



Programme: Computation in Architecture
Title: Relational Strategies: Performance/Making/Modelling
Module responsible: Paul Nicholas
Period: August 31 st , 2026 – January 22 nd , 2027 (1st semester) Exam period: Week 1-2-3 2027 ECTS-points: 30 ECTS
Contents: The semester focuses upon introducing students to the theories, technologies and practices that have helped define (historical) and currently define the paradigms and state-of-the-art within the field of digital architecture. Theoretical appreciation and engagement with the field occurs through the study of given texts in association with design-led, group-based project work [theory]. Skill building design projects are structured to introduce tools and methods for addressing issues of scale and dependencies between scales, material performance and its steering, site, context, climate and programme [medium & project]. Knowledge of appropriate concepts, research, and applied techniques is introduced throughout the semester via courses and research-led workshops that emphasise direct 'hands on' engagement. The semester will include the following courses: - Fundamentals of Computation will introduce students to parametric modelling concepts and techniques, with focus on building basic understandings and skills - Thinking Architecture 1 - The Computational Turn will introduce students to digital and computational cultures in architecture. While being a field of experimentation in its own right since the 1960s, designing with the help of algorithmic tools encompasses many practices and conceptualizations. Students will be introduced to them through a historical outline and through readings, discussions and the production of short texts. - Life Cycle Analysis will introduce students to critical considerations and applied workflows for Life Cycle Analysis, including application to their design project. - Thematic workshops in Digital Fabrication, Material Performance and Sensing introduce students to core concepts and techniques for performance-led design, methods of experimentation and state of the art.
Teaching forms: Workshops, Courses, Group-based tuition
Learning Outcomes (Knowledge, skills and competences): • Knowledge of relevant architectural theory related to digital practice • Knowledge of material simulation and environmental assessment techniques, their assumptions, abstractions, limits and opportunities within design contexts • Knowledge of research-based methods for testing and evaluation of material performance • Skill in applying core concepts of digital practice related to design, analysis, simulation and fabrication.

- Skill in deploying appropriate digital design strategies for addressing architectural, structural, fabrication, programmatic and site-based issues.
- Competence in working effectively within a group-working context
- Competence in critically reflecting upon architectural issues through the analysis, development and engagement of digital tools
- Can use appropriate fabrication technologies to support design investigation and synthesis
- Competence in integrating material performance data with design concept
- Competence in developing appropriate representational methods
- Propositional project work that exercises and further develops the competencies and knowledge introduced throughout the semester

Syllabus: (Number of pages approx.)

The syllabus includes :

- Gordon Pask, "The architectural relevance of cybernetics." *Architectural Design* 39.9 (1969): 494-496.
- John Frazer, *An Evolutionary Architecture*. *Architectural Association Publications*, 1995.
- Stan Allen, "From Object to Field: Field Conditions in Architecture+ Urbanism." *Practice*. Routledge, 2012. 216-243.
- Mario Carpo (ed.), *The Digital Turn in Architecture 1992-2012*. John Wiley & Sons, 2013.
- Mario Carpo, *The Alphabet and the Algorithm*. The MIT Press, 2011.
- James Corner, "The agency of mapping: Speculation, critique and invention." *The Map Reader* (2011): 89-101.
- Terzidis, Kostas, *Expressive Form: A Conceptual Approach to Computational Design*. Routledge, 2003.
- Mette Ramsgaard Thomsen, Martin Tamke, Phil Ayres, Paul Nicholas (eds), *CITA Complex Modelling*. Riverside Architectural Press, 2020.
- Scott Marble (ed.), *Digital Workflows in Architecture*. Birkhäuser, 2013.
- Phil Ayres, Mette Ramsgaard Thomsen, Bob Sheil, Marilena Skavara (Editor). *Fabricate 2024. Creating Resourceful Futures*. UCL Press, 2024.
- Michelle Addington, "Architecture of contingency." Hylozoic Ground. Liminal responsive architecture. Philip Beesley. *Riverside Architectural Press*, Toronto (2010): 66-75.
- James Bridle, *New dark age: Technology and the end of the future*. Verso Books, 2018.
- Imdat As, Prithwish Basu (eds). *The Routledge Companion to Artificial Intelligence in Architecture*. Routledge, 2021.
- Rachel Armstrong and Richard Beckett (eds). *AD Biodesign in Architecture*, VOL 96.1, 2026.
- Ruxandra Chiujea, Paul Nicholas, Martin Tamke, *et al.* A Decision-Making Tree for Adapting the Additive Manufacturing Repair Repertoire for Biopolymer Composite Materials. *Technology / Architecture+ Design*, 2025, vol. 9, no 2, p. 454-467.

Method of assessment: Oral exam of 30 minutes Grading: Grading according to the 7-point grading scale Censor: Internal grading
Reexam/illness exams: As ordinary but with the precondition that the student submit their project in Digital Exam before the oral examination.
Submission requirements: Comprehensive design portfolio that records and reflects upon the semester's individual and group-based work (including representations, photographs, drawings, models, 1:1 prototypes, time-based media, etc). Verbal presentation of study.