### *Please see* [*instructions with examples*](https://archfac.mit.edu/sites/default/files/documents/syllabus-instructions.pdf) *for each section of the syllabus*

### [Term] Syllabus

# 4.570 (meets with # 4.550) Learning form Design Heritage Research Workshop on Data-driven Methods

**Meets with:**

**Level**: G/UG **Units**: 3-3-6 **Prerequisites**: Permission of instructor

**Instructor(s):** Takehiko Nagakura, Daniel Tsai

**Schedule:** Monday 11-2 in room 8-119, Tuesday 7-8:30 pm in room 5-216

**Instructor:** Takehiko Nagakura, takehiko@mit.edu; , Daniel Tsai, dtsai@mit.edu

**TA:** Han Tu, hantu@mit.edu

## Prerequisites/Corequisites

No required or recommended textbooks

## Schedule

*Example:* M 11:00 am-02:00pm, room 8-119; T 7:00-9:00 pm, room 5-216

## Final Exam / Reviews

No

## Description

This class investigates recent information and visualization technologies that helps studying “design heritage”, spatial designs that surround our lives. Design heritage broadly includes architecture, city and landscape; the built, demolished, and planned; and culturally important as well as the banal ones. We will look at various data-driven methods relevant for learning them, such as image/video feature detection, machine learning, physiological sensors, natural language processing, photogrammetric scan, augmented/virtual reality, and gamification. By examining how to collect data, how to process the raw data into forms useful for evaluation, and how to interpret and apply the findings, the students build a foundation for research projects bettering our understanding of the design heritage around us.

## Learning Objectives/Pedagogy:

Each week during the first half of the class, the class will invite a guest speaker, conduct a short hands-on exercise on a data processing tool, and read relevant literature from previous research projects in design heritage. The second half is run in a workshop format with desk critiques, where students are expected to design and develop a small research project individually or in a group. There is no requirement for computational skills for this class, although familiarity with some scripting language is an advantage.

## Schedule of Exercises, Projects, Quizzes, Exams or Assignments

|  |  |
| --- | --- |
| **Date due** | **Assignment (and/or project, quiz, exam)** |
| 2/13/23 | Exercise 1: Image Segmentation |
| 2/27/23 | Exercise 2: Finding and generating patterns by machine learning |
| 3/6/23 | Exercise 3: Photogrammetric modeling and AR |
| 3/13/23 | Exercise 4: Gesture Recognition |
| 3/20/23 | Exercise 5: Design Analysis through text |
| 5/15/23 | Final Projects |

## Absence Policy

N/A

## Evaluation Criteria, Completion Requirements & Grading

25% class participation, 35% weekly assignments, 40% mid-term + final review

## Completion requirements:

Students should finish all the assignments and final projects.

## Grading Definition

A/B/C/F

## Textbooks / Materials

No textbook needed.

## Lab Fees

No Lab fee needed.

## Academic Integrity/Honesty

Massachusetts Institute of Technology students are here because of their demonstrated intellectual ability and because of their potential to make a significant contribution to human thought and knowledge. At MIT, students will be given unusual opportunities to do research and undertake scholarship that will advance knowledge in different fields of study. Students will also face many challenges. It is important for MIT students to become familiar with the Institute’s policies regarding academic integrity, which is available at [*Academic Integrity at MIT: A Handbook for Students.*](http://integrity.mit.edu/)

## NAAB Student Performance Criteria

#### *Applies to all graduate subjects including non-studio subjects*

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