Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus
Course description

Course title	Product Development and Design
Course code	47585
Scientific sector	ING-IND/35 (Module 1) "Product Development" ING-IND/15 (Module 2) "Engineering and Product Design"
Degree	Master in Industrial Mechanical Engineering
Semester	1
Year	OPT
Academic year	2024/2025
Credits	6
Modular	Yes

Total lecturing hours	32
Total lab and exercise hours	24
Attendance	Not mandatory, but highly recommended
Recommended preliminary knowledge	None
Course page	https://www.unibz.it/en/faculties/engineering/master-energy-engineering/course-offering/?academicYear=2024

Specific educational objectives	The course provides insights into the new trends in product development and design. First, students will be guided in the adoption of a managerial view to understand how to structure an innovation process and how to incorporate the Voice of the Customer (VOC) in new product development decisions. Furthermore, they will learn how to investigate the patterns of consumer decision making through market research, thus better understanding the utility and desirability of new products. Second, they will be able to understand an engineering view of designing industrial products. Here, students will learn best practices in generation of new product concepts and their subsequent evaluation, which will take place by means of state-of-the-art systems and methods.

Module 1	**Product Development**
Lecturer	Dr. Margherita Molinaro
Scientific sector of the lecturer	ING-IND/35
Teaching language	English

Teaching assistant *(if any)*	-
Office hours	Appointment by email
List of topics covered	**Customer-oriented product development** • New product development process: history and phases • Portfolio management framework • From customer needs to product characteristics: the Quality Function Deployment (QFD) • Open innovation and crowdsourcing **Market research for new products** • Survey-based market research: the Conjoint Analysis • Forecasting new products: techniques and strategies • The role of crowdfunding
Teaching format	Frontal lectures and exercises

Module 2	**Engineering and Product Design**
Lecturer	Prof. Yuri Borgianni and Dr. Aurora Berni
Scientific sector of the lecturer	ING-IND/15
Teaching language	English
Office hours	Appointment by email
Teaching assistant *(if any)*	-
Office hours	-
List of topics covered	**Engineering design** • Cycles to design new products • Conceptual design and early design phases • Creativity and other metrics to assess the quality of design outcomes • Stimulation and other treatments to support idea generation **Human-Product Interaction** • User Experience and product appraisal • Subjective and objective data in product evaluation • Use of eye-tracking in Human-Product Interaction • Hands-on activities to design experiments on Human-Product Interaction
Teaching format	Frontal lectures, laboratory and experimental activities

Learning outcomes	**Intended Learning Outcomes (ILO)** <u>Knowledge and understanding</u> Students should acquire the knowledge and the understanding of: • New product development process and related concepts

	• Essential tools and methods for customer involvement in new product development • Tools and approaches for market research in new product development • Engineering design cycles • Creative conceptual design • User Experience in engineering and product design • Systems to test human-product interaction <u>Applying knowledge and understanding</u> • Ability to frame a product development process and its governance structure • Ability to apply the Quality Function Deployment tool to a simple product • Ability to properly design a Conjoint Analysis • Ability to understand the main drivers behind product development and design • Ability to meditate about concepts instead of rushing to solutions • Ability to identify the main elements to be tested to allow the appraisal of design ideas and new products • Ability to organize tests aimed to evaluate people's experience with new products <u>Making judgements</u> • Ability to transfer the knowledge and methods learned to real practical applications thanks to groupworks, exercises and simulation of experimental activities within product development and design <u>Communication skills</u> • Ability to prepare, conduct and join interactive discussions in class • Ability to structure, prepare, and present arguments related to product development and design <u>Ability to learn</u> • Ability to autonomously extend the knowledge acquired during the study course by reading and understanding
Assessment	Written exam to verify the understanding of the contents and practical activities shown during the two modules. The duration of the written exam is 3 hours.
Assessment language	English
Evaluation criteria and criteria for awarding marks	The mark is calculated as the average between the scores achieved in each single module. The following criteria are taken into consideration for the assignment of the marks:

	• Ability to accurately illustrate concepts about the topics of the course • Clarity of answers • Mastery of specialistic terminology

Required readings	Lecture notes and documents for exercises will be available on the Microsoft Teams of the course.
Supplementary readings	Books and articles will be possibly suggested by the lecturers during the course.