

# Arch 586 Descriptive & Systematic Approaches in Design

Syllabus for Spring 2018-19

February 12, 2019

This course considers two questions: How do people design? and How can computers design? We review the research that has been undertaken for answering these questions and look at the theoretical frameworks, research methods and research results.

## Topics and Readings

The topics of the course and the list of readings for each topic are given below.

### Introduction

We start the course with the history of design methods and give an overview of the different theories of design and how design is viewed by each of them. We consider the relation of design with science.

#### [Lecture Slides](#)

Background readings:

- Cross N. “[Designerly Ways of Knowing: Design Discipline Versus Design Science](#)” *Design Issues*, v 17, n 3, pp. 49 – 55, Summer 2001.
- Rittel H.W.J., Webber M.M. “[Dilemmas in a general theory of planning](#)”, *Policy Sciences*, v .4, 1973, pp. 155 – 169.

### Intuitive design process

What are some systematic frameworks allowing one to examine the activities that designers undertake? What is the role of the media used in design, of the designer’s training, personality and experience? The processes of design will be considered from a cognitive psychological framework which views thinking as information processing. Cognitive models are empirical in their derivation and their test is the degree that they describe design behavior.

#### [Lecture Slides](#)

Readings:

- Thagard P., [Mind: Introduction to Cognitive Science - 2<sup>nd</sup> ed.](#), The MIT Press, 2005. [BF316.6 . T48 2005]
- Akın Ö., [A Cartesian Approach to Design Rationality](#), METU Faculty of Architecture Printing Workshop, Ankara, 2006. Chapter 3, pp. 49 – 73.
- Eastman C.M. “[On the analysis of intuitive design processes](#)” in *Emerging Methods in Environmental Design and Planning* (ed.) G.T.Moore, The MIT Press, 1970. pp. 21-37.
- [Goldschmidt](#) G., “Capturing indeterminism: representation in the design problem space” *Design Studies*, v 18, 1997, pp.441-455.

- [Goldschmidt](#) G., “Linkographic evidence for concurrent divergent and convergent thinking in creative design” *Creativity Research Journal*, v 28(2), 2016, pp.115–122.

### Systematic enumeration of alternatives

Are there some methods by which design intentions can be systematically explored? We will look at methods for systematic enumeration of designs using floorplans as an example.

#### [LectureSlides](#)

Readings:

- Liggett R.S. “[Automated facilities layout: past, present and future](#)” *Automation in Construction*, v 9, 2000, pp. 197-215.
- Baykan C.A. “[Representations for analysis and synthesis of space layouts](#)”.
- Wu W, Fan L, Liu L, Wonka P. “[MIQP-based layout design for building interiors](#)”. EUROGRAPHICS 2018, v 37, n 2, pp 511-521, 2018.
- Stiny G, Mitchell W J. “[The Palladian Grammar](#)”, *Environment and Planning B*, v 5, 1978, pp. 5 – 18.
- Stiny G, Mitchell W J. “[Counting Palladian Plans](#)”, *Environment and Planning B*, v 5, 1978, pp. 189 – 198.
- Stiny G, Gips J. “[An Evaluation of Palladian Plans](#)”, *Environment and Planning B*, v 5, 1978, pp. 199 – 206.

### Course Organization

The course consists of readings, lectures and class discussions. There are readings on the topic that will be covered in the lecture, indicated on the course calendar. You are expected to do the reading before coming to class and participate in the discussions. You are responsible for everything covered in the readings. The readings can be accessed digitally from the web site <http://users.metu.edu.tr/baykan/arch586/>.

### Grading

Semester grades will be based on class participation, midterms and final.

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|--------------------------------|-----|
| ● Attendance and participation | 10% |
| ● Midterms [2 x 30%]           | 60% |
| ● Final                        | 30% |

## Course Calendar

The course meets for three hours on Tuesdays 13:40 – 16:30 in Room 45.

	Date	Lecture	Readings
1	Feb 12	Introduction	Cross, Rittel & Webber
2	Feb 19	Intuitive design process	Thagard
3	Feb 26	Intuitive design process	Akin
4	March 5	Intuitive design process	Eastman
5	March	Intuitive design process	Goldschmidt 2016,
6	March 19	<i>Midterm 1</i>	
7	March 26	Systematic enumeration of alternatives	Liggett
8	April 2	Systematic enumeration of alternatives	Baykan
9	April 9	Systematic enumeration of alternatives	Wu
10	April 16	Systematic enumeration of alternatives	Stiny/Mitchell/Gips
11	April 23	<i>Holiday -- No Class</i>	
12	April 30	Systematic enumeration of alternatives	
13	May 7	<i>Midterm 2</i>	

## Other Sources

The following journals are good sources to find additional readings and research materials for the topics covered in this class. METU library has an electronic subscription to these journals so that you can access and download articles and other content.

*Automation in Construction* <http://www.sciencedirect.com/science/journal/09265805>

*Design Studies* <http://www.sciencedirect.com/science/journal/0142694X>

*Environment and Planning B* <http://www.pion.co.uk/ep/>

The Design Research Society, DRS, is an organization of the design research community. You can find more about their activities and services at their website, <http://www.designresearchsociety.org/joomla/index.php>.

## Course Faculty

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Office hours: Wednesdays 10:30 – 11:30 or by appointment