Module Specification

Crafting Systems

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Contents

Part 1: Information

Module title: Crafting Systems

Module code: UBLLX1-15-M

Level: Level 7

For implementation from: 2024-25

UWE credit rating: 15

ECTS credit rating: 7.5

College: College of Arts, Technology and Environment

School: CATE School of Architecture and Environment

Partner institutions: None

Field: Architecture and the Built Environment

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module is set up to introduce students to the innovative and creative methods that computational design offers responsible architecture. Designers can find innovative solutions by codifying biological and mathematical data to generate a design, namely biomimicry. Generative design enables designers to reach optimal solutions that consider large data sets. Making good design decisions early on can have a significant impact later in the project. As architecture continues to integrate new digital technologies, generative design tools play a vital role in practice. These platforms generate optimal solutions by considering complex data concurrently, including structural design, environmental strategies, social cohesion, and well-being.

Students are encouraged to run fabrication experiments using form-finding methods, material testing, embedded smart materials and intelligent systems, and automated fabrication in this module. The central focus is digital crafting at the interior architecture and building system scale. The module is a studio-based module introducing students to design research. The students are instructed to work in small teams collaboratively investigating and developing an artefact. In response to a design brief, the teams are invited to develop a proposition for an architectural system. The studio-based module will include a theoretical seminar-workshop focused on the ultimate project's theoretical and academic background. The theoretical investigation and the brief will be defined by the teaching team research and practice, and current events while complementing seminars in other modules.

Features: The module requires teamwork and is assessed by the submission of group project work that is assessed as a single output (where one mark is determined for the project, and all group-members involved in that project receive that mark).

Educational aims: Collectively identify, select, and implement appropriate algorithms and fabrication methods to respond to design challenges.

Investigate and distil theories underpinning generative design.

Develop a practice design skill in computational design at a human and building scale.

Research a system or method, investigate a hypothesis, experiment, and validate the chosen solution.

Practice team-working skills in the development of a proposition for the design of an architectural system.

Develop digital craft skills and curation by communicating with digital fabrication machines and automated construction systems.

Effectively communicate the synthesis of a complex data set in verbal, written, graphical and fabricated media.

Outline syllabus: The module runs as a short, intense 4-weeks architecture studio, with advanced skills lab-based programming and fabrication tuitions, a theoretical thread introducing students to biomimicry in computational design and representation, and an overview of architectural computation design research and practice.

As a design studio, students will be invited to team up in groups of 2-4 students responding to their first given brief. The teaching team will determine the topic and context for the brief (in terms of the subjects for investigation and the design tasks undertaken) at the start of each academic session in response to current national and international agendas and the research and practice interests and specialisms of the teaching team and the department. Every week, the studio will be supported with a full day of desk crits for each group, enabling the team through their self-directed investigation.

The historical, theoretical, and critical understanding of form-finding, architectural systems, along with biomimicry theories and models, will be delivered as lectures and seminars . The lectures and readings focus on various system design theories. The students are invited to read and distil seminal texts to be discussed in the seminar sessions. Collaboratively distilling theory and designing an algorithm in an analogue (non-computational) exercise as part of the team's design process, and formatively assessed in presentation format. This milestone allows an interim review within a fast-paced studio.

Summative: Each team submits one comprehensive submission incorporating the theoretical process into the design proposal, represented in drawings and physical models. The deliverables should include experimentation and validation methods underpinned by seminal research and theoretical hypothesis.

Part 3: Teaching and learning methods

Teaching and learning methods: 1.An advanced architectural studio:
The module is conducted predominantly by self-directed teamwork. Teaching is provided as expert tutorial advice providing insight on appropriate computational methods, fabrication techniques, modelling, structural design and construction management. These advisory tutorials are programmed to support the student-teams' process of design development. This teaching is understood as a form of expert consultancy provided in support of each team's testing and development process.
2.Lab-based practical skills:
The practical lectures, exercises, and primer project are designed to facilitate competency acquisition through applied and indirect learning, building knowledge by introducing the new subjects and gained coding and scripting skills.
3.Lecture-based, seminar discourse, and self-directed study:
This track enables students to support their independent learning by exploring more profound computation design issues and receiving feedback. Students are exposed to the long track of computational design accumulated during the past two decades and are encouraged to build on that body of work. The introduction of analogue logic exercises and the invitation to abstract the process into visual representation allows students with non-design and design background to understand and communicate complex information

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Develop a computational algorithm that demonstrates a system level understanding of a design problem; and defines a clear assembly logic, generates design variations, evaluates performances, and optimises solutions.

MO2 Reflect critically upon ethical issues and identify an enquiry-based exploration in response to a given brief using relevant computational to develop models that respond to changing design parameters and defined constraints.

MO3 Generate high quality visualisations and physical models to demonstrate the technical understanding of complex architectural designs that respond to specific parameters and constraints by utilising appropriate fabrication methods.

MO4 Communicate a well curated design proposal with key theoretical concepts, computational processes, fabrication methods, and critically reflect on the design process.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 120 hours

Studio sessions = 30 hours

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://rl.talis.com/3/uwe/lists/AE9968A1-6772-B02C-95B5-8570F07C8A61.html?lang=en-GB

Part 4: Assessment

Assessment strategy: The assessment output for this module consists of a Teamwork Design Project submission using the accepted communication and media by which a design project is summarised and presented as an entry. Thus, the students will develop communication skills that directly mimic the skills they will need as architectural practitioners.

The assessment strategy adopted by this module centres on a poster and portfolio that effectively communicates the computational methods applied in the proposal and the synthesised critical thinking. The students must appreciate the criticality of communicating complex data and logic visually.

Summative assessments: Developing understanding will be evaluated in the project's research process. Evaluate the practical and theoretical understanding, through the portfolio documents design (40 pages sized A3) and the student's ability to understand and represent complex information.

Resit Strategy: Whereas the First Attempt at this module requires group work on fabrication processes, the Resit Attempt is identified as an individual assessment. The scope of the fabrication experiments identified for this Resit will be reduced to an appropriate level for an individual to complete the assessment. To this end the resitting student will be provided with a revised design brief with a reduced scope for these fabrication experiments, including the theoretical content as part of the project design process. The student will also be asked to reflect on what has been lost, gained, and learned by working individually or in a team.

Assessment criteria will be made available to the students, along with the project brief.

Feedback: there will be peer and tutor feedback throughout the module critiques. The students will be invited to provide self-assessment. Written feedback on completion of the projects.

Assessment tasks:

Portfolio (First Sit)
Description: Teamwork architectural system proposal
A3 (or equivalent) 40 pages (+/-) 10%
Weighting: 100 %
Final assessment: Yes
Group work: Yes
Learning outcomes tested: MO1, MO2, MO3, MO4

Portfolio (Resit)
Description: A revised design brief with a reduced scope for these fabrication experiments, including the theoretical content as part of the project design process.
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Computational Architecture [Frenchay] MSc 2024-25

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