

ARBE1102: Construction Ecology

Callaghan

Semester 1 - 2024



OVERVIEW

Course Description The foundation of this course rests on the importance of maintaining or improving conditions of the natural environment and human health via the built environment. From this understanding, the course combines a grounding of fact-based knowledge in construction materials (classification, production, qualities and uses) with the development of decision-making frameworks that enable environmental and health criteria to be set for a project. Combined, these components provide the knowledge and skills to enable students to select and document responsible building materials for any project, in any location, culture or date.

Academic Progress Requirements Nil

Contact Hours **Callaghan Lectorial**
Face to Face On Campus
3 hour(s) per week(s) for 13 week(s) starting Week 1
Distance learning students will receive equivalent instruction through online or other distance education strategies

80% attendance is compulsory for the Lectorial learning sessions for all on campus, face-to-face enrolled students in ARBE1102.

Attendance/participation will be recorded for the following sessions:
Lectorials Weeks 1 - 13

Method of recording: All students' attendance will be recorded using the myUON App. You will need to check in using the App.

Unit Weighting Workload 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

CONTACTS

Course Coordinator **Callaghan and Online**
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SYLLABUS

- Course Content**
- Materials and their classification
 - Material components and identification of chemicals of concern
 - Raw materials: the process of obtaining from natural resources
 - Composite materials: their manufacture
 - Recycled materials: recycling and repurposing for reuse
 - Materials: their application
 - Environmental and human health considerations in the application of materials in construction
 - Materials: documentation and representation
 - Current natural environment and health issues affected by the built environment

- Course Learning Outcomes**
- On successful completion of this course, students will be able to:**
1. Use appropriate terminology to classify, describe and represent materials.
 2. Describe the interaction of material properties with the natural environment and the consequential design considerations.
 3. Identify current natural environment and human health implications caused by the harvesting, production and use of building materials.
 4. Select and document a set of responsible building materials for a specific project (in a given location, culture or date) by applying materials to an environmental and health criteria framework to assist decision making.
 5. Produce documents in written media supported by an appropriate referencing technique.

SCHEDULE

Week	Date	Lecture: 3-4pm	Tutorial: 4-5pm	Discussion: 5-6pm	Assessment Due
1	26 Feb	JV Welcome and Introduction to Construction Ecology. Introduction to construction ecology and sustainability. Key definitions and concepts for selecting construction materials for Country, sustainability and health.	JV Introduction Introduction to the course. Accessing course information in Canvas. Introduction to the assessment items In class activities towards assessments: Your thoughts on construction ecology and building materials	Student initiated group discussion about course materials.	
2	4 March	NW Construction ecology's connection to Country Introduction and acknowledgement of Country, The building as an 'active player' in the ecosystem, with systems/complexity concepts and their relationship to concept of Country	NW In class activities: Connecting with Country Framework.	Student initiated group discussion about course materials.	
3	11 March	JV Environmental and Health Issues Effected by the Built Environment. Healthy buildings, biophilic design, indoor air quality, material ingredients, raw and composite materials, hazardous and toxic materials	JV Introduction to ASSESSMENT 1 In class activities towards assessments: Finding CAS, VOCs, NPI and red list ingredients. In-class practice quiz (non-assessable) on course concepts and SDGs.	Student initiated group discussion about course materials.	
4	18 March	CT Introduction to environmental science within buildings. An introduction to the concepts of environmental science within buildings. Passive Cooling. Passive Heating. Maintaining Comfort. Ventilation. Insulation. Thermal Mass.	CT Background to ASSESSMENT 4. What is a room? Why is the Assessment based around my own room? How might I measure and draw my room? Details on ASSESSMENT 1	Student initiated group discussion about course materials.	
5	25 March	CT Thermal Comfort and Energy Efficiency. Thermal comfort and the effects of air conditioning on the built environment. How human behaviour within buildings effects energy efficiency. Climate zones Designing buildings in a warming climate.	CT Background to ASSESSMENT 4. Climate and its Effects on the Built Environment, including weathering.	Student initiated group discussion about course materials.	ASSESSMENT 1 Online Quiz (Construction Ecology Concepts) DUE Available from; 2pm 25 March to 11:55pm 31March Access via Assignments tab in Canvas
6	1 April	Public holiday, No classes on Monday 1 st April, recorded information will be provided on Canvas on categorising materials and using specification systems, NatSpec and CSI Masterformat.			
7	8 April	JV Climate Change impacts of construction materials Energy sources, Greenhouse gas emissions, Embodied Carbon and Life Cycle Analysis of Construction Materials	JV In class activities towards assessments: Calculating embodied carbon CT Feedback on ASSESSMENT 1 Construction Ecology Concepts Quiz.	Student initiated discussion about course materials.	MILESTONE 1 of Assessment 4 DUE 11:55pm: 11 April Access via Assignments tab in Canvas

Mid Semester Break from 15th of April to 26th of April					
8	29 April	CT Minimalism and the efficient use of Construction Materials. Reducing the amount of construction materials required for a building - building smaller and smarter. How Small a House? The Least Necessary House.	JV Introduction to ASSESSMENT 2. Building Material Database. Feedback on ASSESSMENT 4 milestone 1	Student initiated discussion about course materials.	
9	6 May	JV Construction waste and its impacts. Closing the loop: circular economy, recycling, reuse, salvage. Construction materials for permanence and temporality	JV In class activities towards assessments: Finding recycled content, waste minimisation opportunities, life expectancy and post-demolition options for materials	Discussion of ASSESSMENT 2. Building Material Database. Student initiated discussion about course materials.	
10	13 May	JV Green building rating systems and Building product eco-labels Decision making using Eco- labels. Thermal modelling, BASIX, NatHERS Biodiversity significance of wood & stone-chain of custody certifications	JV In class activities towards assessments: Finding and using eco-labels and certifications	Student initiated discussion about course materials.	ASSESSMENT 2 Online Activity (Building Material Database) DUE 11:55pm 17 May Access via Assignments tab in Canvas
11	20 May	CT Sustainability and Houses. How the size and location of where we live effects sustainability. The high cost of housing and its climate change effects. Reducing a reliance on space heating and cooling. Living more minimally.	CT Background to ASSESSMENT 4. Materials and sustainability: earth, timber, bricks, concrete Introduction of ASSESSMENT 3.	Student initiated discussion about course materials.	
12	27 May	NW Materials and sustainability Sustainability, defined in terms of social-ecological relationships, and the role buildings play in this relationship.	JV Windows and openings: what these critical parts of a building can offer and what they impact. Material options for openings.	Feedback on ASSESSMENT 2 Student initiated discussion about course materials.	ASSESSMENT 3 Online Quiz (Construction Materials and Sustainability) DUE Available from 2pm 27 May to 11:55pm 2 June Access via Assignments tab in Canvas
13	3 June	CT The effects of Globalism and Localism. The networked origins of construction materials. Where and how construction materials are sourced effects where and how we live in houses. Design and prefabrication	CT Background to ASSESSMENT 4. Justifying the selection of construction materials for a house Feedback on ASSESSMENT 3	Student initiated discussion about course materials. Discussion of ASSESSMENT 4.	
x	10 June				ASSESSMENT 4 Written Assignment (Decision Making Processes) DUE 11:55pm 12 June Access via Assignments tab in Canvas

ASSESSMENTS

This course has 4 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Online Quiz (Construction Ecology Concepts)	Open from 25 March at 2:00pm until 31 March at 11:55pm	Individual	15%	2, 3
2	Online Activity (Building Material Database)	17 May 2024 at 11:55pm	Individual	15%	1, 2, 3, 5
3	Online Quiz (Construction Materials and Sustainability)	Open from 27 May at 2:00pm until 2 June at 11:55pm	Individual	20%	1, 3
4	Written Assignment (Decision Making Processes)	Milestone 1: 11 April at 11:55pm			
		Milestone 2 (full assessment): 12 June 2024 at 11:55pm	Individual	50%	1, 2, 3, 4, 5

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.

Assessment 1 - Online Quiz (Construction Ecology Concepts)

Assessment Type

Quiz

Purpose

To assess the student's ability to identify the key definitions and concepts for selecting construction materials for sustainability, based on the lecture content and concept from the weeks leading up to the quiz.

Description

Online open-book multiple-choice quiz that involves the interpretation of text, images and graphs

Weighting

15%

Due Date

Open from 25 March at 2:00pm until 31 March at 11:55pm

Submission Method

Online. Accessed through the "Assessment 1" tab in Canvas

Assessment Criteria

1. Ability to identify key definitions and concepts for selecting building materials for environmental sustainability and health.
2. Ability to identify the key concepts of environmental science within the built environment.

Return Method

Online

Feedback Provided

In Class - Online at the completion of quiz, and discussed in class as indicated in the Schedule

Assessment 2 - Online Activity (Building Material Database)

Assessment Type

Online Learning Activity

Purpose

To contribute to a publicly available building materials database with product information required to fulfil with environmental compliance (such as the Living Building Challenge).

Description

Students select and locate information a real, currently available building product or material, which meets the criteria identified in Assessment 4. Students then provide research data on the product/material and associated environmental and health impacts.

Weighting

15%

Due Date

17 May 2024 at 11:55pm

Submission Method

Online. Accessed through the "Assessment 2" tab in Canvas

Assessment Criteria

1. Ability to use appropriate terminology to classify, describe and represent building materials.
2. Ability to identify current natural environment and human health implications caused by the harvesting, production and use of building materials

Return Method

Online

Feedback Provided

Online and group feedback discussed in class as indicated in the Schedule

Assessment 3 - Online Quiz (Construction Materials and Sustainability)

Assessment Type	Quiz
Purpose	To assess the student's ability to identify the key definitions and concepts for selecting construction materials for sustainability, based on the lecture content and concept from the weeks after assessment 1 and leading up to this quiz.
Description	Online open-book multiple-choice quiz that involves the interpretation of text, images and graphs.
Weighting	20%
Due Date	Open from 27 May at 2:00pm until 2 June at 11:55pm
Submission Method	Online
Assessment Criteria	1. Ability to identify key definitions and concepts for selecting building materials for environmental sustainability and health. 2. Ability to identify the key concepts of environmental science within the built environment.
Return Method	Online
Feedback Provided	In Class - Online at the completion of quiz, and discussed in class as indicated in the Schedule

Assessment 4 - Written Assignment (Decision Making Processes)

Assessment Type	Written Assignment		
Description	<p>To prepare a professional report that;</p> <p>Analyses the environmental context of a room you regularly occupy, describing and evaluating external environmental factors effecting the room such as; the climate, its aspect and dimensional properties, its prospect, usage, privacy and sociability.</p> <p>Describes and evaluates the construction materials used for the floor, walls, and ceiling / roof. Provides a well researched decision on whether these construction materials meet the room's usage, its climate, and the requirements of current environmental and health frameworks.</p> <p>Construction ecology is fundamentally defined by how the construction materials we specify and build with are related to the environment we take them from, and ultimately use them in. As professions involved in the making of built environments, we can't avoid the effect our decisions have on the earth's resources and ecological systems. Given a particular situation, perhaps these decisions are justified, or perhaps they're not - the difficulty is having enough information about the 'construction material' and the 'context it will be used in' to know which is which. This assessment asks you to evaluate a situation that you're involved with personally, to study the relationship you have with an environment you regularly occupy - a room within the house you live in. Understanding how we behave in an environment we use regularly and have some control over, and how the room itself effects our behaviour, is at the centre of this assessment.</p> <p>The external factors that effect your room provides its 'environmental context', while the 'construction materials' work in some way to control that external environment, making it a usable internal environment.</p> <p>Use the spreadsheet templates provided in this document to prepare a report. Depending on the 'house' that you live in, your room will need to be a living area - a study, a bedroom or the like is also OK, the choice is yours. The report is to be prepared in a professional way, providing a reasoned, evidenced and edited argument for explaining the suitability (or not) of the materials within your room</p>		
Weighting	50%		
Due Date	<table border="1"><tr><td>Milestone 1: 11 April 2024 at 11:55pm</td></tr><tr><td>Milestone 2 (full assessment): 12 June 2024 at 11:55pm</td></tr></table>	Milestone 1: 11 April 2024 at 11:55pm	Milestone 2 (full assessment): 12 June 2024 at 11:55pm
Milestone 1: 11 April 2024 at 11:55pm			
Milestone 2 (full assessment): 12 June 2024 at 11:55pm			
Submission Method	Online: Through "Assessment/Assessment 4" tab in Canvas		
Assessment Criteria	1.The Report utilises research to accurately identify the environmental context of the room. 2.The Report utilises research to accurately identify and document construction materials, classifying them based on the role within the construction system. 3.The Report summarises the ecological and health impacts for the Floor, Wall, Ceiling and Roof Construction materials. 4.The Report provides a well researched justification for why construction materials meet, or fail to meet, environmental and health requirements and criteria. 5.The Report is professionally communicated and well supported by appropriate referencing techniques		
Return Method	Online		
Feedback Provided	Online - Electronic feedback will be provided based on the assessment rubric.		

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).

Communication Methods

Communication methods used in this course include:

Course Evaluation

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.

Oral Interviews (Vivas)

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 [Oral Examination \(viva\) Procedure](#). 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 [Student Conduct Rule](#).

Academic Misconduct

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 <https://policies.newcastle.edu.au/document/view-current.php?id=35>.

Adverse Circumstances

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:

1. the assessment item is a major assessment item; or
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;
3. you are requesting a change of placement; or
4. the course has a compulsory attendance requirement.

Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at:

<https://policies.newcastle.edu.au/document/view-current.php?id=236>

Important Policy Information

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 <https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures> 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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