**Department Course Planner 2025-26 F**

# Course Number: ARCH7476

Category: Digital Media and Fabrication (proposed)

# Course Title: Generative Design in Architecture

Subtitle: Object-Oriented Research using IoT, BIM/GIS, and Light AI (No-/Low-Code Track Supported)

Teacher: Dr. Hongshan Guo

Schedule: 12 weeks × 2 hours/week (Day/Time TBC)

# Enrolment / Quota: TBC

# Office hours: 1 hour weekly (TBC) or by appointment

**I. Course Description**

This elective helps MArch students make better design decisions with evidence. We use 'big data' mainly as sources and simple tools (sensors, maps, building models, basic simulations, and light AI). Each student selects a studio-linked object (system, rule, component, dataset, or workflow), states a short decision claim, runs one small test (either a simple proxy test or a transparent preset simulation), and communicates results in two ways: a firm-facing two‑slide decision memo (Practice Case) and a two‑page Research Brief. No coding is required; a no/low‑code track is the default. We grade clarity, method–question fit, uncertainty, and decision usefulness—not code tricks.

**II. Learning Outcomes**

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| **Course Learning Outcomes** | **Program Learning Outcomes** |
| 1. Frame a clear decision question around a studio‑linked object, including stakeholders and success/fail signals. | PLO 1–2 |
| 2. Choose a right‑sized test (proxy or preset simulation) and explain why it fits the object's mechanism. | PLO 3 |
| 3. Analyze and show uncertainty with ranges/sensitivity (and simple CIs where applicable). | PLO 4 |
| 4. Communicate for practice (decision memo) and research (short report), including a numeric adopt/ defer threshold. | PLO 5 |
| 5. Submit work that a peer can reproduce using your small “Reproducibility Capsule.” | PLO 5 |

**III. Schedule of Teaching and Learning Activities**

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| **Week** | In‑class focus (2h) | Out ‑of‑class (hrs) | Tools (floor/optional) | Key reading/handout |
| W1  Getting started | Why evidence matters; examples in plain language; define your object and decision claim. | Draft A1 seed (1h); short reading (1h). | Sheets/Excel; QGIS; R adiance/VELUX presets. | Craft of Research (excerpts). |
| W2  Finding data safely | List data sources; pick measures; talk e thics/privacy; write ranges you’ll explore. | Finish A1 (1h); draft 3 mentor qu estions + shortlist (1h). | QGIS layers, buffer/clip; HKU storage. | HKU data privacy notes. |
| W3  Planning a test | Pick proxy test OR preset simulation; write a simple test plan (pre‑reg). | Draft A3 plan (2h); start A2 evidence map (2h). | Radiance/VELUX presets; EnergyPlus Simple Glazing GUI. | Short handouts ( Radiance/E+ ‘getting started’). |
| W4  C hecking the plan | Show how your answer changes with ranges (sensitivity). Peer mini‑review. | Complete A2 (3–5 pp) (4h). | Sheets/Excel charts. | Tufte visuals (excerpts). |
| W5  Pilot week | Run a small pilot or dry‑run; log surprises; adjust the plan. | A3 Pilot Memo (≤2 pp) (3h). | Your chosen apparatus or preset sim. | Pilot memo template. |
| W6  Make it r eadable | Turn numbers into clear figures; start your Object Card figure. | Draft A4 figures (3h). | Sheets/Excel; slide tool. | Kirk data viz (excerpts). |
| W7  Decide with numbers | Pick a threshold for adopt/ defer; address coun ter‑arguments. Peer Review #1. | Revise A4 (3h); Change Log #1 (1h). | Sheets/Excel; (optional) Colab/GH. | Practice memo examples. |
| W8  Workflow help (light) | If you use AI or scripts, document them as a workflow object; discuss limits/ethics. Mentor consults (30–45 min). | Mentor Report (1–2 pp) (2h). | Any LLM (optional); documentation only. | Workflow card template. |
| W9 Story & figure clinic | Finish Object Card; tell the two‑slide story for your Practice Case. Peer Review #2. | Polish A4 draft; Change Log #2 (1h). | Slide tool; Sheets/Excel. | Style guide. |
| W10 Draft defense | Short in‑class defenses; make a fix list. | Integrate fixes (3h). | — | — |
| W11  Final polish | Fold mentor advice; finalize thresholds; logistics for review day. | Polish (3h). | — | — |
| W12 Review | Object Fair: 6–8 min talk + 4 min Q&A; submit A4 bundle. | — | — | — |

**IV. Required Reading**

* Booth, Colomb & Williams — The Craft of Research (excerpts).
* HKU Data Privacy & Governance Guidelines.

**V. Recommended Reading**

* Tufte — The Visual Display of Quantitative Information (figure design).
* Kirk — Data Visualization (selected chapters).
* EnergyPlus Engineering Reference — Simple Glazing System (section).
* Radiance primer (short handout).

**VI. Assessment Standards and Tasks:**

Students should refer to the Department Curriculum Guide for University, Faculty, Program and Track level Standards of Assessment, including grade descriptors and Marking rubrics.

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| **Assessment Tasks** | Due | **Weighting** | What you submit (scope) |
| Decision Claim  (1 page) | Week 3 | **10%** | Object • decision claim • who’s affected • success/fail signals • ranges you’ll test (simple table). |
| Evidence Map  (3–5 pages) | Week 5 | **10%** | What is already known (with sources), the property ranges you will use, and the exact Gap→Test you will run. |
| Test Plan & Pilot Note  (≤4 pages total) | Week 7 | **10%** | 2-page plan (plain pre‑registration: design, metric, exclusions, analysis, stop/fail) + 1–2 page Pilot/Dry‑run note (what changed). |
| Final Decision Package (bundle) | W10 draft → W12 final | **40%** | 1) Research Brief (2 pages, short report); 2) Practice Case (2 slides, decision memo); 3) Object Card (1 page, key figure); 4) Reproducibility Capsule (small ZIP: README, data dictionary, spreadsheet with formulas or short notebook, figure sources). |
| Peer Reviews you give + Change Logs | W5 & W8 reviews; W7 & W10 logs | **15%** | Two short written reviews using prompts; two 1‑page Change Logs showing what you changed and why. |
| Mentor Dialogue (data collection consult) | W8–W9 | **10%** | 30–45 min consult with DUPAD/REC/Senior-Year MArch/PhD mentor; 1–2 page report + ‘what changed’ paragraph. |
| Attendance + Methods Passport | Ongoing | **5%** | Attend sessions; submit a simple checklist of methods you actually used. |

**VII. Proportion of Teaching, Learning and Examination Activities**

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| **Activities** | **Number of hours** |
| Lectures / Seminars (contact) | 12 × 2h = 24h |
| Reading / Self‑study | 6h |
| Assessment: A1 — Decision Claim | 8h |
| Assessment: A2 — Evidence Map | 18h |
| Assessment: A3 — Test Plan & Pilot Note | 16h |
| Assessment: A4 — Final Decision Package (incl. draft/clinics) | 34h |
| Peer reviews + change logs | 6h |
| Mentor engagement (incl. report) | 5h |
| Presentation polish (Week 12) | 3h |
| Total out‑of‑class | 96h |
| Grand total (contact + out‑of‑class) | 120h |

**VIII. Guest Speakers**

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| Name | Sessions | Hours |
| TBC | Object Fair/Methods Clinic | ≤2 hrs |

**IX. Statement of Academic Conduct**

All written work in this course will be submitted for plagiarism review via Turnitin, at http://turnitin.com. Clarification of the University of Hong Kong’s policies on plagiarism, as well as detailed descriptions of how to properly cite and source material in your written work and examinations is available at http://www.hku.hk/plagiarism. Plagiarism includes handing in the work of another as your own, and failure to appropriately cite your sources. Plagiarism is an academic misdemeanor, and may be considered grounds for failure from this course as well as further disciplinary action from the University.

Students must adhere to HKU policies on academic integrity. All submissions must be original and properly cited. Where appropriate, submissions may be screened for similarity. Declare any AI assistance and include a workflow card if used. Figures must be reproducible from the Capsule. Also note we've got these course-specific policies:  
  
- Testability rule — If you can't access a product or dataset, test the physics or logic behind the claim. Do a small proxy test (e.g., simple hot box) or a preset simulation (e.g., vary a slider). If neither is possible, submit a clear plan + evidence summary and say what would be needed next.  
  
- Evidence tiers — Be honest about the strength of your evidence: T0 marketing (not enough), T1 datasheets/standards, T2 your own proxy test, T3 a transparent simulation, T4 a field/pilot. Say which tier you reached in your conclusion.  
  
- Clarity over complexity — A correct spreadsheet beats a fancy black‑box model. Complexity does not earn marks.  
  
- Decision threshold — End with a number that tells us when to adopt or defer (e.g., "Adopt if heat‑loss rate ≤ 0.9 W/m²K").  
  
- Data ethics & privacy — If people or phones are involved, use the IRB‑lite consent note; store data on HKU drives; remove names/IDs; state a deletion date.

**X. Reassessment**

N/A.