Architecture and Digital Theory MRes

Programme Information Sheet

This document provides details of the structure and content of this programme.

Programme context and history

One of the school's B-Pro programmes, this programme explores digital theory, history and culture in relation to architecture and is led by world-renowned innovators in the field.

Conceived as a research laboratory, this programme offers a hybrid pedagogical format where learning and experiments, inspired by today's evolving design technologies, are conversant with the culture of the design community, and informed by recent scholarship in the arts and humanities. The core of the programme is a year-long research project, where students develop an individual topic of their choosing within the broad areas of interest outlined below.

Programme structure

Students on this programme undertake several modules totalling 180 credits.

Term 1:

Students have a choice of 2 out of 3 offered transferrable skills modules, each worth 15 credits. Students also undertake a research mini-project worth 30 credits. This is meant to be preliminary to the main research project that students will develop in Terms 2 and 3.

Terms 2 and 3:

Students undertake a subject-specific taught course worth 30 credits and commence their 90 credit research project. This research project is the core of the programme, and it will be submitted at the end of the summer, in the modes and formats indicated below.

Architectural Design: Historical, Cultural and Theoretical Skills is submitted in the first week of Term 2. Students are given a formative mark. This mark will be reported to the MRes June Exam Board for Information. The summative mark will be confirmed at the Architectural Design MArch Exam Board in September and forwarded to the MRes September Exam Board.

Design as a Knowledge-Based Process and **Introduction to Processing for Architecture and Design** are submitted in the last week of Term 1. Summative marks are given at the MRes June Exam Board.

History and Theory of Digital Design is submitted in the last week of Term 2. Formative marks are given, with summative marks awarded at the Architectural History MA examination in September.

The First Research Module is submitted in the last week of Term 1. Summative marks are given at the MRes June Exam Board. Failing students then have the option to re-submit this module by September with a mark confirmed at the MRes September Exam Board or students can re-submit in the following academic year.

The Main Research Module is submitted at the end of the summer vacation. Summative marks are given at the MRes September Exam Board.

Programme modules

Term 1
2 out of the 3 transferrable skills modules that follow:

Architectural Design: Historical, Cultural and Theoretical skills
15 credits

This module offers an introduction to post graduate writing skills and literature survey skills. The module has been established to ensure that students write at Master's level and can analyse text to establish relevant content to their individual programme of study. The vehicle for this is an introduction to key architectural design theoretical concepts so that these can be taken forward in Terms 2 and 3. These concepts are varied but specific to the clusters' research for that year.

Learning outcomes include knowledge of the theoretical and historical issues that underpin a study of architectural design; understanding of the skills required to undertake a theoretical and historical study at post graduate level, specifically how to undertake a literature search and how to construct an appropriate bibliography.

Format: 15 hours of lectures, 15 hours of seminars or tutorials
Assessment: Students are asked to produce an essay of 2500 words.
Module tutor: Professor Stephen Gage
Module managed by: Architectural Design MArch

Design as a Knowledge-Based Process
15 credits

This module introduces theories of design as a knowledge-based or evidence-based process and provides a range of concepts that suggest how the nature of design may itself become the object of research.

The course explores contrasting perspectives in architecture, theories of scientific knowledge, linguistics, social theory and theories of technology via student debate on issues of design practice, the nature of collaboration, machine intelligence and creativity.

The module is intended to get students reflecting on what they do as practitioners by asking them to consider design as a knowledge domain with a particular knowledge base, rather than simply in terms of a tacit community of practice.

Assessment: Students are asked to produce an essay of 2500 words.
Module tutors: Dr Sam Griffiths and Dr Sean Hanna
Module managed by: The Bartlett Space Syntax Laboratory
Compulsory module for students on Space Syntax: Architecture and Cities MSc/MRes.

Introduction to Processing for Architecture and Design
15 credits

This module offers an introduction to the use of programming scripts. It covers the rudiments of programming using Processing, a Java-based language created for visual designers, architects and artists. Through the course, students learn how to use core Processing methods and transferable programming techniques and to create programming solutions to visualisation and analysis problems.

The course begins with the elements of a Processing sketch, through variables, methods, classes, loops and conditionals, before moving on to applications in data visualisation, 3D environments, image processing and user interaction. The module is designed to take beginners through to intermediate programmers, learning about Java syntax and Processing's powerful capabilities.

Assessment: Students produce a demonstration portfolio of work.
Module tutor: Dr Martin Zaltz Austwick
Module managed by: The Bartlett Space Syntax Laboratory
Compulsory module for students on Spatial Data Science and Visualisation MRes and an elective for students on some other programmes.

First Research Module
30 credits

This is a mini-project to be presented at the end of Term 1 in December. Students are asked to present and defend their work verbally. The presentation will be filmed. Lectures will be delivered by Professors Carpo and Migayrou. Lectures will bear on one or more of the following subjects:

1 - Archaeology of discretisation. A history of digital notations (alphabet vs numbers) from Renaissance to today, but also referring to ancient astronomy and cryptography (Greek, Arab etc). The history of computing (John Napier, Charles Babbage, Daniel Bernoulli, Ada Lovelace, Alan Turing etc). Analogue vs digital, discrete vs continuous. Contemporary debates.

2 - The role of spatial disciplines as architecture and urbanism in the history of computation (Desmond Bernal, Leslie Martin and the LUBFS research groups, Christopher Alexander and Serge Chermayeff, Bill Mitchell, Nicholas Negroponte.

3 - A global mapping of the recent history of computational architecture and urbanism defined by the development of CAD software (Form Z to Autocad, Catia, Rhino, Depthmap, Mathematica etc) and their contribution to structural and spatial understanding; aspects of the early digital field and recent developments (file to factory, generic computation, 3D printing, modelisation and simulation…); a history of digitally intelligent design seen in its relationship with the development of computational tools (Peter Eisenman and Chris Yessios, Frank Gehry and Catia, Non-standard architecture etc)

Each lecture will be prepared with readings and followed by one of more sessions of questions and answers and discussion. Students' individual projects during this term will focus on researching and preparing a critical bibliography related to digital design theory in general, and to their own chosen research subject or ambit in particular. Bibliographic material will be assembled during the term, commented upon, and presented at the end of the term. Professors Carpo and Migayrou will mentor and supervise this phase of documentary collection, which may include some form of publication of the findings.

Format: 6 hours of lectures, 30 hours of seminars or tutorials.
Assessment: verbal and visual presentation (filmed for record) 100% of mark; 20 minutes presentation, plus questions and answers
Module managed by: Architecture and Digital Theory MRes

Term 2

Taught course: History and Theory of Digital Design
30 credits

This module is compulsory for students on Architecture and Digital Theory MRes, and an elective for students enrolled on some other Master's programmes. Enrolment limited.

The course provides a systematic, taught introduction to some of the core topics of digital design theory. Students are asked to produce an essay of 4,500 words or equivalent if using multi-media.

This module will assess the present state of computer-based design by situating today's digital turn within the long duration of the history of cultural technologies. It will first describe the technical logics of hand-making, mechanical reproductions, and digital making, and highlight the differences between digital variability, manual and artisanal variations, and the mechanical mass- production of identical copies.

It will focus on some instances of identical reproduction that were crucial in architectural history, particularly on the early modern invention of architectural notations and of architectural authorship (the rise of the 'Albertian paradigm' in the Renaissance), and on the rise of the modernist principle of standardisation in the 20th century.

It will then outline a brief history of the digital turn and of its theoretical and technological premises from Post-Modernism and Deconstructivism and the invention of the Deleuzian "Fold" to the spline-dominated environment of the 1990s; from free-form, topology and digital formalism to mass-customisation, non-standard seriality and more recent developments in digital interactivity, participatory making and building information modelling (BIM).

Lastly, it will discuss the present state of digital design theory, and particularly the issue of Big Data, its cultural and epistemological implications, and its consequences for the making of form (theories of emergence, self-organising systems, form-finding, simulation, optimisation, material computation, discretisation, cellular automata and agent-based

design). Students will test these interpretive patterns by developing a case study of their choice (of a media object, object, building, software, or technology).

Format: lectures, 30 hours
Assessment: 75% of the module assessment grade is the submission of a 4500-word essay on an appropriate topic related to the course, and usually in relation to one of the seminar topics. The essay should be appropriately illustrated, footnoted and referenced with a full bibliography. 25% of the assessment is one or more presentations, with written summaries, during the course of the module seminars (total workload per student will not exceed the equivalent of 4,500 words, regardless of the mode of submission).
Module Tutor: Mario Carpo
Module managed by: Architectural History MA

Main Research Module
90 credits

This is the major research task, to be submitted at the end of the 12-month period. Students are asked to produce a dissertation of 15,000 words or some equivalent thereof if using multi-media. Lectures will be presented by Professor Carpo and Migayrou and will bear on one or more of the following topics:

1 - An inventory of the new processes in industrial production and their direct or indirect impact on the production and construction of architecture (materials, robotics, real or virtual urban networks). Design applications in a transdisciplinary perspective. Case studies and analyses of design projects.

2 - General mapping of the historical and critical discourses on technology and computation. Analysis of theoretical writings by architects, urbanists, engineers, historians, philosophers, and sociologists, defined through three epistemological fields: 1. Formal ontology, bottom up modelisation, modular ontologies defined by practices, ontology of artefacts, ontology oriented objects, new materialisms 2. Post phenomenology structuralism (Jean-François Lyotard , Alain Badiou, Peter Eisenman etc) 3. Morphological structuralism (René Thom, Jean Petitot etc).

3 - Interrelations and intricacy between the natural and the artificial. The production of nature, ecology, ecosophy (Philippe Descola…). The simulation and the production of the living. The question of the naturalization. Theories of complexity (Santa Fe School…).

4 - Genesis of space, history of geometry, algebrisation, form and cognition. Mathematics, simulation and in-formation of the objet (computation). A history of modernist sources from psychophysics (Gustav Fechner, Carl Stumpf, Theodor Lipps) to the definition of the key concept of Gestaltung. Morphodynamic modelisations, morphological models of perception and cognition. Computation and artificial intelligence.

5 - Analysis of the global cultural mutations defined by a global datascape. Toward a new urban understanding; new modes of citizenship or exclusion. Global maps and global simulation systems. Big data architectonics.

Each lecture will be prepared with readings and followed by one of more sessions of questions and answers and discussions. There will be additional contributions from designers and theoreticians from The Bartlett or from outside the school. In some cases, this may include visits to studios or offices in London, including on-site discussions with leading practitioners and designers. Students are welcome to suggest visits and meetings with designers or theoreticians relevant to their projects.

During Term 2, students will proceed from the collection of bibliographic materials and the discussion of sources to the formulation of their research projects, to be finalised at the end of Term 2. Term 3 will be devoted to research and writing. Tutorials with Professors Carpo and Migayrou will take place at regular intervals throughout Term 2 and 3.

Format: lectures, 6 hours; 90 hours of seminars, problem classes or tutorials.
Assessment: a written thesis of 15,000 words; 100% of the mark.
Module managed by: Architecture and Digital Theory MRes.