4.031 Design Studio: Objects and Interaction
Instructors: Marcelo Coelho + Jessica Rosenkrantz
Fall 2017  TR 2-5 pm in 7-434
http://designobjects.mit.edu/

4.031: Design Studio: Objects and Interaction

Studio Overview
This course is an overview of design as the giving of form, order, and interactivity to the objects that define our daily experience. Instruction follows the path from project to interactive product through lectures, hands-on workshops, and studio assignments. Students will gain an understanding of the overall design process, with an emphasis on design development and constraints, preparing them for work in a studio environment.

Topics include the observation and critique of objects; interaction design and user experience; design methodologies, representation, and source material; current dialogues in design objects and production; economies of scale vs. economies of means; designing for unpredictable human behavior; and the role of technology in design.

This course provides a foundation in prototyping skills such as carpentry, digital fabrication, electronics, coding, and interaction. Lectures will provide a technical foundation to enable students to create their products, as well as a foundation in the current dialogues in the design, production, and significance of objects.

Project 1: Chair
We will start the course by constructing one of Enzo Mari’s Autoprogettazione chairs, and proceed to use the techniques you’ve learned to draw, model, build and critique your own piece of furniture inspired by Sol Lewitt’s drawing instructions.

Project 2: Light
In this project, you’ll be giving form to light by creating a lamp from lasercut units that aggregate to surround a light source. Your digitally fabricated lampshade is a vehicle for exploring geometry and fabrication as we transform 2D materials into 3D structures.

Project 3: Timer
We will end our course by designing an interactive clock, and providing a foundation in human-computer interaction, rapid prototyping, 3D printing, and physical computing. For thousands of years, humans have developed objects to measure and visualize time, yet the experience of time is still highly subjective and requires a physical representation so it can been seen, touched or heard.

Learning Objectives
The course is divided into three projects that explore the fundamental skills required in product design today. Students should be able to engage with an increasing level of design research
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and prototyping through a series of iterative studies and short assignments. Upon completion of this course, the student should have a firm understanding of:

- The structure and flow of a design project (opportunity, survey, questions, research, brief, design development, presentation, working drawings, production, critique);
- Digital and craft-based design and prototyping skills (woodshop, programming and electronics, rapid prototyping and digital fabrication, thermoforming and other plastic techniques);
- Design communication and language;
- Model-making, mock-up, and prototyping;
- Design criticism and the role of feedback in design development.

Where to Find Things and Communication

General class communication will take place through Piazza:  
https://piazza.com/class/j6safzrm51fp

Grades will be posted on Stellar:  

General class materials, assignments, and resources will be posted on:  
http://designobjects.mit.edu/

Completion Requirements

Completion of each of the exercises, rigor in process and clarity in representation, as well as the overall progress of the semester (including attendance) will be fundamental to completing the course.

Evaluation Criteria and Grading

The following criteria will be used for the evaluation of student’s work, both in terms of helping their progress and in final grading.

1. Thesis: How clearly is the student articulating the conceptual intentions?
2. Translation of Thesis: How well is the student using their thesis to develop a design response to given problems, interests, or ideas?
3. Appropriateness: How well matched is their choice of representation and prototyping strategy to convey their intentions?
4. Quality: How accomplished are they with drawing, modeling, digital representation, fabrication, etc? To what degree does their product convey what they ought to?

5. Oral Presentation Skills: How clearly are they presenting their ideas orally, whether at their desk, in class discussions, or to a more formal jury?

6. Participation in Discussions: How actively and how constructively are they involved in class discussions, both formally and informally?

7. Response to Criticism: How do they effectively take advantage of criticism from instructors, classmates and outside jurors?

8. Auto-Critical Skills: To what extent are they able to critique their own work regularly and effectively?


A: Excellent - Project surpasses expectations in terms of inventiveness, appropriateness, verbal and visual ability, conceptual rigor, craft, and personal development. Student pursues concepts and techniques above and beyond what is discussed in class.

B: Above Average - Project is thorough, well researched, diligently pursued, and successfully completed. Student pursues ideas and suggestions presented in class and puts in effort to resolve required projects. Project is complete on all levels and demonstrates potential for excellence.

C: Average - Project meets the minimum requirements. Suggestions made in class are not pursued with dedication or rigor. Project is incomplete in one or more areas.

D: Poor - Project is incomplete. Basic skills including graphic skills, model-making skills, verbal clarity or logic of presentation are not level-appropriate. Student does not demonstrate the required design skill and knowledge base.

F: Failure - Project is unresolved. Minimum objectives are not met. Performance is not acceptable. This grade will be assigned when you have excessive unexcused absences.

Grade Distribution

Each of the three projects will count for one third of your grade.

Studio Culture

Work in the studio will build sequentially. Therefore, your commitment to incremental development on a daily basis is of paramount importance. The demanding nature and pace of studio courses necessitates your regular attendance and requires that deadlines be consistently
met. In addition to lowering your grade, late work will prevent you from following the overall structure of the course.

It is important that you take advantage of the studio environment. You have been given a studio space; please use it. Magnification of your development as a designer is made possible by the collective nature of the studio. Working in studio, instead of at home, will allow you to participate in the dialogue of the studio setting. Group reviews are collective for a reason. Each of you has something to gain from your peers.

Since studio is a place for all, it necessitates the careful attention to the needs of everyone in it. Please see your instructors or TAs if there are any problems that you are unable to resolve on your own. All spraying of fixative, spray paint or any other substance should be done in the shop. Security is a necessary component for a studio that is accessible to you and your colleagues 24 hours a day, 7 days a week.

Attendance

Attendance for the full duration of each studio is mandatory. The studio is an exceptional learning environment that requires your physical presence as well as your intellectual presence. You are allowed three excused absences for the semester. An excused absence is defined as one that was discussed with and approved by the professor at least 24 hours prior to the date of absence, or a family or medical emergency that is confirmed by your physician or a dean in Student Support Services. Absences beyond the three allotted will result in a decrease in your final grade. If you miss six or more studio classes, you will be asked to drop the subject or receive a failing grade.

Academic Integrity + Honesty

MIT’s expectations and policies regarding academic integrity should be read carefully and adhered to diligently: http://integrity.mit.edu

Documentation

Students are expected to visually document and post their assignments, research, prototypes, and any pertinent material to the class website. Strategies for visually documenting students’ design work will be presented throughout the semester. We strongly suggest you dedicate a sketchbook exclusively for the class.

Final Studio Deliverables

Grades will not be posted for students to view on their grade report until their work has been archived. The projects need to be properly prepared and formatted, and delivered to the Archiving TA. Studio TA’s will collect project archives from each student immediately following the review. Detailed requirements and instructions for formatting will be posted to CRON, the Department website, and sent to students at the beginning of the semester.
Contact Information

Instructors:

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Materials List

Please have these materials in studio for every class session so you can sketch and make

- sketch book
- pencils
- ruler with mm and in
- exacto
- cutting mat
- glue
- tape
- scissors
## Schedule

***tentative schedule, some things may change***

### Project 1: Chair

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Introduction</th>
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<tbody>
<tr>
<td>9/7</td>
<td>Introduction to the course</td>
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<tr>
<td></td>
<td>Introduction to Enzo Mari and project 1 warm-up</td>
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<td></td>
<td><strong>Reading:</strong> Autoprogettazione</td>
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<thead>
<tr>
<th>Week 2</th>
<th>Shop Training and Construction of Chair Q</th>
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<tbody>
<tr>
<td>9/12</td>
<td>Shop training</td>
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<tr>
<td></td>
<td>Pair up and begin construction of chair Q</td>
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<tr>
<td>9/14</td>
<td><strong>Critique of Chair Q</strong></td>
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<tr>
<td></td>
<td>Intro project 1, design by rules, and Sol Lewitt</td>
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<tr>
<td></td>
<td>Conditional Drawing exercise</td>
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<tr>
<td></td>
<td><strong>Reading:</strong> Conditional Design Manifesto</td>
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<td><strong>Due:</strong> chair Q</td>
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<tr>
<th>Week 3</th>
<th>Concept Development and Drawing</th>
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<tr>
<td>9/19</td>
<td>Rhino drawing tutorial</td>
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<tr>
<td>9/21</td>
<td>Desk crit</td>
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<td><strong>Due:</strong> chair concept drawing + rules</td>
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<tr>
<th>Week 4</th>
<th>Modeling and Building</th>
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<tr>
<td>9/26</td>
<td>Scale modelling and prototyping tutorial</td>
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<tr>
<td></td>
<td>Introduction to studio photography</td>
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<tr>
<td>9/28</td>
<td>Work session &amp; desk crits</td>
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<td><strong>Due:</strong> 3 mini chair models</td>
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<th>Week 5</th>
<th>Production and Critique</th>
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<tr>
<td>10/3</td>
<td>Work session</td>
</tr>
<tr>
<td>10/5</td>
<td>Final review project 1 (with invited critics)</td>
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<td><strong>Due:</strong> project deck + final chair</td>
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Project 2: Light

Week 6  Introduction
         10/10 No class
         10/12 Intro to project 2 warm-up
                Fabrication tutorial: laser cutting
                Grasshopper tutorial (surface panelization)

Week 7  2D to 3D aggregations
         10/17 Review warm-up
                Intro to project 2
                Lecture + demos of techniques for making 3D structures from flat parts (modules, origami, layers)
                Due: warmup exercise

         10/19 Rhino tutorial (surface construction / deconstruction methods)
                “How to wire your light” tutorial
                Reading: basic electronics
                Due: lamp sketches

Week 8  Light + Shadow
         10/24 Blender rendering tutorial
                Due: light and shadow exercise

         10/26 Work session

Week 9  Prototyping
         10/31 desk crits
                Due: 3 lamp prototypes

         11/2  work session

Week 10 Critique
         11/7  Project 2 review (with invited guests)
                Due: project deck + lamp
Project 3: Timer

Week 10  Introduction

11/9  Intro to project 3 warm-up
Reading: electronics

Week 11  Interaction Design

11/14  Review warm-up
Introduction to project 3
Due: Warm-up exercise

11/16  Work session + desk crit
Due: Timer sketches

Week 12  Work-Like Prototype

11/21  Work session + desk crit
Due: Work-like cardboard prototype

11/23  No class

Week 14  Work-Like and Look-Like Prototype

12/5  Work session

12/7  Work session + desk crit
Due: Work-like + look-like prototype

Week 15  Final Critique

12/12  Final review project 3 (with invited critics)
Class clean-up
Due: Project deck + timer