Module Definition Form (MDF)

Module code: MOD008411	**Version:** 2 **Date Amended:** 24/Jun/2024

1. Module Title
Technology B1 (Architecture)

2a. Module Leader
Graham Terry

2b. School
School of Engineering and the Built Environment at Anglia Ruskin University

2c. Faculty
Faculty of Science and Engineering

3a. Level
5

3b. Module Type
Standard (fine graded)

4a. Credits
15

4b. Study Hours
150

5. Restrictions

Type	Module Code	Module Name	Condition
Pre-requisites:	None		
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:	BA (Hons) Architecture		

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

This module will help you understand the principles of climate science so that you can make informed and responsible decisions to actions and inaction that may affect this issue.You will also be given an insight into application of sustainable strategies in the design process to achieve thermal and energy efficiency, which will provide the Technology related knowledge to support Design Studio B1 (Architecture).

Environmental performance and sustainability are central in this module. The module is designed to develop understanding of the impact the building sector has on the environment, in the context of such as sustainable development goals and the key legislation, regulations and policies in respect of the climate and ecological crisis. The module introduces the environmental science relating to temperature, humidity, sound and lighting and the principles of human comfort and indoor air quality in relation to energy use. Design strategies to minimise the environmental impact such as, Fabric First, design to achieve net-zero buildings, Passive design techniques for energy efficiency are also introduced.

The module introduces sustainable and low energy design solutions to design problems. Both the passive and active design features for energy efficiency are explored and exploited to produce an environmentally friendly building design and the use of onsite renewable energy generation or further offsetting to achieve decarbonisation will be explored. The following passive strategies are introduced: solar gains and orientation; natural lighting; natural ventilation; natural cooling and circulation. Whilst the following active design strategies and renewable technologies to optimised energy performance in buildings are introduced: solar thermal collectors; photovoltaics; wind energy; mechanical systems; efficient lighting.

The module also introduces to the different approaches to create 3D Geometry and designing building forms in a BIM environment. Once the design is finalised you are showed how to generate integrated models which allows you to perform Solar Radiation Analysis, Daylight Analysis. You are also shown how to improve visualization to communicate virtual design features with clients by showcasing how they look in real life; and by being able to produce adequate detailed designs to allow for airtightness and thermal integrity.

6b. Outline Content

Knowledge and Understanding

- Sustainability and key legislation, regulations and policies in respect of the climate and ecological crisis
- Principles of climate science: evaluate the outdoor climate and effect of the building site.
- Evaluate the indoor thermal climate (temperature, humidity, sound and lighting)
- Evaluate human comfort in relation to energy use
- Evaluate air control in buildings: air supplies; humidity; condensation.
- Carry out basic heat transfer calculations in order to find the thermal resistance and transmittance (U-value).
- Design strategies to minimise the environmental impact such as Fabric First, Passivhaus design, design to achieve net-zero buildings.
- Use of onsite renewable energy generation or further offsetting to achieve decarbonisation.
- Passive strategies are introduced: solar gains and orientation; natural lighting; natural ventilation; natural cooling and circulation.
- Active design strategies to optimise energy performance in buildings are introduced: solar thermal collectors; photovoltaics; wind energy; mechanical systems; efficient lighting.
- Radiation analysis.
- Daylight Analysis.

Skills based:

- Use, set up and control the user interface and working environments on BIM software
- Design development - create and edit walls, doors, windows, stairs, railings, roofs and spaces
- Using external references and inserting 2D and 3D objects from software libraries
- Creating sun path and inserting lightings
- Be able to produce adequate detailed designs to allow for airtightness and thermal integrity
- Generation of dimensions, elevations and the preparation of drawing schedules
- Control the display and plotting environments
- Creating Photorealistic Architectural Rendering
- Working in a collaborative BIM environment to design, simulate, and visualize a project
- Professionally communicate design options through a variety of reporting and visualization strategies.

6c. Key Texts/Literature

The reading list to support this module is available at: https://readinglists.aru.ac.uk/

6d. Specialist Learning Resources

LinkedIn Learning

7. Learning Outcomes (threshold standards)		
No.	**Type**	**On successful completion of this module the student will be expected to be able to:**
1	Knowledge and Understanding	Integrate aspects of environmentally sustainable and responsible architecture with low energy design solutions through both the passive and active design features for energy efficiency.
2	Knowledge and Understanding	Analyse and evaluate building environmental performance.
3	Intellectual, practical, affective and transferrable skills	Create, manipulate and present 3D digital BIM sustainable and responsible architecture object-oriented design methods.
4	Intellectual, practical, affective and transferrable skills	Professionally communicate a design project, with a clear environmental strategy through a variety of reporting and visualization strategies.

8a. Module Occurrence to which this MDF Refers				
Year	**Occurrence**	**Period**	**Location**	**Mode of Delivery**
2025/6	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	**Hours**	**Learning Outcomes**	**Details of Duration, frequency and other comments**
Lectures	12	1-2	1 hours per week
Other teacher managed learning	12	2-4	1 hours per week. Computer lab-based teaching Plus, students are expected to take part in two, one day “crits” in the studio timetabled concurrently with their design module.
Student managed learning	126	1-4	Private study
TOTAL:	150		

9. Assessment for the above Module Occurrence					
Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
010	Coursework	1-4	100 (%)	Fine Grade	40 (%)
Individual report maximum 2400 words					

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:
(a) achieve the qualifying mark for each element of fine graded assessment as specified above
(b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]