Programme Specification

Computational Architecture [Sep][PT][Frenchay][2yrs]

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Section 1: Key Programme Details

Part A: Programme Information

Programme title: Computational Architecture [Sep][PT][Frenchay][2yrs]

Highest award: MSc Computational Architecture [Sep][PT][Frenchay][2yrs]

Interim award: PGCert Computational Architecture [Sep][PT][Frenchay][2yrs]

Interim award: PGDip Computational Architecture [Sep][PT][Frenchay][2yrs]

Awarding institution: UWE Bristol

Affiliated institutions: Not applicable

Teaching institutions: UWE Bristol

Study abroad: No

Year abroad: No

Sandwich year: No

Credit recognition: No

Department responsible for the programme: FET Dept of Architecture & Built Environ, Faculty of Environment & Technology

Contributing departments: Not applicable

Professional, statutory or regulatory bodies: Not applicable

Apprenticeship: Not applicable

Mode of delivery: Part-time

Entry requirements: For the current entry requirements see the UWE public website

For implementation from: 01 September 2021

Programme code: K19A12-SEP-PT-FR-K19A12

Section 2: Programme Overview, Aims and Learning Outcomes

Part A: Programme Overview, Aims and Learning Outcomes

Overview: This Masters programme in computational architecture emphasises a systematic exploration of computational design tools and methods, smart material behaviours, and digital fabrication - targeting design innovation in architecture. The programme will develop knowledge and skill in a design generated through environmental, construction and programmatic data analysis; the application and experimentation with data infographics, scripts, and computational models in design studio; and the testing of proposals through kinetic models and digital fabrication. This programme aims to be at the cutting edge of design problem-solving, exploring new research methodologies and technologies of computer-aided manufacturing, 3D printing, computer numerical control machining, and robotic manufacturing. The programme aspires to offer students a transformative design experience. With curious eyes, students gain new ways of understanding and contributing to the contemporary world.

It is a part-time two-year course, with options for two entry points (at the beginning of Semester 1 or Semester 2), and is structured in modular increments that develop skill and understanding in the fundamentals of computational design - in terms of both theory and technology, modelling methodologies, and advanced digital fabrication techniques. These modules allow for flexible part-time access to the programme and 'module gathering' as Continuing Professional Development'. Learning culminates in an extended research project that encourages collaborative and exploratory research work.

The programme is design-led and is situated in the design studio - as a site for creative analysis, experimentation and response to complex, open-ended problems of spatial use, meaning and environmental change. Project-based, collaborative and inter-disciplinary working is central to the programme. Students develop projects using research by design methodologies that encourage instinctual, open-ended enquiry.

The programme provides theoretical background underpinned by technical skills. Students are introduced to various generative design platforms, including visual programming, scripting, and coding. Students learn methods of tackling complex problems that have a set of conflicting issues and use mathematical and biological models to design artefacts that integrate seamlessly with nature. Advanced digital fabrication methods express these generative models. Students are encouraged to develop a craft of control and refinement of these technologies.

Pathway 2 (K19B12) is for applicants that have already completed research-based project work in computational design. Applicants seeking access to this route will be required to present a sample of their research work and discuss this at an interview, to confirm the suitability of their current project work for this route way.

Educational Aims: The Educational Aims of the programme are:

To provide a coherent programme of advanced postgraduate study in computational architecture, which integrates theoretical understanding with computational design methodologies and fabrication technologies and that is informed by research (including that carried out by academic staff at UWE);

To complement and develop at postgraduate level the disciplinary understanding and expertise brought by students to the course from a range of academic and professional backgrounds (including architecture, computer science, engineering, product design and 3-dimensional design); and to encourage cross- and trans-disciplinary collaboration between these students in their exploration of computational architecture;

To provide an integrated pathway for students in their foundational understanding and development of skill in computational architecture, that includes flexible modes of access and delivery, and that encourages collaboration amongst the programme cohort;

To encourage students to develop the capacity for advanced thought and action that

is independent, critical, reflective and applicable in a range of international contexts;

To encourage students to experiment and operate design methodologies that encourage instinctual, open-ended enquiry.

To position students and academics at the cutting edge of design problem-solving in computational architecture research and practice. To connect students to leading design researchers nationally and internationally. To open up opportunities in new consultancy and manufacturing settings for graduates.

Programme Learning Outcomes:

Programme Learning Outcomes

PO1. A broad and systematic understanding of the historical use of computation design and the relative current theoretical underpinnings of this field of study and identifies the interrelationship with other relevant design disciplines and scales.

PO2. Demonstrates an understanding of a broad range of computing (social, biological, and mathematical) models underpinning design algorithms and how they are interpreted in simulation and generative design methods.

PO3. Systematic understanding of a broad range of digital fabrication, material testing, rapid prototyping, physical computing, automated construction, and assembly processes and use reflective analyses to develop a designed artefact (physical, or virtual).

PO4. Develop critical responses to existing theoretical discourses, computational and fabrication methodologies to synthesise and use design ideas at a high level of abstraction.

PO5. Works proactively, flexibly, and creatively to apply computational knowledge in unfamiliar contexts, incorporate critical ethical dimension to design, manage the implications of current ethical dilemmas and generate transformative solutions.

PO6. Employing advanced skills to conduct design research by undertaking substantial investigations to address significant design areas, selects appropriate computational and fabrication methodological approaches, and critically evaluate and validate their effectiveness.

PO7. Acts with initiative to identify and explore new opportunities for decision-making and accessing support within given design briefs, developing new concepts or approaches within the field of computational architecture through self-directed learning, and accepting accountability for outcomes.

PO8. Engage, work and design collaboratively within multi-disciplinary teams that integrate different actors, phenomena, and skills, by negotiating and enabling the flow of ideas and logic design.

PO9. Effectively communicate and present visually and verbally complex data, research context, hypothesis, experimentation, and results, along with, project materialisation through mix reality, simulation, prototyping, and execution documentation.

Part B: Programme Structure

Pathway 1

Year 1
The student on Pathway 1 (K19A12) must take 90 credits from the modules in Year 1.

Pathway 2 (K19B12) is for applicants that have already completed research-based project work in computational design. Applicants seeking access to this route way will be required to present a sample of their research work and discuss this at an interview, to confirm the suitability of their current project work for this route way. The student on Pathway 2 must take 90 credits from the modules in Year 1.

Year 1 Compulsory Modules Pathway 1
The student following Pathway 1 (K19A12) must take 90 credits from the modules in Compulsory Modules for Pathway 1.

Module Code	Module Title	Credit
UBLLU1-15-M	Computing Complexity 2021-22	15
UBLLX1-15-M	Crafting Systems 2021-22	15
UBLLY1-15-M	Digital Charrette 2021-22	15
UBLLW1-15-M	Logic to Artefact 2021-22	15
UBLM11-15-M	Make and Build 2021-22	15

UBLLV1-15-M	Urban Sentience 2021-22	15

Year 2
The student on Pathway 1 (K19A12) and Pathway 2 (K19B12) must take 90 credits from the modules in Year 2.

Year 2 Compulsory Modules Pathway 1
The student following Pathway 1 (K19A12) must take 90 credits from the modules in Compulsory Modules Pathway 1 in Year 2.

Module Code	Module Title	Credit
UBLMKS-30-M	Design Research 2022-23	30
UBLLY7-60-M	Dissertation 2022-23	60

Pathway 2

Year 1
The student on Pathway 1 (K19A12) must take 90 credits from the modules in Year 1.

Pathway 2 (K19B12) is for applicants that have already completed research-based project work in computational design. Applicants seeking access to this route way will be required to present a sample of their research work and discuss this at an interview, to confirm the suitability of their current project work for this route way.
The student on Pathway 2 must take 90 credits from the modules in Year 1.

Year 1 Compulsory Modules Pathway 2
The student following Pathway 2 (K19B12) must take 75 credits from the modules in Compulsory Modules Pathway 2.

Module Code	Module Title	Credit
UBLLU1-15-M	Computing Complexity 2021-22	15
UBLLX1-15-M	Crafting Systems 2021-22	15
UBLLY1-15-M	Digital Charrette 2021-22	15
UBLM11-15-M	Make and Build 2021-22	15

UBLLV1-15-M	Urban Sentience 2021-22	15

Year 1 Optional Modules Pathway 2
The student following Pathway 2 must take 15 credits from the modules in Optional Modules Pathway 2.

If students have studied Logic to Artefact as part of the UWE MArch, students must take UBLMGW-15-M or UBLMQ4-15-M and not Logic to Artefact.

Module Code	Module Title	Credit
UBLMGW-15-M	BIM in Design Coordination 2021-22	15
UBLLW1-15-M	Logic to Artefact 2021-22	15
UBLMQ4-15-M	Low/zero Impact Buildings 2021-22	15

Year 2
The student on Pathway 1 (K19A12) and Pathway 2 (K19B12) must take 90 credits from the modules in Year 2.

Year 2 Compulsory Modules Pathway 2
The student following Pathway 2 (K19B12) must take 90 credits from the modules in Compulsory Modules Pathway 2 in Year 2.

Module Code	Module Title	Credit
UBLM31-30-M	Design Research Development 2022-23	30
UBLLY7-60-M	Dissertation 2022-23	60

Part C: Higher Education Achievement Record (HEAR) Synopsis

A programme of advanced postgraduate study that integrates theoretical understanding of complex systems, coding and computational design methodologies with the craft of digital fabrication. The programme positions students at the cutting edge of design problem-solving in computational architecture research and practice, and connects them to leading design researchers. The learning and teaching is enquiry-led and Studio based and students experiment and operate design methodologies that encourage instinctual, open-ended enquiry and order these

process by learning and using design research methods. The students collaborate on research work, a design charrette and full-scale structural prototypes learning team-building and cross-disciplinary skills.

Part D: External Reference Points and Benchmarks

This programme is conceived with reference to the QAA Subject Benchmark Statement for Architecture and can be understood as an architectural course where the nature and content of architectural teaching is described in Chapter 2 'Learning and Teaching' of the Benchmark Statement (2020, pp. 13-17). However, this programme is not subject to the PSRB requirements identified in the QAA Subject Benchmark Statement for Architecture and is not mapped to the ARB Criteria listed therein.

Part E: Regulations

A: Approved to University Regulations and Procedures