5.0 **Module 5**

Fundamentals of Product Design:

18 hours (12 in school and 6 at home)

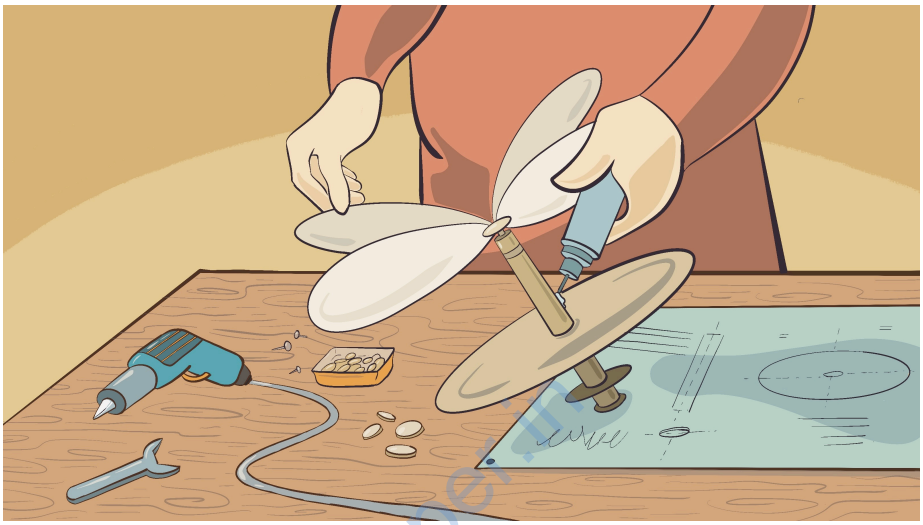
Exposure 1	- Elements of Form
Exposure 2	- Design Inspirations from Nature and design for the environment
Exposure 3	- Product and System

Overall Task	**Observation and Problem Identification**
Task 5.1 (at School + Home)	- Understanding Form
Task 5.2 (at School + Home)	- Representation and Analysis of Form
Task 5.3 (at School + Home)	- Nature and Design
Task 5.4 (at School + Home)	- Simple Product Design
Final Output	- Sketches, Slides and Presentation
	+ Reflections, Self Assessment and References

5.0 **Module 5**

Fundamentals of Product Design

18 hours (12 in school and 6 at home)



Introduction

Product Design is the design of useful products with both functional as well as formal considerations. It involves a creative and innovative problem-solving process with concern for the user, aesthetics, materials, process, technology and environment.
Product design has a wide variety of applications: consumer products, medical devices, furniture, jewelry, automobiles, toys, mobiles, sports equipment, etc. As a product designer, you could be designing any of these and making a difference in improving the quality of life.

Aim of the Course:

To expose school children (Grade 11) to basic fundamentals of Product Design and the principles of Product Design. It should create an interest in this field, nurture their sense of curiosity, and motivate them to explore and discover this area. The students should be able to be more sensitive towards the various products they see around them. They will be able to have a deeper understanding of a product in relation to the user, its immediate environment, and the functions it provides. With this knowledge and understanding we believe that the students will be equipped to take various product-related design challenges in the present day.

Place:

Place: Task 5.1, 5.2, 5.3 and 5.4 done at School and at home

Grouping:

Grouping: Class tasks are done in groups of 3-4 and Home tasks are individually

Equipment:

Equipment: Sketchbooks for sketching and taking notes, A3 Size papers, Color Pencils and Color Pens, Cardboards/ Foam Boards, sandpaper, poster colours, and Computers/Laptops for representations and making presentations (if available, but not necessary)

Exposures

Exposure1: Understanding Form
Story of form and form attributes. A presentation on how the form has always been an expression of an individual in relation to the social and economical context. Four slides on attributes of form talking about radii manipulation, color and volume.
Exposure 2: Representation and Analysis of Form
Exposure 3: Nature and Design
Exposure 4: Simple Product Design

Design Thinking & Innovation Process involvement:

This task involves the following phases of the DT&I Process:
Phase 1. Observe/Empathise/Research (observation of Product features)
Phase 2. Understand/Analyse/Define (analyzing different product aspects)
Phase 3. Ideate/Alternate/Create (trying creative alternatives)
Phase 4. Build/Prototype/Detail (making the output and the presentation)
Phase 5. Evaluate/Reflect/Implement (feedback from others)

Mapping SDG Goals:

The following SDG goals need to be considered while solving this task. While documenting elements and expressions, do think of gender equality and reduced inequalities and concern for life on our planet.

Task 5

Task 5 = 5.1 + 5.2 + 5.3 + 5.4
School Hours: 12, Home hours: 6

Task 5.1a

Task 5.1a:
Home Hours: 2, done individually

Task Title:

Understanding form

Take 10-12 different images of cars/scooters from the internet. Take prints of the images and place them on a big sheet with a matrix of softness and sharpness at two ends.

Discuss with students why certain cars/scooters were placed in the categories. Discuss the properties in the objects that represent these qualities of Softness and Sharpness.

NB: Task 1a is not being assessed.

Task 5.1b

Task 5.1b:
School Hours: 2 done individually

Topic title: Elements of form
1. Make three squares (10cm x 10 cm)

2. Transform the square shape (A) to a soft (could be organic form) form and the square shape (C) to a sharp-edged form (could be geometric form)
3. Placing the perfect square (B) in between, make 7 transitional forms between (A) and (B) and 7 transitional forms between (B) and (C)
4. Trace the final form 17 forms on cardboard and cut out the forms
5. Place them on a vertical rod or string
6. You can explore the materials of the cut-out. Students can also paint the form in a gradation or wrap the form with a tensile material

Output 5.1b: Cutouts of the 17 transitional forms on a vertical rod/string

Task 5.2

Task 5.2:
Home hours: 2, done individually

Task Title:

Representation and Analysis of Form

Task objectives:
- In Depth product Analysis
- Drawing / Rendering Skills

This task is mainly to observe details of form and analyze its function/purpose and in addition make a sketch of it.
1. Photo document any one electric appliance at home (could be Fridge, Toaster, Mixer, Fan, etc)
2. Look closely at the electric appliance
3. Make note of various details, functions, parts, and forms
4. Note: Students do not disassemble the product while doing the assignment and do it under adult supervision
5. Find out what interests you/is interesting about the product
6. Think about what the designer had thought while designing
7. Discover if any of its forms or functions are derived from occurrences in nature
8. Make quick sketches of how it can be improved
9. Make one final sketch of the product as it is, along with different parts and uses

Output 5.2: Documentation of the product along with analysis along with sketches

Task 5.3

Task 5.3:
School Hours: 4 and Home hours: 2, done individually

Task title:

Nature and Design

Task Objective
- Form abstraction and representation
- Drawing/ rendering skills

Topic title: Redesign of a simple product like your pen set by taking inspiration of nature (the flow of wind and water)

You take the above product and explore possibilities of taking inspiration from nature and redesigning the product in terms of its function/ form/ colour/ attributes etc. This should lead to a deeper understanding of the product.

1. Select a product to redesign – your pen set (2 pens gel + ink)
2. Look at inspiration from objects, plants and living beings shaped by the play of wind and water
- examples could be sand dunes, rock surfaces, lotus flowers, fish like dolphins, birds like cranes, etc.
3. compile images from these for inspiration (you may use internet for this task)

4. Categorise these images into groups and look out for the relevant curves or surfaces (this exercise is also called creating a **Mood Board**)
5. Using this as inspiration, sketch at least different 5 concepts of pens
6. Select one concept
7. Refinement of the selected concept by detailing the features
8. The final sketch, a pencil or pen rendering of the final design

Output 5.3: Prepare a 10 slides presentation that shows the process followed

Task 5.4

Task 5.4:

School Hours: 6, done in groups of 3-4

Task title:

Simple Product Design

Task Objectives

- Product analysis
- Problem identification
- Concept development
- Drawing/ rendering skills
- Presentation

Task Topic: Redesign of an Object that you take to School

In this task you'll design a simple product using the design process of observation, analysis, ideation, sketching details and making a presentation.

1. Choose one simple product that you carry with you to school (for example: water bottle, carrying bag, umbrella, tiffin box, watch, etc.)
2. Write a short brief (around 10 sentences) on what you like and what you do not like about the product
3. Exchange the brief with your friend
4. Do a deep diving exercise to understand the friend and the product better.
5. Write a redefined brief understanding the key problem/ opportunity area for design intervention
6. Identify problem/ gap areas / opportunity areas
7. See if inspirations from nature could be used for its improvement
8. Sketch 5 to 7 concepts
9. Discuss and present it to your friend/client
10. Improvise on the product after feedback from the friend
11. Try and make a mock model
12. Final sketch, a pencil or pen rendering of the final design.

Output 5.4: Prepare a 5 slides presentation that shows the process followed

Reflection:

Questions to ponder:

- What are the most interesting phases of the Simple Product Design process that you liked?
- Can you try to come with ideas to redesign simple objects and artifacts that you find in your immediate surroundings like home, neighborhood and school?
- Will you share this information on the use of the Design Thinking Process and innovation with others – like your friends and cousins?

Self Assessment:

Task 5.1b
Understanding Form
(Individual Assessment)

Assessment Criteria (Task 5.1b) – Assess yourself:

Understanding and Application:

- The students were able to understand the basic concepts of form and its attributes and apply their understanding to the assignment provided

☐ *Beginning* ☐ *Developing* ☐ *Promising* ☐ *Proficient* ☐ *Excellent*

Involvement/Participation:

- The students actively participated in the discussion/task and tried different exploration

☐ *Beginning* ☐ ☐ *Promising* ☐ ☐ *Excellent*

Skill Demonstration:

- The students were able to work with new materials and create good finished quality models.

☐ *Beginning* ☐ ☐ *Promising* ☐ ☐ *Excellent*

Self Assessment:

Task 5.2
Representation and Analysis of Form
(Individual Assessment)

Assessment Criteria (Task 5.2) – Assess yourself:

Product Analysis

- The students explored enough in terms of analysing the products.

☐ *Beginning* ☐ ☐ *Promising* ☐ ☐ *Excellent*

Involvement/Participation

- The students actively participated in the discussion/task and tried different explorations

☐ *Beginning* ☐ ☐ *Promising* ☐ ☐ *Excellent*

Skill Demonstration

- The rendered drawings were up to mark in terms of the perspective/ light/form

☐ *Beginning* ☐ ☐ *Promising* ☐ ☐ *Excellent*

Documentation/Communication
- How was the final presentation made and the quality of presentation

☐ ☐ ☐ ☐ ☐
Beginning *Promising* *Excellent*

Self Assessment:
Task 5.3
Nature and Design
(Individual Assessment)

Assessment Criteria (Task 5.3) – Assess yourself:

Critical Thinking
- The student has been able to understand the product, its attributes and relate it to the inspiration he has chosen to work with

☐ ☐ ☐ ☐ ☐
Beginning *Promising* *Excellent*

Concept/Form Development
- The student has applied his initial form understanding to create the product inspired from nature

☐ ☐ ☐ ☐ ☐
Beginning *Promising* *Excellent*

Involvement/Participation
- The student has demonstrated understanding, explored and pushed his boundaries and participated with teachers and peers

☐ ☐ ☐ ☐ ☐
Beginning *Promising* *Excellent*

Skill Demonstration
- The student has shown great skills in representing his final concept product

☐ ☐ ☐ ☐ ☐
Beginning *Promising* *Excellent*

Presentation/Communication
- The student has been able to communicate his idea to his peers and teacher and the presentation outlined the process in detail

☐ ☐ ☐ ☐ ☐
Beginning *Promising* *Excellent*

Self Assessment:
Task 5.4
Simple Product Design
(Group Assessment)

Assessment Criteria (Task 5.4) – Assess yourself:

Problem Analysis
- The student has been able to get a good understanding of the problem area and grasp the client requirement and propose a redefined brief

☐ ☐ ☐ ☐ ☐
Beginning *Promising* *Excellent*

Concept Development
- The student is able to make solutions that adhere to the specified problem area

☐ ☐ ☐ ☐ ☐
Beginning *Promising* *Excellent*

Involvement/Participation

- The student has demonstrated understanding, explored and pushed his boundaries and participated with teachers and peers

☐ ☐ ☐ ☐ ☐

Beginning *Promising* *Excellent*

Skill Demonstration

- The student has shown great skills in representing his final concept product

☐ ☐ ☐ ☐ ☐

Beginning *Promising* *Excellent*

Presentation/Communication

- The student has been able to communicate his idea to his peers and teacher and the presentation outlined the process in detail

☐ ☐ ☐ ☐ ☐

Beginning *Promising* *Excellent*

Other References:

Other suggested References:

1. Product Design 1:
https://www.dsource.in/course/product-design-1

2. What is Product Design?
https://www.youtube.com/watch?v=JNzvLWC2cGQ