

PRODUCT DESIGN & INNOVATION COURSE MODULES

How do you define good design? We see it as innovations that are equal parts attractive, practical and functional, and are able to differentiate themselves from their competitors. Through our Diploma in Product Design & Innovation [POI], you will get to design your very own smart innovation and learn about why some products become successful in the market.

The course integrates three important disciplines of product design - Arts, Engineering and Business. You will get to explore design processes at every stage, from idea conceptualisation to realisation, and graduate with quality design folios, including working prototypes. With our studio-based learning approach, you will work in modern design studios and develop prototypes using state-of-the-art model making equipment and facilities.

In your first year, learn about fundamental design principles as well as engineering concepts that are applied to the design process. You will be taught how to use computer-aided design software in your second year, and apply what you have learnt to actual product design projects. You will then progress to more advanced product innovation and development projects in your final year when you learn about the business management aspects of product development. You will also go on a three-month internship at leading companies.

Under our partnership with Motorola Solutions, top designs in the students' final-year projects are given awards by Motorola.

To top it off, we've got local and overseas field trips to design centres and museums in countries such as Australia, so your learning journey is nothing short of fulfilling.

LEVEL 2.1

Career & Professional Preparation II

This module equips students with skills necessary to seek and secure work. They will also be equipped to communicate their personal brand in a positive way. As students sharpen their communication skills, they will also learn how to market themselves effectively.

Computer Aided Design 2

In this follow-on module of Computer Aided Design 1, students are required to apply their knowledge and skills of computer-aided design for the design of relatively more complex parts and assemblies. Through these assignments, students acquire more advanced techniques in 3D modelling and production drawings. Topics include advanced 3D modelling, assembly analysis, limits and fits, and application of linear and geometric tolerances in CAD and drawings.

Materials & Design Applications 2

This module is a follow-on module of Materials & Design Applications 1, focusing on the selection of plastic materials and design of plastic parts for given design requirements. It also covers knowledge of the characteristics and design considerations for parts made of other materials with emphasis on their properties and applications. The module includes the topic on the principles and applications of Geometric Tolerance and Dimensioning. Students learn through projects, assignments, lectures and discussions.

Product Design Studio 1

This studio project module requires students to integrate and apply the knowledge and skills they have learnt from the various modules so far, in a design project based on a given design brief. Students are required to carry out design research, prepare design specifications, generate ideas and concepts, make mock-up models, and communicate their final design with a portfolio and presentation. There will be short lectures, case studies and assignments on topics including design research, mood board preparation, intellectual property search and studies on contemporary styles.

Product Aesthetics & Ergonomics 1

This focuses on the study of the relationships between form and function. Topics include principles and applications of aesthetics in product design, product semantics, colour theory and their applications. Students also learn the use of computer-aided industrial design software tools and design rendering for presentations using markers. The module requires students to carry out product form and basic ergonomics studies using model making assignments.

LEVEL 2.2

Business & Project Management

This module provides an overview of business organisation, functions and general management, leading to a detailed treatment of the organizational and operational aspects of project management in the context of product design and development. Topics include introduction to business organisation and management, organisation of projects, roles of the project manager, project planning, scheduling and controlling using network analysis such as Critical Path Method (CPM), Gantt Charts, and Programme Evaluation and Review Technique (PERT). The importance of concurrent or simultaneous product design and development in order to achieve short time-to-market is also emphasised.

Component Design & Development

This module covers the understanding of how the components or parts of a product influence its overall design, with studies on the layout, functions and design requirements of standard and non-standard components. Students learn the purposes, characteristics and applications of common standard components including motor, bearings, electronic circuit boards, gears and shafts; as well as how these are linked and assembled with non-standard parts such as housings, etc. Projects are used to reinforce learning along with assignments and case studies on existing products. Students also learn to prepare parts lists or bill of materials, CAD 3D and 2D detailed drawings, which are an important process in product design and development.

Engineering Sciences for Design 2

This is a follow-on module of Engineering Sciences for Design 1 (ESD1). While ESD1 focuses on the fundamentals and design applications of mechanics, ESD2 covers the essentials of thermodynamics, fluids, mechanics and strength of materials and basics of electrical and electronic technology. These topics are discussed and analysed within the context of the basic principles and applications of product design and development, using practice-oriented learning methods.

Furniture & Lifestyle Product Design

This module provides students with the valuable insights into designing furniture that is both aesthetically pleasing and functional for both domestic and commercial settings. Topics include trends, technologies, materials and production processes in the furniture industry. Students will learn through lectures and projects that require students to design and make furniture in the workshop. Designing of lifestyle products such as lighting, bathroom products and accessories will also be covered in this module.

Product Aesthetics & Ergonomics 2

This module covers the principles of ergonomics (or human factors) and user-centred design, their applications in product design, the influence of these design factors in users' preference for a particular product or system, as well as codes and standards governing product safety. It also covers anthropometrics, user-centred design principles and approaches and environmental factors in the application of products. The emphasis is on research and a good understanding of the target users' needs, requirements, limitations and application in product design. The module project requires students to carry out tasks in product design, emphasising human factors and user-centred design.

Product Design Studio 2

This is the second studio project module that requires students to integrate and apply the knowledge and skills they have learnt from the various modules so far, in a design project based on a given design brief. Students are required to carry out design research, prepare design specifications, generate ideas and concepts, make mockup models, perform detailed design with 3D CAD models and detailed drawings, and communicate the final design via a design portfolio and presentation. There will be short lectures, case studies and assignments and topics including product market segmentation and positioning, cultural and social impacts related to design, and sustainable design.

COURSE CURRICULUM

Module Name	Credit Units
YEAR 2	
Level 2.1 (27 hours per week)	
Career & Professional Preparation II	2
Computer Aided Design 2	6
Materials & Design Application 2	4
Product Design Studio 1	6

Product Aesthetics & Ergonomics 1	7
Interdisciplinary Studies (IS) elective ^	2
Level 2.2 (28 hours per week)	
Business & Project Management	3
Component Design & Development	5
Engineering Sciences for Design 2	4
Furniture & Lifestyle Product Design	4
Product Aesthetics & Ergonomics 2	4
Product Design Studio 2	6
Interdisciplinary Studies (IS) elective ^	2

Notes:

^ For more details on Interdisciplinary Studies (IS) electives, please log on to www.np.edu.sg/is/

IS Modules

The School of Interdisciplinary Studies (IS) delivers a broad-based curriculum, which nurtures a new generation of professionals with multidisciplinary skills and an innovative and entrepreneurial spirit to meet the challenges of a knowledge economy. IS offers both prescribed modules and electives to challenge boundaries. Prescribed modules develop students' competencies in core areas such as Communication, Innovation and Enterprise, Culture and Communication, and Personal Mastery and Development, while elective modules provide insights into Arts and Humanities, Business, Design, and Science and Technology.