Course Outline Form

Year: 2014-2015
Course Number: ARCH5111C (DTCD G9)
Course Title: ADVANCED ARCHITECTURE DESIGN STUDIO1
Course sub-title: Hyper Materialism
Instructor: Kristof Crolla (Email: kristof.crolla@cuhk.edu.hk)
Schedule: Semester I, Monday & Thursday PM

HYPER MATERIALISM

1. STUDIO OBJECTIVE:

Studio “Hyper Materialism” explores how digital design and fabrication allows architecture to embrace novel material tectonics and expressionism, and tests this potential through the design of a museum building. The development of fully integrated tectonics in which “Form follows Matter” is based on research on recent software’s space-generating abilities and real-time performance evaluation. The studio exaggerates hyper materiality and embraces tectonics as spatial articulator, pattern and ornament. Computation assists in the meaningful exploration of non-Euclidian architectural languages. Opportunities for digital fabrication are combined with craftsmanship and building tradition to create specificity and identity – an ambition which is rigorously tested through physical and digital model making. Elegance, beauty, exuberance, the accidental, the unpleasing, the ugly and the perverse form an integrated part of the aesthetic explorations. Through built form the studio seeks to provoke sensual, haptic reactions from users of an activating and catalytic architecture.

2. STUDIO BRIEF:

Ex. 1: Affective Skin (2.5 weeks)

TOPIC | Spaces impact their experience not only through their spatial form, but also through their texture, light, colour, materiality, etc. This opening exercise breaks from the modernist traditions that abandoned ornament and favoured basic geometries. It is designed to help students re-discover the architectural opportunities of material expression, fabrication, and craftsmanship. Although computational tools allow for the easy generation of complexity, patterning, and decoration, it is the fabrication process that defines whether or not these survive in the final built project. In spite of the proliferation of computer controlled fabrication tools, most buildings are still assembled by hand. This exercise challenges the students to augment the traditionally manual construction environment with digital tools in order to achieve specific affects.

TASK | Design & build inside a fictitious bounding box of 800 x 800 x 800mm a physical space of non-planar geometries that has an interior and exterior surface. Use this as a basis to “skin” the interior and exterior in a logical and procedural manner with the aim to achieve particular given effects, affects, and emotions in the end-user.

SET-UP | Teams of 2-3 students
DELIVERABLES | Public Presentation: Physical model + Panels including photography of the model and construction diagrams

Ex. 2: Per-Form (3.5 weeks)

TOPIC | The industrial revolution and the following period of modernism resulted in a favouring of architectural tectonics where structural elements are disintegrated into discreet, standardised, pre-manufacturable parts (such as columns, slabs, windows, doors, etc). Architectural design is reduced to the assembly of these parts, all optimised as individual building elements, but not as a holistic architectural project (as opposed to e.g. Gothic architecture, Art Nouveau or various types of vernacular architecture). The result is the proliferation of a homogeneous architectural landscape of unvaried repetition. Today, however, user-friendly digital design and fabrication tools open up direct access to various matter-related properties. Real-time physics engines, finite element analysis and evolutionary optimisation allow for the instantaneous generation of fascinating performative spatial networks in direct feedback with the architectural designer. In parallel the integration of digital fabrication tools within our current construction environment is opening up new ways for their materialisation. This second exercise introduces students to designing with real-time performance evaluation tools.

TASK | Design & build inside a fictitious bounding box of 800 x 800 x 800mm a physical space using real-time physics evaluation tools in response to arbitrary physical inputs. Explore the combination of this spatial outcome with the output of exercise 1.

SET-UP | Teams of 2-3 students

DELIVERABLES | Public Presentation: Physical model + Panels including photography of the model and construction diagrams

Ex. 3: Museum (7 weeks)

BRIEF | This final exercise asks students to apply their knowledge and skill gained in exercise 1 and 2 in the design of a Museum. A specific site, detailed programmatic and spatial
requirements, and building-operational schedule will be given. Elements of matter, texture, materiality and ornament comprise a fully integrated architectural tectonic. Concepts of fabrication and construction are elaborated and applied throughout the key spaces of the design.

SET-UP | teams of 2-3 students

DELIVERABLES | Public Presentation: physical models, animations and panels including architectural drawings, and diagrams.

Final Portfolio

All work, including reading exercises (see below), is to be bundled and submitted in an individual A4 portfolio following a mandatory template.

3. LEARNING OUTCOMES

At the end of this course students
1. will be able to critically investigate and evaluate theoretical concepts and drivers behind evolving architectural design; tackle novel situation and ill-defined problems; understand design as an on-going process, not as a product; develop a comprehensive understanding of contemporary theoretical discourse
2. will be able to demonstrate architectural applications of recently developed digital design and fabrication tools; develop an ability to use the technical tools associated with contemporary architectural practice; extend and advance the use of new tools and technologies into architectural design; remain technologically agile in order to adapt to and capitalize upon changes in technology.
3. will have explored through team work new ways of representing architectural concepts verbally, graphically and by means of physical models; develop and propose new ways of representing architectural concepts verbally, textually and graphically.

4. ASSESSMENT SCHEME

- Students will be continuously individually assessed for their part within group work and their class participation.
- Interim grades will be indicative only.
- The public final review will count for 60% of the overall received grade.
- The individual final portfolio will count for 30% of the final grade.

5. STUDIO FORMAT

- Collaboration in teams is required for all design phases. Teams can be reconfigured for each design stage.
- Detailed project briefs and submission requirements for each stage will be communicated at each phase’s introduction.
- Students are expected to actively participate in the intellectual environment of the studio in every session.
- This studio will capitalise intensely on recent architectural digital design technology by working with McNeel’s Rhinoceros NURBS modelling software, its plugin Grasshopper and its recent add-ons. Therefore a prior knowledge of Rhinoceros and Grasshopper or equivalent 3D modelling packages or computer programming is recommended.

6. READING
In order to introduce students to the currently ongoing dialogue about the roles of computational design and fabrication, various texts will be given for which a very short written summary and critical reflection is to be submitted and shared with class mates at various intervals. Possible reading sources will be:

**Required reading:**

**Highly recommended reading:**
- CROLLA, Kristof and Sebastien Delagrange, *International Workshop Series: Grasshopper Course Notes v.6.0*, Hong Kong, 2014

**Additional reading**

**7. SCHEDULE**

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8. **FIELD TRIP:**

In order to first-hand experience the possibilities and potential of Chinese construction, a 2-day field trip (date tbd.) is planned to Shenzhen / Dongguan where we will visit construction, fabrication, and manufacturing facilities.

9. **PREREQUISITES:**

Students entering this studio are required to take the elective “ARCH4231-5231B – Topological Studies in Computational Design – The Man-Machine: Digital Bamboo / real-time physics”.

**IMPORTANT NOTE TO STUDENTS:**
Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details may be found at [http://www.cuhk.edu.hk/policy/academichonesty/](http://www.cuhk.edu.hk/policy/academichonesty/). With each assignment, students will be required to submit a statement that they are aware of these policies, regulations, guidelines and procedures.