CARLETON UNIVERSITY
School of Industrial Design

IDES 3310 - Industrial Design Projects IIIB - Fall 2017

Instructor
Çağla Doğan, Ph.D.

Office
Rm. AP 436
Tel: 613-520-5671, E-mail: cagla.dogan@carleton.ca

Office Hours
During studio hours or by appointment

Course Time and Location
Friday 9:35-12:25, 13:35-16:25 in ME 3475

Teaching Assistants
To be announced
Consultation Hours: During studio hours or by appointment
Room 436, Azrieli Pavilion (AP) Tel. 613-520-5671

COURSE DESCRIPTION
Introduction to the design principles associated with the evaluation and re-design of an existing product. Topics included: user/machine relationships, component packaging and manufacturability. The design project(s) incorporate principle knowledge for all previous IDES courses.

COURSE LEARNING OUTCOMES
By the end of this course students will be able to:

1. Use a systematic design process within a comprehensive design project, utilizing the design phases through research and analysis.

2. Explore and observe the use of products to identify product shortcomings, allowing for identification of project opportunities.

3. Identify and demonstrate product appropriateness in relations to aesthetics technology and marketplace feasibility, manufacturability, and use.

4. Incorporate design theory formed through required IDES course.

5. Through sketching and modeling exploration, show the development process of the individual problem identified. Alternative solutions presented will show the breadth of ideation, then refining the concept through iterations.

6. Build physical prototypes at different levels of fidelity to explore, test and verify design solutions.

7. Utilize digital design software to aid in the design process, with emphasis on final technical drawings.

8. Exhibit a finalized design that is completely defined in terms of appearance, function and manufacturing detail.

9. Presenting a short but concise document illustrating the design phases and summarization the work completed.

10. Communicate progress to peers and advisors through in class presentations.

11. Demonstrating professional behavior as an industrial designer.

12. Exhibit the ability to receive and respond to peer and instructor evaluation.
INSTRUCTIONAL METHODS
The following instructional methods will be used to achieve the course objectives: Design critiques, classroom discussions, lectures, seminars and workshops, student presentations (2D and 3D), market visits, user observations, idea generation tools.

READINGS: Recommended readings include, but are not limited to:

PARTICULAR COURSE INFORMATION

Sketch Record
Sketching allows a designer to record their ideas, practice different techniques, do exercises, make notes, paste loose sketches/photos/articles, work out details, note daily observations and record the processes of developing a product. Students are required to present their personal reflections and observations through sketching. It is also required to present sketches in an organized manner.

SCHEDULE

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Dates</th>
<th>Topics</th>
<th>Contents</th>
<th>Assignments</th>
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</thead>
<tbody>
<tr>
<td>WK 1 Intro</td>
<td>Sept 8</td>
<td>What is this course about? How to collect data for the literature search?</td>
<td>Introduction Course objectives Detailed schedule Assignment Zero Project brief, design process etc. Set up research teams Literature search on selected topics</td>
<td>Assignment zero Literature search about related approaches and examples Preparation for product breakdown reasons</td>
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<tr>
<td>WK 2 Literature search presentation &amp; Repair Workshop</td>
<td>Sept 15</td>
<td>What should I do in the field research and user observations via Experience Chart? How to conduct user Interviews? How to analyze gathered data? How to find user insights? What are the product breakdown reasons?</td>
<td>Presentation - Literature Search Repair Workshop (for product breakdown reasons) Introduction of the Experience Chart (EC) Guide as a User Observations Tool Qualitative research &amp; Interviewing for the EC Guide Ethics process Conducting observations and user interviews</td>
<td>Experience Chart (EC) Guide observations &amp; interviewing &amp; analysis</td>
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<tr>
<td>WK 3</td>
<td>Experience Chart &amp; Design Directions</td>
<td>Sep 22</td>
<td>How to organize and present findings and insights via EC?</td>
<td>Presentation – Experience Chart</td>
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<td>What are the problems, needs, preferences and design directions?</td>
<td>Gaining insights from the EC findings and develop design directions</td>
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<td>Introducing Biomimicry Sketch Analysis (BSA) exercise Part1</td>
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<tr>
<td>WK 4</td>
<td>Biomimicry &amp; Ideation</td>
<td>Sep 29</td>
<td>How to generate creative design ideas?</td>
<td>Design Workshop on Biomimicry Sketch Analysis as an Idea Generation Tool</td>
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<td>Biomimicry Sketch Analysis (BSA) Part 2</td>
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<tr>
<td>WK 5</td>
<td>Ideation on Design Transformation</td>
<td>Oct 6</td>
<td>Idea generation through a team collaboration</td>
<td>Design Workshop on Design Transformation via Scenario building and Lo-Fi prototypes</td>
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<td>Scenario building and Role playing/Body storming</td>
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<td>WK 6</td>
<td>Idea visualization</td>
<td>Oct 13</td>
<td>Here are my early ideas!! This is how my ideas supposed to work!</td>
<td>Design Critiques</td>
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<td>Visualize the early ideas through sketches (i.e. explorative and explanatory)</td>
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<td>Lo-Fi prototype to test the early ideas</td>
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<tr>
<td>WK 7</td>
<td>Preliminary evaluation</td>
<td>Oct 20</td>
<td>Here is my design in detail!</td>
<td>Preliminary evaluation/review</td>
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<td>Pin up idea sketches for design critiques/review</td>
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<td>Fall Break (No class)</td>
<td>Fall Break (No class)</td>
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<tr>
<td>WK 8</td>
<td>Concept prototype and feedback</td>
<td>Nov 3</td>
<td>This is how my design concept should work!</td>
<td>Video Presentation – Proof of concept prototype</td>
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<td>Testing design concepts</td>
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<td>WK 9</td>
<td>Refinement</td>
<td>Nov 10</td>
<td>I’m improving my design!</td>
<td>Design critiques</td>
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<td>Concept refinement</td>
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<tr>
<td>WK10</td>
<td>Design details &amp; Model making</td>
<td>Nov 17</td>
<td>How my design looks like?</td>
<td>Design critiques</td>
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<td>Tech. drawings</td>
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<td>Full-scale model making</td>
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<tr>
<td>WK11</td>
<td>Final screening &amp; Model making</td>
<td>Nov 24</td>
<td>How my design looks like? What to present?</td>
<td>Final screening for presentation boards and tech. drawings</td>
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<td>Model making</td>
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<tr>
<td>WK12</td>
<td>Presentation</td>
<td>Dec 1</td>
<td>Final Presentation/Review</td>
<td>Presentation and submission</td>
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<td>Models, tech. drawings, presentation boards</td>
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<tr>
<td>WK13</td>
<td>Report submission</td>
<td>Dec 8</td>
<td>Final Report</td>
<td>Submission and feedback</td>
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<td>Final report</td>
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**Phase I (team work – presentations):** Each team will cover one subject category for the literature research and conduct a thorough literature search on the subject category assigned to their team. As a team, you will discuss and present your major conclusions and findings from the literature search. Each team will also conduct use observations with a particular focus on project theme to identify problems and develop alternative design directions. Based on the Experience Chart Guide tool (for user observations) introduced in the studio, you will present your major conclusions and insights from this phase of research.

**Phase II (individual work – idea sketches, Lo-fi and concept prototypes):** In this phase, you are expected to benefit from the findings/insights and initial sketches you produced during the analysis phase, and develop alternative and diverse scenarios that propose design solutions for the area of focus via the use of various idea generation tools and methods (e.g. biomimicry sketch analysis, scenario building, body storming, etc.). While developing scenarios and solutions, you are expected to explore diverse stories with diverse personas, taking place in various locations in line with the project theme. Through hand sketches and full-scale mock-ups, you will test and present your design solutions for the preliminary evaluation and proof of concept prototype phases.

**Phase III (individual work – models, presentation boards, tech drawings and report):** For the final phase, you will focus on one design alternative and develop it further for final presentation. You will demonstrate your design solution via using colored drawings and renderings based on design considerations outlined in the project brief. This phase will also include design detailing for which you will prepare black and white technical drawings, including orthographic views with dimensions, perspective drawing(s), section(s), and drawings of details as many as necessary. 3D presentation will be supported by full-scale models.

**DELIVERABLES**

1. Research presentations (15 %)
   For the literature research, the class will be divided into several groups based on the sub categories of the project theme to focus on. In each team, students will need to investigate relevant information such as technological details, related products, contextual information, sustainability criteria, etc. For the field research, furthermore, students individually need to observe potential users to identify their problems, difficulties, issues and needs. It is expected that the field research will allow each student to identify a design opportunity.

   [Deliverables]
   Presentation and Submission:
   1. Literature Search Presentation
   1. Experience Chart Guide Presentation based on provided format

   * Assessment Criteria: Data gathering process: Lit. Search, User Observations and Interviews via the Experience Chart Guide, etc.
     - Insights: Novelty, Hidden insights, Problem and Opportunity identification
2. Idea sketches & Lo-fi prototypes (25 %)

Idea sketches and low-fidelity prototypes are employed as mediums to facilitate individuals as well as group’s ideation process. The idea sketches (e.g. explorative and explanatory sketches) and lo-fi prototypes should be used as ways to visualize as many alternative ideas as possible and a way to explore the ideas. The sketches should also include context as well as use cycle/stages that clearly communicate how prospective users will engage with the product. Consider variations on more detailed aspects such as materials and formal qualities.

[Deliverables]
Explorative and explanatory sketches & lo-fi prototypes

* Assessment Criteria:
  - Diversity of ideas
  - Fluency of visual communication
  - User engagement and use environment (i.e. scenario)
  - Innovative/creative aspect
  - Completeness and quality of delivered work

3. Proof of concept prototype (15 %)

Proof-of-Concept Prototype is a show-and-tell device that allows you to evaluate and demonstrate that your design idea is going to work and function as envisioned. This prototype does not need to be pretty. Normally, it does not bear any resemblance to your final product, since the goal is to only prove it functions and not to prove that it looks refined.

Existing products may be taken apart to explore components. Safety guidelines must be observed to avoid hazards and any electronic wiring work will need to be done under supervision in a shop technician.

The following guidelines should be followed:
The proof of concept prototypes may be made out of materials such as cardboard, foam-core, pink foam, wood, found objects etc. It should not include any machined parts or 3D printed parts.

[Deliverables]
  - Prototypes to test proposed design ideas
  - Foam/detailed models to test user’s physical interaction

* Assessment Criteria:
  - Testability
  - Reliability

4. White model with design details (15 %)

This is where the design is finalized and completely defined in terms of form and design details. It will be important to refine and optimize the formal resolution of the product, by focusing on fine details and the aspects of production. This non-working full-scale white model will be made that replicates the final form of the product as much as possible. Design details is to be demonstrated with external parts (including controls and displays) as well as representational parts of other major internal components (e.g. hinges, printed circuit board (PCB), etc.). Some components (i.e. small scale) of the model must be produced by 3D printer, CNC or laser cutter.

[Deliverables]
  - White model via the incorporation of 3D printer or CNC

* Assessment Criteria:
  - The level of form refinement
  - The level of design details
  - The quality of workmanship
5. Final report, Presentation board, Tech. drawing (30 %)

**Final report:** The final documentation format will be short and concise and will follow the guidelines which will be presented in class. The reports are to be handed in as soft copy (on CU Learn). This report will make use of the documentation created during the various phases and primarily summarizes the work done by the student.

**Presentation Board:** This will demonstrate your design solution through describing all critical design features and details, and its usage in context via using colored drawings and computer renderings.

**Tech. Drawing:** Technical drawings includes orthographic views with dimensions, section(s) showing the placement of the product and electric components, and exploded view of each product part for connection details.

* Assessment Criteria:
The level of details
Manufacturability
The level of innovation and adherence to the design considerations highlighted in the project brief.

**Grading**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Research presentations</td>
<td>15 %</td>
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<tr>
<td>Idea sketches &amp; Lo-fi prototypes</td>
<td>25 %</td>
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<tr>
<td>Proof of concept prototype</td>
<td>15 %</td>
</tr>
<tr>
<td>White model with design details</td>
<td>15 %</td>
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<tr>
<td>Final report, Presentation board, Tech. drawing</td>
<td>30 %</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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**Materials:** Utilize the tools that you have purchased from previous years courses.

**Suggested Materials:**
- One pack of HP Bright White Ink Jet paper or Similar 8 ½ x 11"
- Tracing Paper (in role format) 11" or longer
- Roll of masking/drafting tape (25mm)
- Roll of double sided tape (25mm)
- Various Nylon Tipped or Roller Ball Pens - investigate different pens, you will get a feel for what you like
- Verithin Pencils – Color selection – Non-Repro Blue, Indigo Blue, and /or Black
- Cool and Warm Gray Designer Markers – Series 1 to 10
- Coloured Designer Markers
- X-ACTO craft knife with # 2 replacement blades
- Segmented Knife – Olfa like, replacement blades required (a pack of 50 is recommended)
- Cork back steel ruler - 14” +
- Cutting Board – Small 30cm x 45cm
- Hot Glue Gun and Glue Sticks (small craft glue guns are not sufficient)
- Engineer Square or equivalent
- 100 and 220 Grit Wet Dry Sand Paper with a Sanding Block
- One set of Safety Goggles/Glasses
- If you have sensitive hearing I would also suggest ear plugs
- If you need dust masks, they can be purchased at SID shops

**Software installed on laptop:**
- Adobe Suite (Photoshop & Illustrator)
- Solid Works and/or Rhino
**Individual/Group Work**  
Courses may include various combinations of individual and group work. Students must demonstrate individual aptitude. It is important where collaborative work is undertaken that students be able to clearly demonstrate that individual contribution has been made. Where the evaluation for individual work is below a passing grade, that grade will be awarded for the course.

**Studio Class Attendance**  
Due to the participatory nature of the studio environment, students are expected to attend studio lectures and classes regularly.

**Review Attendance**  
Attendance at scheduled SID reviews is mandatory. These are equivalent to exams in IDES courses when indicated in the course outline. Failure to attend will result in a grade of F. If you are not able to attend a review, you are required to call the General Office (613-520-5672) and/or send an email to id@carleton.ca to leave a message in advance. A comprehensive medical certificate or other documentation to substantiate the absence must be submitted as soon as possible after the review. The documentation must state the date of illness onset, the expected date of recovery, and the extent to which the student is incapacitated. The student is also required to set up a meeting with the instructor as soon as he or she is well enough to discuss and schedule an alternative date.

Any student in the review should submit materials for presentation and present as scheduled. In addition, a student who does not remain for the complete review session, who does not present as scheduled, or who arrives late for the review, without approval from the instructor, will receive a 10% grade reduction for that review.

**Late Submission of Deliverables**  
Course Deliverables for reviews and other due dates  
All deliverables submitted late will accrue a 10% per day deduction from the determined grade, to a maximum of 3 days, from the original deadline time and date. Failure to submit within 3 days, without approval from the instructor, will result in a grade of F.

**Participation and Professionalism**  
Active participation and professional conduct are particularly important in studio courses and will be evaluated. At the same time, when the student’s work is reviewed at the end of the course, an evaluation will be made based on one or more of the following: in class discussion; consultations with instructors; and work ethic. However, none of these evaluations will be used to raise an overall failing grade, to a passing one, based on the quality of the work.

**Student Access to Final Reports**  
This is for evaluation purposes only and will not be returned to the student.

**STUDENT CONSIDERATIONS AND RESPONSIBILITIES**

**Academic Accommodation** (Equity Services)  
You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

**Pregnancy obligation:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit: [http://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf](http://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf)

**Religious obligation:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit: [http://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf](http://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf)

**Academic Accommodations for Students with Disabilities:** The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your
PMC coordinator to send me your *Letter of Accommodation* at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (*if applicable*). **Requests made within two weeks will be reviewed on a case-by-case basis.** After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website (www.carleton.ca/pmc) for the deadline to request accommodations for the formally-scheduled exam (*if applicable*).

**Instructional Offenses / Plagiarism**  
The regulations of the university require that we bring to your attention regulations on *Instructional Offenses*, descriptions of which can be found in the current *Academic Integrity Policy* available on the Student Affairs website. The policy governs the academic behavior of students. At the same time it seems that students do not always understand the meaning of plagiarism and how to avoid it.

In industrial design, ideas and concepts come from a multitude of sources to be modified and utilized in the design and development process. The student should reference sources appropriately.

**Student Responsibility (studio courses)**  
The student is responsible for knowing the content of this course outline, the schedule of classes, assignments, and reviews; and material covered during any absence from scheduled classes.

Unless otherwise arranged, the class will meet during regularly scheduled studio hours. These meetings are mandatory; important issues and questions will be raised, and announcements might be made. Everyone is expected to be based in studio and to work during scheduled hours. The studio should be considered a professional design studio environment. Because of the special involvement of external professionals, scheduling changes for guest lectures, presentations, and reviews may occur at short notice; students should stay informed regularly.

**Changes to the Course Outline**  
The course outline may be subject to change in the event of extenuating circumstances.