Design for Medium Complexity (11050) 2023

UNIVERSITY OF CANBERRA
FACULTY OF ARTS AND DESIGN
COURSE IN INDUSTRIAL DESIGN

Design Statement

This unit comprises 3 hours of studio contact per week. It continues the development of the design process, design skill acquisition and design methodologies within a project-based design program with a focus on design solutions suitable for specific contexts and users. The unit has an emphasis on three-dimensional creative design of a product consisting of several components that require the arrangement of components to fit into an assembly. Also required is consideration to the form, function, ergonomics, marketing and sustainability. Students will systematically investigate the interrelated, syntactic, pragmatic and semantic attributes of a range of new and existing products. The knowledge gained will inform, how they are designed, constructed, used and how they can be improved by further design and development. As designers in training, students will learn to use problem-solving methods to develop new design concepts.

Timetable

Week	*Activity*	*Assessment*
1	**1. Handout Unit Outline** **2. Launch Project** **3. Research Report Format** **4. Technical package.** **5. Mind mapping class exercise**	
2	1. Update on project progress- Students are to bring their work in progress to class (Research) for feedback. 2. Sketching Workshop- Will need an A3 Bleed-proof pad, pencils, pens & markers.	
3	1. Update on project progress- Students to bring their work in progress to class (Research and Concepts) for feedback. 2. Rendering Workshop- Will need an A3 Bleed-proof pad, pencils, pens & markers.	
4	**Submission:** **Task clarification** (TC) **Concept Generation** (CG)	**Formative assessment** as in class feedback provided verbally during class. Written feedback on canvas. **Value 25%**
5	1. Working on Project- Students to bring their work in progress to class (Evaluation, Refinements & in progress form study) for feedback. 2. Workshop on Eco-Indicator values	
6	Working on Project- Students to bring their work in progress to class (Evaluation & Refinement) for feedback.	

7	**Submission:** **Evaluation and Refinement** (ER)	**Formative assessment** as in class feedback provided verbally during class. Written feedback on canvas. **Value: 30%**
8	CLASS FREE WEEK	
9	Working on Project- Students to bring their work in progress to class (Final Design) for feedback.	
10	Working on Project- Students to bring their work in progress to class (Final Design) for feedback.	
11	Working on Project- Students to bring their work in progress to class (Final Design) for feedback.	
12	Working on Project- Students to bring their work in progress to class (Final Design) for feedback.	
13	**Submission** **Final Design and design process summary**	**Formative assessment** as in class feedback provided verbally during class. Written feedback on Canvas. **Value: 45%**
		Summative assessment **Value 100%**

Lists of required texts/readings

Bonollo, Elivio (2015) Product Design: A course in first principles

Available as a paperback (320 pages), in black and white and full colour versions: http://www.fast-print.net/bookshop/1877/product-design-a-course-in-first-principles-mono (Links to an external site.)Links to an external site.
The 2018, eBook edition is available in mobi (Kindle) and ePub (iBook) file versions on amazon and other worldwide networks; including on the following websites:
ePub versions:
https://www.booktopia.com.au/ebooks/product-design-elivio-bonollo/prod9781784562946.html

mobi (Kindle versions):
https://www.amazon.com.au/Product-Design-Course-First-Principles-ebook/dp/B07FNV2F4L/ref=sr_1_fkmr0_1?ie=UTF8&qid=1532497383&sr=8-1-fkmr0&keywords=Product+Design+a+course+in+first+principles

Resources

Technical Drawing.pdf

EI99_Manual for designers.pdf

Assessment overview

Assessment item (including exams held in the exam period)	Due date of assignments	Weighting (total to equal 100%)
Project 1: Task Clarification & Concepts	Week 4	25%
Project 1: Evaluation & Refinement	Week 7	30%
Project 1: Final Design & Process summary	Week 13	45%

Project Brief – Design for Medium Complexity

UNIVERSITY OF CANBERRA
COURSE IN INDUSTRIAL DESIGN

Unit: 11050 Design for Medium Complexity
Title: Project 1 – Electric Water Kettle
Handout: Week 1
Submission: Week 13
Duration: 13 weeks
Value: 100 %

LEARNING OUTCOMES

This project is about connecting students with learning experiences and skills gained by the creative design and construction of products with several components, including analysing and testing such products for their function and ergonomics while being mindful of sustainability considerations. In this project, the design process is employed to conceive innovative and creative solutions to design problems. Through research, design, testing, and building a product with several parts, that must fit together into an assembly, students will develop and enhance their design skills and knowledge and understanding of a medium complexity assembly.

Students who complete this project should have:

- Further developed information processing and problem-solving skills, including cognitive, affective and perceptual motor skills for designing products of medium complexity.
- Gained, through direct analysis and testing, an appreciation of ergonomics.
- Acquired knowledge and appreciation for design detail through experience in the construction of products with several parts.

- Acquired a practical knowledge of medium complexity product materials and manufacturing methods, mindful of workshop safety practices (a full-size prototype of the design is required).
- Acquired a basic understanding of quantitative and qualitative Ecodesign parameters and Life Cycle tree calculations.

These outcomes should be demonstrated by:

- Your ability to empathise with potential users/consumers in the design and development of a creative product with several parts that fit together in a medium complexity assembly.
- Your perception and understanding of the design brief/problem, and your skill in planning your work to meet the submission deadlines.
- Your skill in researching the market to identify commercial possibilities, as illustrated by a consumer survey and marketing matrix/analysis techniques.
- Your creative skills in using and applying design methods (including mood boards, biomimicry and biological analogies) to generate a reasonable number of novel design concepts in a design thinking/design process context; and your skill in evaluating design concepts to recognised design award criteria.
- Your analytical skills in compiling the ergonomic requirement of your proposed designs based on published data.
- Your skill and resourcefulness in the selection of appropriate materials and the construction of a prototype, which is suitably close in appearance to what the final manufactured product would be in the marketplace (scale 1:1).
- Your ability to integrate all the interdependent stages of the design process to bring the design project to a notable and timely conclusion with due regard to form, function and environmental variables.
- Your communication skills in presenting your design solution to your peers and tutor (client). Your willingness to consider constructive critique and comments from peers and tutor.

BACKGROUND

Design Brief (requirements, context, scope):

You are required to design an **Electric Water Kettle** for the domestic consumer market with a mid to high end price range (based on Electric Water Kettles currently on the market). You are required to select the market price point (somewhere in the mid to high range) and an existing brand for your Electric Water Kettle design. In scope, your design must take into consideration the following design variables, parameters and constraints:

- A major design consideration is to design a marketable product that is innovative and unique. It must be functional, ergonomically sound, aesthetically pleasing and importantly is **safe and environmentally sustainable**.
- The design can employ any material and finish selected in consultation with your tutor mindful of Design for Sustainability (DFS), Ecodesign and Safety principles.

- Internal components (technical package) will be look at, but you can source your own components from technology that is readily available on the market.

Procedural Guidelines:

Task Clarification (TC) stage of the design process:

- In consultation with your Tutor, research and document similar products available on the market and critically summarize their usability, functions, safety, technical package, ergonomics, aesthetics, price and environmental factors. Construct a *Marketing Matrix* to compare these products: make this comparison based on relevant design features, for example, ease of use versus price, simple structure versus complex, low cost versus high cost and so on. You can construct more than one matrix if needed.
- Use this matrix(s) to locate a prospective target market (void in the market) for your design—label this area as your *Target Market* which will inform your *Design direction*. Summarize your TC findings to justify the *Design direction* for developing your Electric Water Kettle.
- Present your research from this stage in a concise PDF 4 pages maximum report.

*Concept Generation (*CG*)* stage of the design process:

- Generate a minimum of 3 alternative unique design concepts. Each concept must be communicated via quality free hand sketches, complete with explanatory notes, on a minimum of 3 A3 Sheets per concept. You may choose *biological analogies* and other idea generating methods as sources of inspiration for your concepts. Concepts need to consider usability, functions, technical package, assembly & disassembly, ergonomics, materials, aesthetics and environmental factors. You must clearly communicated these requirements in you sketches.
  Your presentation sheets need to incorporate a simple graphic theme to tie them together and project a professional look to the presentation (your tutor will explain).

  Make an A3 mood board to reflect your target market, design inspirations and directions. If you have more than one target market, you will need a different mood board per target market. Aim for the concept designs is to have i*mpact* or *wow* factor including an appropriate *form language*.

*Evaluation and Refinement (*ER*)* stage of the design process:

- Choose a preferred concept based on the feedback from your tutor (Client) in the CG stage. Evaluate and refine the preferred concept's usability, functions, assembly & disassembly, safety, unintended dangerous use, cleaning, technical package, materials, ergonomics, aesthetics, recycling and environmental factors; also see Good Design Australia for design *Evaluation Criteria* (https://good-design.org/good-design-awards/categories-criteria/).

- Generate some sketches of your refined Electric Water Kettle concept and then construct a simple form study at a 1:1 scale to show the features of your design. For the form study you can use blue foam, plantation timber or other low-cost and readily available materials.

- Use the refined sketches and form study to empathize with prospective users of your product. Conduct a *user-trial* with a group of peers and potential users. Record results carefully and analyze them to arrive at findings regarding the advantages and disadvantages.

- Summarize the findings of your user-trial, focus group, environmental factors, positive and negative attributes of your design, Life Cycle analysis and calculation of eco-indicator values in a PDF report, 4 pages maximum.

- Based on your findings, update your refined sketches and form study as follows:
  - Generate a minimum of three A3 sheets of quality freehand sketches/renderings with explanatory notes of your refined design. Your sheets need to incorporate a graphic theme to tie them together and project a professional look to the presentation.
  - Make a 1:1 scale form study made from blue foam, plantation timber or other low-cost and readily available materials

*Final Design (*FD*)* and Documentation stage of the design process:

- For this stage you can use CADD to develop your final design. In industry this is where CADD is typically employed. Bring your computers along to class so that your tutor can assist you with your CADD modeling.

- Prepare two A2 PDF size posters to sell and visually summarize your design.
  PAGE 1- Highlights your final Electric Water Kettle design in its typical environment as the central focus-piece showing its market, user(s), creative, novel and aesthetic features.
  PAGE 2- Show materials, finishes, manufacturing, construction, assembly, technical package, context, safety and sustainability.
  Remember to incorporate a graphic theme.

- Construct a 1:1 scale detailed **blue foam model** of your **Electric Water Kettle** to demonstrate the creative and novel attributes of your design.

SUBMISSIONS

Assignment 1: Task clarification (TC) — In response to the brief and the Procedural Guidelines: You are required to submit a 4 x 4A pages maximum report in pdf format on Canvas. This includes- Introduction timeline, market analysis, moodboard, strengths and weaknesses, features, price, usability, functions, materials, assembly & disassembly, technical package, ergonomics, aesthetics, environmental factors, etc. plus reference list.

Assignment 1: Concept Generation (CG) — In response to the brief and the Procedural Guidelines: You are required in class to pin-up and present 3 concepts of your Electric Water Kettle consisting of 3 A3 pages per concept of quality hand-generated sketches with explanatory notes

and Mood board(s) for your tutor to critique.
Submit a pdf copy of your sketches on the Canvas site.

Assessment 1 Criteria
Task Clarification and Concept Generation:

- Quality of the task clarification stage- problem definition, attention to detail, developing empathy with prospective users, carrying out a detailed information search, literature review and market analysis.
- Quality of the concept generation stage as informed by your task clarification- level of creativity and innovation, ability to use sketches to communicate design intent, are the sketches self-explanatory with appropriate notations and is the presentation of a professional level incorporating a graphic theme to tie the presentation together.

Week 4 25%

Assignment 2: Evaluation and Refinement (ER) - In response to the brief and the Procedural Guidelines: Evaluation and Refinements, you are required in class to pin-up and present a minimum of 3 A3 sheets of freehand sketches/renderings with explanatory notes plus display your form study (1:1 scale) of your refined Electric Water Kettle for your tutor to critique. On the Canvas site you are required to upload:

a) A digital copy of your pin-up presentation with photos of you form study and,
b) A 4-page maximum PDF summary of your user-trial, focus group, environmental factors, positive and negative attributes of your design, Life Cycle analysis and calculation of eco-indicator values.

Assessment 2 Criteria
Evaluation and Refinement

- Quality of sketches/renderings, level of evaluation refinement of selected concept, use of appropriate evaluation methods including notable syntactic, pragmatic and semantic analyses.
- Level of communication in conveying design intent with self-explanatory notes and a professional level of presentation incorporating a graphic theme to tie the presentation together.

Week 7 30%

Assignment 3: Final Design (FD) **and Documentation-** In response to the brief and the Procedural Guidelines:
you are required to present a 1:1 scale detailed blue foam model of your Electric Water Kettle in class for your tutor to critique.
Also, in class you are required to present your two A2 page digital PDF poster to sell and visually summarize your design as follows:

PAGE 1- Highlights your final Electric Water Kettle design in its typical environment as the central focus-piece showing its market, user(s), creative, novel and aesthetic features.
PAGE 2- Show materials, finishes, manufacturing, construction, assembly, Technical package, context, safety and sustainability.
Remember to incorporate a graphic theme.

A digital copy of your posters and quality photos of your Electric Water Kettle model must be submitted on Canvas.

Assessment 3 Criteria

Final Design and process summary

- Quality of the design: Realized a high-quality product design that has been prototyped and tested against relevant evaluation criteria, including novelty, creativity, usability, functions, technical package, ergonomics, form, aesthetics, scale, proportions, market, safety and sustainability.
- Design process: Understood the nature of the design problem/tasks; empathy with prospective consumers; information search and data analysis skills.
- Communication: Achieved quality of final communication of the project: including completeness of all required elements; quality of your drawings and prototype, and the ability to orally communicate clearly and confidently your design intentions and output. Shown ability to write and present concise and explanatory information and reports about the creative and technical features of your design work.

Week 13 45%