>School Office</b>	<b>School of Architecture and Built Environment</b> Architecture Building Callaghan archbe@newcastle.edu.au +61 2 4921 5771

# SYLLABUS

<b>Course Content</b>	<ul style="list-style-type: none"><li>• Building Code of Australia</li><li>• Specifications</li><li>• Evolution of high-rise structures</li><li>• Curtain walls &amp; facades</li><li>• High-rise HVAC, environmental, electrical, mechanical, hydraulic services &amp; lifts</li><li>• Thermal comfort, heat load analysis, air conditioning processes, plant selection and sizing</li><li>• Implications for managing the construction process</li><li>• Gas, oil, electricity and solid fuels</li><li>• Design of hot and cold water supply, drainage systems and effluent, electrical supply and distribution systems and vertical transportation</li><li>• Concrete frame construction</li><li>• Steel frame construction</li><li>• High-rise structural elements</li><li>• Management of the building process</li></ul>
<b>Course Learning Outcomes</b>	<p><b>On successful completion of this course, students will be able to:</b></p> <ol style="list-style-type: none"><li>1. Understand the techniques used in high-rise construction and how they are incorporated into the building process</li><li>2. Appreciate the requirements and elements of HVAC, mechanical, electrical, hydraulic and transportation services in buildings</li><li>3. Understand the design and integration of services into high-rise buildings</li><li>4. Present written and visual concepts and ideas.</li></ol>
<b>Course Materials</b>	Recommend readings located in course resources on CANVAS site.

# SCHEDULE

Week	Week Begins	Topic	Learning Activity	Assessment Due
1	26-Feb	Course introduction	Lecture, reading and ongoing contribution on discussion board	
2	4-Mar	Terminology, evolution of high-rise structures, forces live and dead load	Lecture, reading and ongoing contribution on discussion board	
3	11-Mar	Stress and deformation, wind tunnel simulation	Lecture, reading and ongoing contribution on discussion board	
4	18-Mar	Concrete frame structure and construction, facades, BCA and specification	Lecture, reading and ongoing contribution on discussion board	
5	25-Mar	Steel frame structure and construction, BCA & specification	Lecture, reading and ongoing contribution on discussion board	
6	1-Apr	Basement, Formwork, Curtain walls and facades, BCA and specification	Lecture, reading and ongoing contribution on discussion board	Assignment 1A: By 7 April 2024 23:59 pm
7	8-Apr	HVAC and design guide	Lecture, reading and ongoing contribution on discussion board	Assignment 2: 14 April 2024 23:59 pm
<b>Mid Term Break</b>				
<b>Mid Term Break</b>				
8	29-Apr	Vertical transportation and design guide	Lecture, reading and ongoing contribution on discussion board	
9	6-May	Water supply, drainage & sewage, and design guide	Lecture, reading and ongoing contribution on discussion board	
10	13-May	Fire protection and design guide	Lecture, reading and ongoing contribution on discussion board	
11	20-May	Electrical services and design guide	Lecture, reading and ongoing contribution on discussion board	
12	27-May	Services integration		Assignment 1B: By 2 June 2024 23:59 pm
13	3-Jun	Revision lecture on request		Assignment 3: 5 June 2024 23:59 pm
<b>Examination Period</b>				
<b>Examination Period</b>				

# ASSESSMENTS

This course has 3 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	A1 [A and B] - Online Discussion Board	Assignment 1A: By 7 April 2024 23:59 pm Assignment 1B: By 2 June 2024 23:59 pm	Individual	10% (5% X 2)	1, 2, 3
2	A2 - Structural and Building Process Analysis	Assignment 2: 14 April 2024 23:59 pm	Individual	45%	1, 4
3	A3 - Integration of Building Services	Assignment 3: 5 June 2024 23:59 pm	Individual	45%	1, 2, 3, 4

## Late Submissions

**The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.**

<b>Assessment 1: Online Discussion Board</b>	
<b>Assessment Type</b>	Online learning activity
<b>Description</b>	<p>The CANVAS Discussions Assignment are an important component of the course and contribute to your final grade. For each of the CANVAS Discussions Assignment you are expected to <b>post / answer 1 question</b> (summary of your conversations with community members, summary of your conversation with a practitioner, and an example of community engagement) and <b>then comment on at least two other classmates' posts</b>. The aim of the postings is to promote the sharing of ideas, resources and strategies toward assignment 2 and 3 preparation. Disagreements and debate are welcome but please make sure all postings are done in a respectful and polite manner. The discussion questions will be populated from the end of week 2 onward.</p> <p>The questions will be posted on the under Assignment 1A and Assignment 1B under Discussion thread.</p>
<b>Weighting</b>	10%
<b>Due Date</b>	Assignment 1A (5%): By <b>7 April 2024</b> 23:59 pm Assignment 1B (5%): By <b>2 June 2024</b> 23:59 pm
<b>Submission Method</b>	Online
<b>Assessment Criteria</b>	<p>Did not complete the main post by due date - 0 mark</p> <p>Completed all the required posts but without a significant contribution to the discussion (e.g., just saying "Thanks for your interesting post" is not significant.) – 50 marks</p> <p>Provided a clear summary or review, included all the required details, made comments that could help other students and referenced appropriately (where needed) – 100 marks</p>
<b>Return Method</b>	Not return
<b>Feedback Provided</b>	Online through CANVAS discussion board

<b>Assessment 2: Structural and Building Process Analysis</b>	
<b>Assessment Type</b>	Written Assignment
<b>Purpose</b>	<p>On completion of this assignment the student should be able to:</p> <ul style="list-style-type: none"> <li>* Demonstrate an understanding of the issues associated with the construction of structural systems and the building process for a high-rise building.</li> <li>* Identify techniques used in High-rise construction and how they are incorporated into the building process.</li> <li>* Present written report and visual concepts and ideas in form of markup drawings.</li> </ul>
<b>Description</b>	<p>This assignment is to focus on the structural aspects of high-rise construction. Your firm is in the planning stages for construction of a new high-rise building project.</p> <p>To advance the planning process, concept strategies for the construction of structural system are required. Using the architectural drawings provided, you are required to review and research the structural system and materials for the structural elements. Using your understanding of structures for high-rise construction you are to prepare a structural construction plan report identifying the main systems and materials. You are to include an analysis and discussion on the chosen system and materials, outline any construction challenges that are to be managed as well as compare with alternative systems. A full brief document will be provided in week 1.</p>
<b>Weighting</b>	45%
<b>Length</b>	Maximum 5,000 words including everything
<b>Due Date</b>	<b>14 April 2024</b> 23:59 pm
<b>Submission Method</b>	Online through Turnitin
<b>Assessment Criteria</b>	The assessment criteria are in the assignment brief document.
<b>Return Method</b>	Not return
<b>Feedback Provided</b>	Online - Feedback on the assessment item will be provided to each student typically within three weeks of submission. Feedback will be provided to you in Turnitin comment portal.

<b>Assessment 3: Integration of Building Services</b>	
<b>Assessment Type</b>	Written Assignment
<b>Purpose</b>	The aim is for the students to demonstrate knowledge of the technical issues associated with the integration of services into a High-rise building into building structure. On completion of this assignment the student should be able to: * Identify the requirements and elements of HVAC, mechanical, electrical, hydraulic and transportation services in buildings; * Explain the design and integration of services into High-rise buildings; and * Present written report and visual concepts and ideas in form of markup drawings.
<b>Description</b>	This assignment task is an extension of assignment 2. Considering building services, provision, and integration planning for the new high-rise building, you are required to investigate the building services (electrical, mechanical, fire hydraulic, lifts etc.) required for this building and provide a construction planning report identifying the main systems. You are required to investigate what is required and using the architectural drawings provided concepts details for the reticulation of the services in the building. You are required to consider coordination of the services and any impact on the structure. You are to identify issues as appropriate of any impact on the architectural planning and provide options for consideration. A full brief document will be provided in week 1.
<b>Weighting</b>	45%
<b>Length</b>	Maximum 5,000 words including everything
<b>Due Date</b>	<b>5 June 2024 23:59 pm</b>
<b>Submission Method</b>	Online through Turnitin
<b>Assessment Criteria</b>	The assessment criteria are in the assignment brief document.
<b>Return Method</b>	Not return
<b>Feedback Provided</b>	Online - Feedback on the assessment item will be provided to each student typically within three weeks of submission. Feedback will be provided to you in Turnitin comment portal.

## ADDITIONAL INFORMATION

### Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

\*Skills are those identified for the purposes of assessment task(s).

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<b>Communication Methods</b>	Communication methods used in this course include:
<b>Course Evaluation</b>	Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.
<b>Oral Interviews (Vivas)</b>	As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the <a href="#">Oral Examination (viva) Procedure</a> . In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the <a href="#">Student Conduct Rule</a> .
<b>Academic Misconduct</b>	All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to <a href="https://policies.newcastle.edu.au/document/view-current.php?id=35">https://policies.newcastle.edu.au/document/view-current.php?id=35</a> .
<b>Adverse Circumstances</b>	<p>The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:</p> <ol style="list-style-type: none"><li>1. the assessment item is a major assessment item; or</li><li>2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system;</li><li>3. you are requesting a change of placement; or</li><li>4. the course has a compulsory attendance requirement.</li></ol> <p>Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at: <a href="https://policies.newcastle.edu.au/document/view-current.php?id=236">https://policies.newcastle.edu.au/document/view-current.php?id=236</a></p>
<b>Important Policy Information</b>	The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at <a href="https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures">https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures</a> that support a safe and respectful environment at the University.

*This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.*

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