



**London
South Bank
University**

EST 1892

Module Guide

3D CAD and
Building Information Modelling

EBB-5-160

School of the Built Environment and
Architecture

Level 5

Become what you want to be

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1. MODULE DETAILS

Module Title:	3D CAD & Building Information Modelling
Module Level:	5
Module Reference Number:	EBB-5-160
Credit Value:	20
Student Study Hours:	75
Contact Hours:	45
Private Study Hours:	80
Pre-requisite Learning (If applicable):	Construction Practice
Co-requisite Modules (If applicable):	None
Course(s):	BSc Architectural Technology
Year and Semester	2019-20 Semester 2
Module Coordinator:	Daniel Fong
MC Contact Details (Tel, Email, Room)	Tel: 020 7815 7288 room T504, fongd@lsbu.ac.uk
Teaching Team & Contact Details (If applicable):	
Subject Area:	Construction, Property & Surveying
Summary of Assessment Method:	Coursework, Project
External Examiner appointed for module:	Paul Laycock Programme leader – Design and Surveying Birmingham City University

2. SHORT DESCRIPTION

This module builds on the parametric CAD fundamentals covered at level 4 and further develop students a greater understanding of the use of computers in architectural design practices. The module also seeks to develop the students' 3D modelling abilities and help create an awareness of the latest computer modelling and visualisation tools.

3. AIMS OF THE MODULE

The aim of the module is to develop the students' computer based 3D modelling abilities for the generation of construction and architectural drawings.

4. LEARNING OUTCOMES

4.1 Knowledge and Understanding

Knowledge of 3D modelling concepts in CAD

Knowledge of Building Information Models (BIM) and the development of BIM with parametric CAD systems

Understanding of the use of software to produce realistic visualisation and animation on computer

4.2 Intellectual Skills

Ability to select appropriate approach and techniques in developing a building model

4.3 Practical Skills

Design in 3D on a parametric CAD system

Render scenes with appropriate materials and lighting techniques

Produce animations of flythrough
Enhance realism by photo-editing an image

4.4 Transferable Skills

Managing and developing self
Communication
Managing tasks and solving problems
Applying numeracy
Applying technology

5. ASSESSMENT OF THE MODULE

This study is assessed one coursework and an individual project.

	% of Module	Deadline	Feedback
1st Coursework: Report	50%	13 Mar 20	8 Apr 20
2nd Project: Building model	50%	15 May 20	5 Jun 20

An overall module mark of 40% is required to pass the module.

Late Submission

Late submission policy states late work will either be:

- i) Capped to 40% if submitted within 2 weeks of the original deadline; or
- ii) 0% if more than 2 weeks late.

You may submit extenuating circumstances claim for your late submission if you meet the criteria. See **Extenuating Circumstances** at <https://my.lsbu.ac.uk/page/regulations> If your claim is supported, no capping of marks will be applied, and where the submitted work is incomplete the Examination Board may grant a deferral and allow you to attempt the referral with mark uncapped. If your claim is not supported, the late submission policy will apply.

Referral / Deferral

The referral / deferral attempt will take place in summer 2020.

6. FEEDBACK

Feedback on assignment will be made in class 15 working days after the deadline for submissions made on time.

7. INTRODUCTION TO STUDYING THE MODULE

7.1 Overview of the Main Content

Students will be introduced to the concepts of modelling buildings in 3D, Building Information Modelling (BIM), rendering and animation of 3D models, photo-editing of images.

7.2 Overview of Types of Classes

The learning process in this module of study is based on lectures and in-class exercises. Attendance in classes and regular practice outside scheduled hours are keys to learning the concepts and developing the software competence effectively. The contact time will be spent mainly on computer lab exploring procedures and techniques involved in modelling various elements of buildings. Time will also be given on providing assessment feedback.

7.3 Importance of Student Self-Managed Learning Time

Student responsibility in the learning and development process will be emphasised. Students are required to undertake directed self-study and prepare solutions/discussions to questions relative to various topic areas. Students will be encouraged to identify for themselves particular problems of difficulty and to use seminar discussions, where appropriate, for the resolution of these. Students must regularly access the Moodle site for this module. They should download the class/lecture material from the Moodle site, and do the seminar exercises and complete the recommended reading, before each lecture/class, in order to derive maximum benefit from seminar time. The programme of teaching, learning and assessment gives guidance on the textbook reading required for each week, the purpose of which is to encourage further reading both on and around the topic.

7.4 Employability

Practical skills of the software and knowledge of Building Information Modelling are much sought after by employers at present and graduates in the architecture related fields are expected to demonstrate competency in the area.

8. THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT

SEMESTER 2			
WEEK	TOPIC	READING (CORE TEXT)	TEACHING STAFF
1	Module introduction. Concepts of BIM	Handout	Daniel Fong
2	BIM case studies, Coursework preparation	Handout	Daniel Fong
3	Further concepts of BIM	Handout	Daniel Fong
4	Introducing Revit & design principles	Handout	Daniel Fong
5	Revit exercise	Handout	Daniel Fong
6	Revit exercise	Handout	Daniel Fong
7	Revit exercise. Coursework 1 deadline (BIM report)	Handout	Daniel Fong
8	Revit exercise	Handout	Daniel Fong
9	Photomerge using Photoshop	Handout	Daniel Fong
10	Walkthrough in Revit and Lumion demo	Handout, Lumion demo	Daniel Fong
Easter vacation			
11	4D animation in Navisworks	Handout	Daniel Fong
12	Massing	Handout	Daniel Fong
13	Coursework 2 deadline (Revit Project) . Tutorial		Daniel Fong

9. STUDENT EVALUATION

A link to the module evaluation questionnaire will be available on Moodle towards the end of the semester. Your feedback is valuable to us and will help improve the module in the future.

10. LEARNING RESOURCES

10.1 Core Materials

Kirby, L., Krygiel, E., Kim, M. (2017) Mastering Autodesk Revit Architecture 2018, Autodesk Official Press, Wiley.

Wing, E. (2016) Autodesk Revit Architecture 2017: no experience required, Sybex.

Duell, R., Hathorn, T., Hathorn, T.R. (2015) Autodesk Revit Architecture 2016 Essentials, Autodesk Official Press, Sybex.

Eastman, C., Teicholz, P., Sacks, R., Liston, K. (2011) BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors, John Wiley & Sons (also e-book).

10.2 Optional Materials

Deutsch, R. (2011) BIM and Integrated Design: Strategies for Architectural Practice, Wiley.

Race, S. (2013) BIM demystified : an architect's guide to Building Information Modelling/Management (BIM), RIBA.

BIM+, Chartered Institute of Building, <http://www.bimplus.co.uk/>

The BIM hub <http://thebimhub.com>

10.3 Reading List

<http://readinglists.lsbu.ac.uk/lists/7E46C612-DDB8-29CB-3230-5821536D489E.html>

10.4 Library and Learning Resources (LLR)

Finding and referencing research material

Students are encouraged to make use of the academic resources to support their research. There is a list of resources, including Technical Indexes, British Standards Online, Business Source Complete and Science Direct on the Library subject support page for your subject area on MyLSBU.

Find your subject guide here <https://libguides.lsbu.ac.uk/subjects/home>

They can be accessed 24/7 from any location with your LSBU password and user name.

Support for students:

- Please use this address for all subject related library enquiries: askalibrarian@lsbu.ac.uk
- Students can book appointments lasting up to 30 minutes with an Information Skills Librarian. These will be available between:

Monday-Wednesday 9-12pm
Thursday 2-5pm
Friday 9-12pm

If you need help quickly, visit our drop-in Research Help Desk located on Level 3 Bridge in the Perry Library (open Monday-Friday 12:00-16:00 term time)

Students IT support

The main student IT support desk is in the Perry Library on Level 1 East. For online IT support including passwords please go to <https://libguides.lsbu.ac.uk/studentitsupport>

For direct help please contact llr-ithelpdesk@lsbu.ac.uk

NOTES

1. **How to download Revit for free**

You are expected to work on Revit on a weekly basis and are strongly advised to install the software on your homePC/laptop. To download free software, you need to first create a student account with Education Community in Autodesk:

1. Go to www.autodesk.com/education/home
2. Pick **Free software** from the list on the left.
3. Click on the **Revit** icon in the middle of the screen.
4. Select **CREATE ACCOUNT >** and fill in your details on the form.
*** You need to make a note of the email address and password entered as activation code will be emailed to you by Autodesk ***

Once registered, sign in and follow the instructions on screen to download the same version in use at LSBU. Check if your computer meets the minimum system requirements before installing. **You will need to activate the software within one month of installing the software.**

2. **Where can you find Revit installed on campus**

The following computer labs have Revit installed:

- T806, T807, B151, B153, B251, B253, B350, E258

11. COURSEWORK 1

Contribution to Module: 50%

All submissions must be submitted via Moodle by 11pm on due date.

Due date: 13th Mar 20

Select a high-rise building project in UK suitable for implementing a Building Information Modelling (BIM) system. The building project should have adequate media coverage on its nature, background, design characteristics, any Client requirements, and information on its project team.

You have been appointed by the Client as the BIM manager for this high-rise building project. Prepare a report on proposing a BIM system for the design and the delivery of the building project, The report should contain no more than 2,500 words, excluding References and Appendix.

No reference should be made to the BIM software used in the real project. You are expected to consider the project as if it had not commenced.

All research should be based on desktop literature review without contacting the companies involved in the building project or the owner/occupiers.

Coursework 1 Marking Scheme

	%
Literature research into background of the building project	15
Mission of the BIM system for the building project	10
Survey and compare BIM software available to every professional discipline in the building project	25
Appraise similar BIM cases (no mark will be given to cases used in-class)	15
Describe a feasible BIM system for the building project and discuss its advantages	25
Presentation - the work should be word-processed and professionally presented with the use of Harvard referencing. An executive summary and an appendix is recommended.	10
TOTAL:	100%

12. Coursework 2

Contribution to Module: 50%

Due dates: 15th May 20

All submissions must be submitted via Moodle by 11pm on the due dates.

Project Brief

Select a building for modelling. Visit the site in order to make a visual study of the elevation of the building. **This must be done from the street without disturbing the occupiers or users of the property.**

The building should be at least five storeys high and should be located in a position on the street such that photographs of the entire building could be taken. Consult your tutor if you are unsure of its suitability.

- Capture adequate high quality, coloured photographs enough to cover the exterior of the entire **building from various angles**.
- Capture high quality, coloured photographs of **architectural details** of the building exterior.
- Estimate all measurements of the building and its elements, or obtain them from the architect of the building project.
- Produce a 3D parametric model of the building in Revit including the roof. The model should also include some hypothetical internal structures and fixtures such as floors and doors.
- Produce rendering of at least two different perspective views of your 3D elevation.
- Create a photomerge in Photoshop for every rendered image with the streetscape.
- Produce A2-sized colour poster(s) (in PDF format) contrasting the original photos and the corresponding photomerges for every perspective view.
- Create a walkthrough video that navigates round the entire exterior of the building, as well as the travelling into the ground floor space and going up the steps onto the first floor. The video must be a standalone file, not embedded within Revit.

Submission

Photos of the building and close-up of its architectural elements individually

Full address of building

One Revit 2020 (or earlier version) file. If more than one submitted, only the first one will be read.

Photos of any material/texture used

Revit family files created

Images of rendered building

A2-sized poster(s) of the photomerge comparisons in PDF

One walkthrough video file (no mark will be given to embedded walkthrough in Revit)

Make sure all the files are readable and the combined file size **does not exceed 50MB**. No mark will be given to files which cannot be opened, sent by email, or linked to external depository.

Coursework 2 Marking Scheme

	%
Accuracy of building address. Adequacy and quality of photographs of building	10
Ability to develop 3D parametric models	20
Dimensional accuracy of model based on survey	5
Completeness of building details	15
Complexity of subject chosen	15
Assigning of material colours and textures	5
Rendering with correct lighting effect	10
Photomerge - perspectives, colour retouching, composition	10
Walkthrough video	10