MATERIALS AND APPLICATIONS I

IE University

Professor: ANDREA CARUSO
E-mail: acaruso@faculty.ie.edu

Academic year: 19-20
Degree course: SECOND
Semester: 2º
Category: COMPULSORY
Number of credits: 6.0
Language: English

PREREQUISITES
The students are required to be familiar with design research methods, ideation techniques, visualisation and prototyping in physical and digital environments and; issues of design for sustainability, the circular economy and commercial viability. The practical requirements: hand sketching, computer skills in order to research and compile presentations (Keynote, Powerpoint, Indesign, Illustrator). It is highly recommendable to know some fundaments of computer aid drawing - 2D and 3D (i.e. Rhinoceros, Autocad, Sketch-up etc.). Students must have a very good predisposition to manual work, using different types of materials, and dominate the use of tools and machineries in the Fablab.
SUBJECT DESCRIPTION
The programme is an introduction to the world of materials and its manufacturing processes. The course provides different perspectives to gain insight into modern processing technology, product design, innovation, financial considerations and production.
OBJECTIVES AND SKILLS
The main themes and skills to be acquired will be:
- To learn the different material properties;
- To learn how to modify the properties through manufacturing techniques;
- To apply the material theory to practical exercises;
- To identify the use of the best material depending on a project briefing;
- To propose sustainable material alternatives in the manufacturing of products;
- To learn important references in the history of design and in the contemporaneity;
METHODOLOGY
The course is divided into different consecutive sections all of them composed by theoretical and practical activities and the engagement with readings through assignments, class discussion and tasks both individual and group work. Students are expected to delivery assignments constantly throughout the course, collective debates will be held every session to share contents and points of view. Interactivity and engagement is critical to the learning process and therefore students will be encouraged to share their thoughts and ideas in relation to issues presented in each seminar.

Theory
The course is divided into 5 sections:

1. Introduction to the Material World
2. Wood & Composites, Related Innovative Materials
3. Ceramics & Glass, Related Innovative Materials
4. Metals, Related Innovative Materials
5. Plastics, Related Innovative Materials

Individual Assignment
The course main assignment is the analysis of a Home Appliance. Each student will find a home appliance product and make an extensive analysis of its materials and manufacturing process. The assignment is divided in consecutive deliveries through out the entire course. The assignment will end with a speculative new design proposal, correcting or improving the shape or the product.

Individual Assignment Deliverables

Product Analysis:
Each individual will use a cardboard project folder (Muji - model is linked below) to inlcude the following materials:
- Research and Analysis of a Mythical or the Best Selling Competitors’ Product
- Instruction manual step by step handsketch
- Components Chart describing Materials and Manufacturing Processes
- Usability Diagram
- Cost Analysis for a production of 100,000 Units
- Blue Prints in A3 folded into half (A4) with axonometric, top & side views, sections

Each individual needs to buy a Muji folder with cardboard finish (7€):

New Design:
- A3 Vertical Sketch Blue Craft Paper of New Product (update of design)
- Physical Moodboard for new proposal
- Reproduce de shape of the product or its main component by using a sustainable or recycle / upycle material

Final Show:
Part of the assignment is to design the way the project can be communicated and displayed in a public show.
<table>
<thead>
<tr>
<th>Teaching methodology</th>
<th>Weighting</th>
<th>Estimated time a student should dedicate to prepare for and participate in</th>
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</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>26.67 %</td>
<td>40 hours</td>
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<td>Discussions</td>
<td>13.33 %</td>
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<tr>
<td>Exercises</td>
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<td>30 hours</td>
</tr>
<tr>
<td>Group work</td>
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<td>30 hours</td>
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<tr>
<td>Other individual studying</td>
<td>20.0 %</td>
<td>30 hours</td>
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<tr>
<td>TOTAL</td>
<td>100.0 %</td>
<td>150 hours</td>
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</table>
PROGRAM

SESSIONS 1 - 3

1. Introduction.
In this introductory session the class will pay a visit to:
- Ciszak Dalmas Studio
- COAM - Materioteca in Madrid
The aim of the visits is to discover how materials are applied both in product design and architecture.

Each individual will contact an innovative supplier and will require a sample. All samples must arrive to the IE Segovia Campus before Session n. 25. Students have to study the material properties and the way it is manufactured. All samples will be displayed on the class shelves with a detailed tag (properties, prices and contact information).

CISZAK DALMAS: Calle Lope de Vega 21, 4 izq. - Madrid
COAM: C/ Hortaleza 63, 3ª planta. 28004 - Madrid

Individual Assignment
The teacher will introduce the main assignment: a "Home Appliance Biopsy". Each student will find a home appliance product and make an extensive analysis of its materials and manufacturing process. The assignment is divided in consecutive deliveries throughout the entire course. The assignment will end with a speculative new design proposal, correcting or improving the shape or the product.

Readings:
http://www.chrislefteri.com/publications.html

SESSIONS 4 - 6

Introduction to Manual & Bibliography:
The Detailed Guide by Professor Andrea Caruso

2. Wood & Composites
The first sessions are dedicated to Wood & Composites materials, explaining types, manufacturing processes and design references.

2.1. Innovative Materials: Wood
This short lecture will be on alternative materials, showing how innovation has introduced new sustainable solutions to solve the many problems deriving from the use of solid wood.

Individual Assignment:
- Theory: each individual will study the material shown in class and prepare for the product analysis.
- Practice: each individual will bring to class the chosen home appliance product to start its disassembly.

Mid Sessions Delivery:
One week after each individual is required to publish 3 pictures that represent the process and post them on the course Instagram profile @BIDMATERIALS, including a text description of the materials, tools and finishes shown in the pictures.
SESSIONS 7 - 9

This class is dedicated to visit the Parque Tecnológico de Valdemingómez.
The purpose of the visit is to understand the products' life cycle and how they are dismissed at the end of their life.

SESSIONS 10 - 12

3. Ceramics & Glass
The session is dedicated to Ceramics & Glass materials, explaining types, manufacturing processes and design references.

3.1. Innovative Materials: Ceramics & Glass
This short lecture will be on innovative solutions in the same category of material.

Individual Assignment:
Each individual will work on the main assignment.

Mid Sessions Delivery:
One week after each individual is required to publish 3 pictures that represent the process and post them on the course Instagram profile @BIDMATERIALS, including a text description of the materials, tools and finishes shown in the pictures.

Additional readings will be given on the subject.

SESSIONS 13 - 15

Mid Term Review

Each individual will present the analysis of the Home Appliance.

In a cardboard project folder (Muji - model is linked below) include the following materials:
- Research and Analysis of a Mythical or the Best Selling Competitors’ Product
- Instruction manual step by step handsketch
- Components Chart describing Materials and Manufacturing Processes
- Usability Diagram
- Cost Analysis for a production of 100,000 Units
- Blue Prints in A3 folded into half (A4) with axonometric, top & side views, sections

Each individual needs to buy a Muji folder with cardboard finish (7€):

SESSIONS 16 - 18

4. Metals
The session is dedicated to Metal materials, explaining types, manufacturing processes and design references.

4.1 Innovative Materials: Metals
This short lecture will be on innovative solutions in the same category of material.

Individual Assignment:
Each individual will work on the main assignment ("New Design")
Mid Sessions Delivery:
One week after each individual is required to publish 3 pictures that represent the process and post them on the course Instagram profile @BIDMATERIALS, including a text description of the materials, tools and finishes shown in the pictures.
Additional readings will be given on the subject.

SESSIONS 19 - 21

5. Plastics
The session is dedicated to Plastic materials, explaining types, manufacturing processes and design references.

5.1 Innovative Materials: Plastics
This short lecture will be on innovative solutions in the same category of material.

Individual Assignment, Project Review:
Each individual will work on the main assignment ("New Design")

SESSIONS 22 - 24

This class is dedicated to Indiviual Project Review and Final Show Briefing.

Individual Assignment, Final Show:
Each individual will design the way their course's project can be communicated and displayed in a public show.

SESSIONS 25 - 27

This class is dedicated to Indiviual Project Review. Students may use this class to correct their assignment before the final submission.

SESSIONS 28 - 30

FINAL SUBMISSION
Students will display their final work:

Product Analysis:
Each individual will use a cardboard project folder (Muji - model is linked below) to include the following materials:
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- Instruction manual step by step handskecht
- Components Chart describing Materials and Manufacturing Processes
- Usability Diagram
- Cost Analysis for a production of 100.000 Units
- Blue Prints in A3 folded into half (A4) with axonometric, top & side views, sections

Each individual needs to buy a Muji folder with cardboard finish (7€):

07th January 2020
New Design:
- A3 Vertical Sketch Blue Craft Paper of New Product (update of design)
- Physical Moodboard for new proposal
- Reproduce the shape of the product or its main component by using a sustainable or recycle/upcycle material

The teacher will address questions on each individual project to evaluate the knowledge the students have acquired in class.

EXHIBITION
Students participate in the mounting of the final exhibition showing the process and results of the MA Course.
BIBLIOGRAPHY

Compulsory:
 ISBN-10: 0500513759

Recommended Bibliography:
Henley's Twentieth Century Formulas, Recipes and Processes, Hiscox, Benediction Classics (March 17, 2010)
ISBN: 9781856697255
EVALUATION CRITERIA

The evaluation system will be the sum of the Mid Term Presentation, Final Submission and class participation.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Percentage</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Analysis</td>
<td>10 %</td>
<td>Mid Term Review</td>
</tr>
<tr>
<td>Product Biopsy</td>
<td>30 %</td>
<td>Mid Term Review</td>
</tr>
<tr>
<td>New Design Proposal</td>
<td>30 %</td>
<td>Final Submission</td>
</tr>
<tr>
<td>Project Display</td>
<td>20 %</td>
<td>Final Submission</td>
</tr>
<tr>
<td>Class Participation</td>
<td>10 %</td>
<td>Class Participation</td>
</tr>
</tbody>
</table>

PROFESSOR BIO
Professor: ANDREA CARUSO  
E-mail: acaruso@faculty.ie.edu

ANDREA CARUSO

Andrea Caruso Dalmas is co-founder of Ciszak Dalmas studio and La Clinica Design brand together with Alberto Gobbino Ciszak.  

Since 2009, the Italian duo Ciszak Dalmas has been running a full-service Architecture and Design Studio based in Madrid, Spain. The studio works across a range of disciplines including architecture, retail, product design and art direction. For Max&Co. the studio developed a new retail concept for its stores worldwide, counting 500 single-label boutiques. Similarly they were asked by Zara to design new fixtures and display furniture that were installed in the brand stores internationally. The studio has recently unveiled the design of Malababa and Ambrosia flagship stores in the Central Madrilenian district of Salamanca. The studio has also collaborated in the design of products and spaces with Bosa, Bitossi, Camper, Interbrand, Loewe, Muroexe, and Saffron among others.  

Previous to starting the studio in Madrid, Andrea worked in design offices in Italy including Pininfarina, Artemide and Brh+. He holds a Master in Design from the IED Madrid (2008) and a Bachelor in Industrial Design from the Politecnico di Torino (2005). Andrea is adjunct professor at the Bachelor in Design at the IE University and visiting professor at other institutions. Andrea gives lectures in an international framework, such as the Biennale di Architettura in Venice, Salone del Mobile in Milan, Experimenta Design in Lisbon and Design Ambassador in Hong Kong. He is fluent in English, Spanish and Italian and lives in Madrid.

OTHER INFORMATION

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07th January 2020