BLCN29005 *Building Information Modelling (BIM)*
Term 1 - 2023

All details in this unit profile for BLCN29005 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

General Information

Overview

The adoption of Building Information Modelling (BIM) that is developing into Building Lifecycle Management (BLM) within the built environment is an advanced and developing technology that offers significant productivity, technical and environmental benefits. Governments around the world have mandated BIM use in their projects and various Australian governments and commercial developers are adopting this practice. In this unit, you will develop fundamental BIM knowledge and competencies which are rapidly becoming a core requirement for design and construction professionals. You will learn about recent developments in a construction-related discipline and/or area of professional practice. You will develop your understanding of research principles and methods applicable to your field of work and learn skills (BIM visualisation, creation and maintenance) essential for the successful adoption and maintenance of BIM in the construction industry, especially in the context of construction management. The client's post-construction use of BIM will be critically studied.

Details

Career Level: *Postgraduate*
Unit Level: *Level 9*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites

Prerequisites: BLCN29001 Construction Technology BLCN29003 Construction Measurement AND BLCN29004 Construction Cost Planning
Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the [Assessment Policy and Procedure (Higher Education Coursework)](#).

Offerings For Term 1 - 2023

- Brisbane
- Perth

Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

Website

[This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.](#)

Class and Assessment Overview

Recommended Student Time Commitment
Each 6-credit Postgraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

Class Timetable

Regional Campuses

Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

Metropolitan Campuses

Adelaide, Brisbane, Melbourne, Perth, Sydney

Assessment Overview
1. **Written Assessment**
Weighting: 20%
2. **Written Assessment**
Weighting: 40%
3. **Practical Assessment**
Weighting: 40%

Assessment Grading
This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the University's Grades and Results Policy for more details of interim results and final grades.

CQUniversity Policies

All University policies are available on the CQUniversity Policy site.
You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the CQUniversity Policy site.

Previous Student Feedback

Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

Feedback from This document

Feedback

No previous data recorded as this was the first time the unit was presented.

Recommendation

At this stage no recommendation due to insufficient data.

Unit Learning Outcomes

On successful completion of this unit, you will be able to:

1. Critically analyse the development and function of Building Information Modelling and Building Life-cycle Modelling processes as related to contemporary construction practice and identify the affiliated professions in Building Information Modelling use and development
2. Apply advanced, creative, collaborative techniques and theoretical knowledge in Building Information Modelling and Building Life-cycle Modelling to optimise constructability and reduce the risk of errors
3. Apply theoretical and professional knowledge in Building Information Modelling and Building Life-cycle Modelling to design, plan and execute a substantial research-based project.

Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level	○ Introductory Level	○ Intermediate Level	○ Graduate Level	○ Professional Level	○ Advanced Level

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes		
	1	2	3
1 - Written Assessment - 20%	●	●	
2 - Practical Assessment - 40%			●

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes		
	1	2	3
1 - Knowledge	○	○	○
2 - Communication	○	○	○
3 - Cognitive, technical and creative skills	○	○	○

Graduate Attributes	Learning Outcomes		
	1	2	3
4 - Research	○	○	○
5 - Self-management			
6 - Ethical and Professional Responsibility	○	○	
7 - Leadership			
8 - Aboriginal and Torres Strait Islander Cultures			

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes							
	1	2	3	4	5	6	7	8
1 - Written Assessment - 20%	○	○	○	○				
2 - Written Assessment - 40%	○		○			○		
3 - Practical Assessment - 40%	○	○	○	○				

Textbooks and Resources

Textbooks

There are no required textbooks.

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Autodesk Revit 2023 (Educational Version downloaded for free from Autodesk.com)
- Autodesk Navisworks Manage 2023 (Educational Version downloaded for free from Autodesk.com)

Referencing Style

All submissions for this unit must use the referencing style: Harvard (author-date)
For further information, see the Assessment Tasks.

Teaching Contacts

Chamil Erik Ramanayaka Unit Coordinator
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Schedule

Week 1 - 06 Mar 2023

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to BIM and Revit		Work your way through the weekly materials as described below • Read Week 01 Lecture Notes • Participate in Week 01 Lecture • Complete Learning Activity 01 • Participate in Week 01 Tutorial Class By the end of this week, you will; • Learning objective 1: Define BIM as an information management methodology relying on digitalisation and collaboration. • Learning objective 2: Identify the power of BIM in 'I' – i.e., information. • Learning objective 3: Identify the merits of object-oriented and parametric modelling compared to traditional CAD drafting. • Learning objective 4: Explain Common Data Environment (CDE), and CDE's quality assurance requirements. • Learning objective 5: Identify the purpose of BIM standards.

Week 2 - 13 Mar 2023

Module/Topic	Chapter	Events and Submissions/Topic

Module/Topic	Chapter	Events and Submissions/Topic
BIM uses and deliverables over the project life cycle and Revit parameters and applications		Work your way through the weekly materials as described below; • Read Week 02 Lecture Notes • Watch Week 02 Lecture • Complete Learning Activity 01 • Participate in Week 02 Tutorial Class • Respond to Moodle threads You will achieve the following learning objectives: Objective1. Identify BIM uses over the project life-cycle Objective2. Describe potential value from each BIM use and the challenges to implementing them in a project environment Objective3. Align BIM potential uses with project management objectives and describe how a project team decides to implement a BIM use in a project Objective4. Explain the concept of Level of Development (LOD)

Week 3 - 20 Mar 2023

Module/Topic	Chapter	Events and Submissions/Topic

Module/Topic	Chapter	Events and Submissions/Topic
Interoperability issues and solutions including Industry Foundation Classes (IFC) and Modelling parametric objects using Revit		Work your way through the weekly materials as described below; • Discuss Task 1 and 2 of Week 2 (from the lecture) answers with your lecturer during the lecture • Read Week 03 Lecture Notes • Participate/Watch Week 03 Lecture • Participate in Week 03 Tutorial Class • Respond to Moodle threads created by the end of the week You will achieve the following learning objectives: Objective 01. Define interoperability and identify its consequences for BIM implementation Objective 02. Discuss solutions to interoperability, including non-proprietary, neutral data formats Objective 03. Learn to create Revit families

Week 4 - 27 Mar 2023

Module/Topic	Chapter	Events and Submissions/Topic

Module/Topic	Chapter	Events and Submissions/Topic
Defining and cascading Employer's Information Requirements (EIR) using ISO 19650 fundamentals and Performance-based design using Revi		Work your way through the weekly materials as described below; • Download a copy of AS ISO 19650 – Part 1 (2019) from the CQU Library • Read Week 04 Lecture Notes • Participate/Watch Week 04 Lecture • Participate in Week 04 Tutorial Class • Respond to Moodle threads and Learning Activities created by the end of the week You will achieve the following learning objectives: Objective 01. Identify why ISO 19650 standards are important for BIM implementation Objective 02. Be familiar with OIR, AIR, PIR and EIR Objective 03. Identify how the appointing party cascades OIRs down the supply chain Objective 04. Explain how design performance could be enhanced in design authoring through model-based collaboration

Week 5 - 03 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic

Module/Topic	Chapter	Events and Submissions/Topic
Roles and responsibilities of the client and the supply chain under BIM implementation and Introduction to Navisworks: Federated model		Work your way through the weekly materials as described below; • Download a copy of AS ISO 19650 – Part 2 (2019) from the CQU Library • Read Week 05 Lecture Notes • Participate/Watch Week 05 Lecture • Participate in Week 05 Tutorial Class • Respond to Moodle threads and Learning Activities created by the end of the week You will achieve the following learning objectives: Lecture Objective 01. Identify OIR, AIR and PIR with respect to a practical scenario Objective 02. Explain the information management process using ISO 19650: Part 1 Objective 03. Recognise the generic structure of a BIM team Objective 04. Explain the activities associated with the information management process in the delivery phase using ISO 19650: Part 2 Tutorial Objective 01. Be familiar with the Navisworks Manage 2023 interface Objective 02. Learn to create a federated model Objective 03. Identify Navisworks file types and their applications Objective 04. Learn basic Navisworks skills – such as navigating through a model, selection tree, and creating sets **Assessment 1 (Research -based)** Due: Week 5 Friday (7 Apr 2023) 11:59 pm AEST

Vacation Week - 10 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic
		ASSESSMENT 1 - DUE

Week 6 - 17 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic
Quality assurance in the Common Data Environment (CDE) and design review and validation using Navisworks		Work your way through the weekly materials as described below; • Read Week 06 Lecture Notes • Participate/Watch Week 06 Lecture • Participate in Week 06 Tutorial Class • Respond to Moodle threads and Learning Activities created by the end of the week • Refer to additional reading to enhance your knowledge of ISO 19650: Part 2 implementation You will achieve the following learning objectives: Lecture Objective 01. Enhance student's understanding of CDE Objective 02. Understand the need for a federation strategy Objective 03. Explain the importance of naming conventions for information containers Objective 04. Explain the necessity of metadata in document management Tutorial Objective 01. Master Navisworks navigation skills Objective 02. Understand and use Selection Tree efficiently Objective 03. Know Navisworks Selection Resolutions and the effect on Navisworks parameters Objective 04. Create selection and search sets and know the difference between them Objective 05. Use 'Review' and 'Find Items' to check design compliance

Week 7 - 24 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic

Module/Topic	Chapter	Events and Submissions/Topic
BIM Execution Plan: Part 1 and 4D BIM		Work your way through the weekly materials as described below; • Read Week 07 Lecture Notes • Participate/Watch Week 07 Lecture • Participate in Week 07 Tutorial Class • Respond to Moodle threads and Learning Activities created by the end of the week • Refer to additional reading to enhance your knowledge of ISO 19650: Part 2 implementation You will achieve the following learning objectives: Lecture Objective 01. Explain the requirement of a BIM Execution Plan (BEP) Objective 02. Understand the process of creating BEP Objective 03. Understand the content of BEP Tutorial Objective 01. Understand the benefits and limitations of 4D modelling compared to other project planning software applications (MS Project) Objective 02. Use Revit Phases to communicate a design effectively Objective 03. Use Revit Phases for cost-driven decision making Objective 04. Use Navisworks Timeliner tools to create 4D models including planned, and planned versus actual simulations

Week 8 - 01 May 2023

Module/Topic	Chapter	Events and Submissions/Topic

Module/Topic	Chapter	Events and Submissions/Topic
BIM Execution Plan: Part 2 and Clash Detective		Work your way through the weekly materials as described below; • Read Week 08 Lecture Notes • Participate/Watch Week 08 Lecture • Participate in Week 08 Tutorial Class You will achieve the following learning objectives: Lecture Objective 01. Develop information exchanges Objective 02. Define supporting infrastructure for BIM implementation Objective 03. Learn Fundamental Principles of information container-based collaborative working Objective 04. Know Delivery team capability and capacity Objective 05. Understand Responsibility matrix, Task Information Delivery Plans (TIDPs) and Master Information Delivery Plan (MIDP) Tutorial You will learn: Objective 01. How to avoid clashes proactively Objective 02. Interference check while authoring design models Objective 03. Navisworks Manage Clash Detective Objective 04. Why practical considerations are critical for designing clash-detection tests Objective 05. Detailed process map for clash detection

Week 9 - 08 May 2023

Module/Topic	Chapter	Events and Submissions/Topic

Module/Topic	Chapter	Events and Submissions/Topic
Guest lecture (Topic to be announced) and Use of Visio for BIM process mapping		Work your way through the weekly materials as described below; • Read Week 09 Guest Lecture Notes • Participate/Watch Week 09 Guest Lecture • Participate in Week 09 Tutorial Class • Respond to Moodle threads and Learning Activities created by the end of the week You will achieve the following learning objectives: Objective1. Develop our Visio skills to develop BIM process maps Objective2. Develop a Timeliner-integrated Clash Detective using Navisworks Manage to minimise clashes among MEP work packages Objective 3. Understand the practical applications of BIM in the Australian Construction Industry

Week 10 - 15 May 2023

Module/Topic	Chapter	Events and Submissions/Topic

Module/Topic	Chapter	Events and Submissions/Topic
Construction Operations Building Information Exchange (COBie) and Preparing a COBie output		ASSESSMENT 2 - DUE Work your way through the weekly materials as described below; • Read Week 10 Lecture Notes • Participate/Watch Week 10 Lecture • Participate in Week 10 Tutorial Class • Respond to Moodle threads and Learning Activities created by the end of the week You will achieve the following learning objectives: Lecture: Objective1. Understand COBie data schema Objective2. Understand COBie's business value to clients, asset managers and facilities managers Objective3. Understand COBie process Tutorial: Objective 1: Learn to use design authoring tools to produce a COBie outcome **Assessment 2 (ONLINE QUIZ)** Due: Week 10 Friday (19 May 2023) 11:59 pm AEST

Week 11 - 22 May 2023

Module/Topic	Chapter	Events and Submissions/Topic

Module/Topic	Chapter	Events and Submissions/Topic
Integrated Project Delivery (IPD) and 5D BIM		Work your way through the weekly materials as described below; • Read Week 11 Lecture Notes • Participate/Watch Week 11 Lecture • Participate in Week 11 Tutorial Class You will achieve the following learning objectives: Lecture Objective1. Understand contract arrangements facilitating collaborative BIM Objective2. Define IPD and its key values Tutorial Objective1. Understand 5D BIM Objective2. Practice Navisworks Quantification for automatic extraction of quantities

Week 12 - 29 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
Revision and assessment support (practical assessment)		ASSESSMENT 3 - DUE Work your way through the weekly materials as described below; • Watch Week 12 Lecture • Participate in Week 12 Tutorial Class You will achieve the following learning objectives: Objective (Lecture): Summarise the learning outcomes of the semester Objective (Tutorial): Get assistance with Assessment 03 issues **ASSSESSMENT 3 (PRACTICAL)** Due: Week 12 Friday (2 June 2023) 11:59 pm AEST

Review/Exam Week - 05 Jun 2023

Module/Topic	Chapter	Events and Submissions/Topic

Exam Week - 12 Jun 2023

Module/Topic	Chapter	Events and Submissions/Topic

It is expected that students will attend each tutorial class in the designated labs.

It is recommended to have the educational versions of the following software applications from: [Autodesk Education & Student Access | Autodesk](#)
The educational versions are free:
Autodesk Revit 2023
Autodesk Navisworks Manage 2023

Assessment Tasks

1 Assessment 1 (Research -based)

Assessment Type
Written Assessment

Task Description
Assessment 1 is a group assessment, and a group could consist of members up to 04.
Assessment 1 evaluates students' knowledge and skills in digitising and managing information related to construction projects using BIM. In addition to the first four topics (Week 1-4) discussed in the lecture, students will undertake substantial research to complete Assessment 1. Students will refer to a given Scenario and identify the project and asset management objectives. After that, students will identify Organisational Information Requirements (OIRs) to pursue the identified project and asset management objectives. Students will demonstrate how OIRs are cascaded down the supply chain and how PIM (Project Information Model) and AIM (Asset Information Model) are delivered by the supply chain to fulfil OIRs. Students will align BIM uses with the information requirements and discuss challenges project stakeholders face under BIM implementation from information management perspectives.

Assessment Due Date
Week 5 Friday (7 Apr 2023) 11:59 pm AEST
Submission must be via Turnitin

Return Date to Students
Week 7 Friday (28 Apr 2023)
Via Moodle

Weighting
20%

Assessment Criteria
SEE MODLE FOR DETAILS

Referencing Style

- [Harvard (author-date)](#)

Submission
Online Group

Submission Instructions
One submission per group

Learning Outcomes Assessed

- Critically analyse the development and function of Building Information Modelling and Building Life-cycle Modelling processes as related to contemporary construction practice and identify the affiliated professions in Building Information Modelling use and development
- Apply advanced, creative, collaborative techniques and theoretical knowledge in Building Information Modelling and Building Life-cycle Modelling to optimise constructability and reduce the risk of errors

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills

- Research

2 Assessment 2 (ONLINE QUIZ)

Assessment Type
Written Assessment

Task Description
Assessment 2 evaluates students' knowledge and skills about theoretical aspects and practical considerations of BIM. This online test will consist of multiple choices and short written responses. The questions are from the lecture contents from Week 5 to Week 11. Students will require a substantial understanding of ISO19650 and available Australian BIM implementation protocols. The quiz will focus on the following areas:

1. the roles and responsibilities of the client and the supply chain to manage information using the Common Data Environment (CDE)
2. Students' knowledge of CDE and skills in managing practical issues under CDE implementation)
3. Theoretical and practical aspects of a BIM Execution Plan (BXP)
4. Construction Operations Building Information Exchange (COBie)

Assessment Due Date
Week 10 Friday (19 May 2023) 11:59 pm AEST
Completion via Moodle

Return Date to Students
Week 10 Friday (19 May 2023)
Via Moodle

Weighting
40%

Assessment Criteria
SEE MOODLE FOR DETAILS

Referencing Style

- [Harvard (author-date)](#)

Submission
Online

Graduate Attributes

- Knowledge
- Cognitive, technical and creative skills
- Ethical and Professional Responsibility

3 ASSSESSMENT 3 (PRACTICAL)

Assessment Type
Practical Assessment

Task Description
Assessment 3 evaluates knowledge of BIM and software skills concerning the delivery stage of construction projects. In addition to software skills gained from the tutorials, students will undertake research to complete this assessment. Students will use Autodesk Revit (2023) and Autodesk Navisworks (2023) to illustrate their skills on design changes, 3D coordination and 4D (time integration) and 5D (cost integration) modelling. In addition to digital skill development, it is expected that students will understand the benefits and challenges of BIM compared to traditional project delivery.

Assessment Due Date
Week 12 Friday (2 June 2023) 11:59 pm AEST
Submission must be via Turnitin

Return Date to Students
Review/Exam Week Friday (9 June 2023)
Via Moodle

Weighting
40%

Assessment Criteria
SEE MOODLE FOR DETAILS

Referencing Style

- Harvard (author-date)

Submission
Online

Learning Outcomes Assessed

- Apply theoretical and professional knowledge in Building Information Modelling and Building Life-cycle Modelling to design, plan and execute a substantial research-based project.

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research

Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the **Student Academic Integrity Policy and Procedure**. This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

What is a breach of academic integrity?
A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

Why is academic integrity important?
A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

Where can I get assistance?
For academic advice and guidance, the Academic Learning Centre (ALC) can support you in becoming confident in completing assessments with integrity and of high standard.

What can you do to act with integrity?

Be Honest
If your assessment task is done by someone else, it would be dishonest of you to claim it as your own

Seek Help
If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)

Produce Original Work
Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem