JÖNKÖPING UNIVERSITY
School of Engineering

PROGRAMME SYLLABUS

Industrial Design (master), 120 credits

Industridesign (master), 120 högskolepoäng

Programme Code:	TAID5	Programmestart:	Autumn 2025
Confirmed:	Feb 01, 2025	Education Cycle:	Second-cycle level

Title of qualification

Degree of Master of Science (120 credits) with a major in Product Development specialisation in Industrial Design

Teknologie Masterexamen med huvudområdet Produktutveckling inriktning Industridesign

Programme overview

Main field of study

Product development includes the study of products as technical systems and the business process of activities that from identified needs and/or technological advancements, develop, define, validate, and over time improve a product, including its associated services. Product development is built on technical knowledge and systematic methods combined with creative processes. Product development requires multi-disciplinary collaboration between e.g. mechanical engineering, design, materials, information technology, electronics, construction, production and industrial economics. The application of simulation and management of development activities are also important.

Product development combines a technical perspective, with a scientific basis in mathematics and physics, with a context of humanistic and social science, in which business and sustainability aspects are important areas for the subject. Methods for research includes, among others, empirical studies, modelling, case studies, action research and constructive methods. The studies are based on knowledge in an application area of mechanical engineering, design, materials, information technology, electronics and construction, individually or in combination.

Studies in product development fosters knowledge in the application area, see above, in combination with knowledge of products as technical systems in combination with systematic and creative development methods as well as methods for simulation and management of development activities. Knowledge in different fields, such as industrial economics, ergonomics, aesthetics, quality, socio-technical systems are in parts complementary subjects for studies in product development. Skills that are developed include the ability to analyse needs, establish requirements specification, development of functional description and system structure, generate alternative solutions, designing individual subsystems, analysing the characteristics and requirements fulfilment, as well as perform system integration and validation. The ability to work interdisciplinary and in a development organisation is important as well as the application of a holistic perspective on the different phases of the product life cycle and its various stakeholders.

Background

In today's highly competitive global market, products must stand out to attract consumers and businesses. The key to success lies in designing products that meet users' needs and appeal aesthetically, ensuring they resonate emotionally and functionally with users. Products now compete globally around the clock, with consumers making choices based on price, quality, performance, reliability, and emotional appeal. In this landscape, design is a critical determinant of a product's success or failure.

Our Master program in Industrial Design equips engineering graduates with the skills and knowledge to excel in this dynamic field over two intensive years. We emphasize a holistic and interdisciplinary approach to product development, a hallmark of Sweden’s strong tradition in design and engineering. Our curriculum reflects the needs of small and medium-sized enterprises, which thrive on efficient decision-making processes and flat organizational structures.

A significant aspect of our program is the collaboration with companies in student projects. This collaboration provides students with real-world experience and exposure to industry practices, enriching their learning and preparing them for the challenges of professional practice.

Graduates of our program will be prepared to tackle complex design challenges and possess detailed knowledge of the integral components of products. The program places a strong emphasis on the aesthetic aspects of design, ensuring that products are not only functional but also visually appealing and emotionally engaging.

The ability to visualize and evaluate concepts with prototypes is crucial, and our program provides extensive training in these areas. Students will learn to create detailed prototypes, allowing them to test and refine their designs effectively. Additionally, the program includes user experience design, to develop an understanding of how digital interfaces impact the physical products.

The rapid development of novel materials, driven by the push for sustainability, adds another layer of complexity and opportunity. Understanding both technical and aesthetic functions of materials is crucial, and our program fosters expertise and collaboration across disciplines to create successful product solutions.

Our approach integrates product design with a comprehensive view of the product lifecycle. This ensures that our graduates can bring diverse and innovative products to market efficiently and sustainably, meeting the demands of the modern world.

Objectives

Upon graduation, students of the Industrial Design Master program will be equipped to contribute effectively to the development of innovative and improved products, with a strong focus on user-centered design, aesthetic appeal, and sustainability. They will be able to drive the creation of new products by integrating user needs, aesthetic considerations, and functional requirements. Through advanced visualization techniques and prototype evaluations, students will develop and refine product concepts, ensuring designs are both innovative and practical.

Graduates will conduct thorough analyses of product proposals, ensuring manufacturability by considering materials and manufacturing methods while effectively balancing form and function. They will work seamlessly with materials scientists, engineers, and other stakeholders to integrate novel materials and technologies into product designs, enhancing both performance and appeal. Additionally, they will improve product development workflows within companies, fostering knowledge reuse and increasing efficiency through systematic and creative approaches.

The program also emphasizes user experience design, equipping students with the skills to create intuitive and engaging digital interactions for their products. This capability is essential for effectively designing products that meet user needs and ensuring seamless interaction between users and the product, contributing to successful product development.

Graduates from the Industrial Design program will be highly attractive in the job market, possessing a balanced expertise in both the creative and analytical aspects of product development. Their comprehensive training will enable them to contribute effectively to the interdisciplinary demands of modern industrial design.

Post-graduation employment areas

After completing the program, graduates will be qualified for roles as industrial designers or design engineers in various industries. They will specialize in defining and refining the visual and functional aspects of products, utilizing skills in software, sketching, and modeling for concept development.

Graduates may work on analyzing product designs to ensure they are aesthetic, functional, sustainable and manufacturable using conventional production techniques while meeting aesthetic standards and fulfilling real user needs.

They will also contribute to improving product development processes within companies, focusing on enhancing efficiency and integration between design and production phases. Additionally, graduates will collaborate with materials scientists and engineers to incorporate novel materials and technologies into product designs.

Furthermore, the program prepares graduates for advanced academic pursuits, such as pursuing doctoral studies in universities and research institutes. Through the program, students gain insight into research methods and undertake the writing of a scientific thesis, providing them with valuable experience and skills necessary for academic research and scholarship.

Overall, graduates from the Industrial Design program will be well-prepared for careers as industrial designers or design engineers in industry, as well as for pursuing further academic endeavors as PhD students.

Objectives

Common learning outcomes

After the completion of the programme, students must meet the intended learning outcomes, as described in The Higher Education Ordinance by Degree of Master, and also the intended learning outcomes, as described by JTH:

Knowledge and Understanding

1. demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in certain areas of the field as well as insight into current research and development work
2. demonstrate specialised methodological knowledge in the main field of study

Competence and skills

3. demonstrate the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information
4. demonstrate the ability to identify and formulate issues critically, autonomously and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as well as the ability to evaluate this work
5. demonstrate the ability in speech and writing both nationally and internationally to clearly report and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences
6. demonstrate the skills required for participation in research and development work or autonomous employment in some other qualified capacity

Judgement and Approach

7. demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work
8. demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used
9. demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning

JTH. prove ability to embrace interdisciplinary approaches

Programme-specific learning outcomes

Upon completion of the programme, the intended learning outcomes provided for programme must also be met.

Knowledge and Understanding

10. demonstrate an understanding of user needs and how they are related to the design of a product
11. display knowledge on the relations between product design, materials and manufacturing processes
12. display knowledge about sustainability and how to design sustainable products
13. display knowledge of the basic principles of composition and color theory

Competence and skills

14. demonstrate the ability to develop products with consideration to functional as well as aesthetic values from design intention to product in use
15. demonstrate the ability to visualize design ideas
16. demonstrate the ability to show design ideas through physical prototypes
17. demonstrate the ability to evaluate design ideas
18. demonstrate the ability to implement branding and design languages into the design of a product
19. demonstrate the ability to present finished design solutions and to document the design process

Judgement and Approach

20. demonstrate the ability to improve concepts based on evaluation results
21. demonstrate the ability to improve concepts based on stakeholders' feedback

Contents

Programme principles

The Industrial Design Master's program at JU spans two academic years, divided into four semesters. The academic year consists of a fall and a spring semester, with a break in between. Each semester comprises 30 credits, totaling 120 credits for the entire program.

The programme includes eleven courses, eight of which are 7.5 credits each. Two courses are 15 credits, and the final course, the thesis project, is 30 credits. This comprehensive curriculum ensures that students gain both practical and theoretical knowledge, culminating in a significant thesis project that demonstrates their expertise in industrial design.

During the first year, students will take four courses where they will continuously learn and train their industrial design skills. Additionally, they will complete two courses focused on sustainability and material selection, and one course about user experience design.

In the second year, students will apply the knowledge and skills acquired in the first year through various project courses in collaboration with companies. These projects provide practical experience and real-world application of their industrial design expertise. They will also have a course in Research methodology to deepen their knowledge in academic practices.

For students who have only completed 15 credits of mathematics prior to enrollment, an additional mathematics course must be taken. This can be done either by replacing a course in the first semester of the second year or by taking the additional mathematics course on top of the standard course load.

Research basis

The Industrial Design Master programme is founded on a robust research framework, providing students with the necessary tools and skills to engage in exploratory projects grounded in scientific methods.

At the core of the programme is the integration of research for design and research through design approaches. Students are introduced to these methodologies, which serve as the foundation for their investigative endeavors throughout the programme.

Through research for design, students delve into the intricacies of product development, with a keen focus on understanding how design influences user interactions. This involves rigorous examination of surface design and quality assurance, utilizing advanced technical and affective measurement methods. Students are encouraged to critically analyze and evaluate surface conditions, ensuring that design intentions are effectively conveyed to end users.

In parallel, research through design empowers students to seek innovative solutions that address both functional and aesthetic requirements, while also considering industrial sustainability factors. Here, students are encouraged to think creatively, employing scientific inquiry to develop unique design concepts that resonate with users on an emotional level. This approach fosters an environment of experimentation and discovery, where students are encouraged to push boundaries and explore new possibilities in industrial design.

Throughout the programme, students are actively engaged in research-based projects, applying scientific methods to their exploratory endeavors. They learn to formulate hypotheses, conduct experiments, analyze data, and draw meaningful conclusions—all essential skills for conducting research in the field of industrial design.

By integrating scientific methods into their projects, students not only deepen their understanding of industrial design principles but also contribute to the advancement of knowledge in the field. This research-driven approach prepares students to excel in various professional settings, equipping them with the expertise to tackle complex challenges and drive innovation in industrial design.

Equal terms, gender equality and diversity

The School of Engineering (JTH) strives in all its activities to ensure that all individuals are given equal opportunities and treated equally. At both the JU and JTH levels, this is reflected in governing documents concerning organizational and personnel matters, the establishment and delivery of programmes and courses, as well as the monitoring of educational quality. At JTH, student influence is also ensured through student representation in various educational and industry councils.

The Industrial Design Master programme is committed to promoting equal terms, gender equality, and diversity. Students are taught to design products for everyone, considering ergonomics and inclusivity to ensure that designs meet the needs of diverse user groups. This approach prepares students to create products that are accessible, functional, and appealing to a wide range of people, fostering an inclusive design mindset.

Study abroad

The School of Engineering has internationalization as a focus area where the educational programmes include opportunities for both international experiences at home as well as various opportunities to do

internships and study abroad, giving students valuable experiences and skills to prepare them for a global labour market.

Students in the Industrial Design Master's programme have the opportunity to study abroad during the first semester of their second year. This experience allows them to gain international exposure and broaden their perspectives. Jönköping University (JU) has numerous partner universities worldwide, offering a wide range of options. The JU International Office is available to assist students interested in studying abroad, helping them find suitable courses that align with the subject of product development and supporting them throughout the process.

The course in research methodology must either be replaced by a similar course at the partner university or completed online through Jönköping University. Studying abroad can enhance students' education and provide unique insights into global design practices.

If students choose to study abroad, the mandatory courses in the first semester of the second year will be considered optional.

Programme progression

The progression of the Industrial Design Master programme is carefully structured to build a strong foundation in the first year, followed by advanced applications in the second year.

In the first year, students undertake four industrial design courses that progressively deepen their knowledge and skills. The initial course introduces the fundamentals, covering design philosophy, design methodology, design history, and essential industrial design tools. This foundational knowledge sets the stage for more advanced studies and provides students with a good understanding of form and how to express meaning through abstract representation.

The second course focuses on visualization tools, including sketching and rendering techniques, surface modeling, and exploring the sensations and perceptions of design. This enhances students' ability to visualize and communicate their design concepts effectively.

In the third course, students delve into prototyping design ideas and evaluating physical models. This hands-on experience is crucial for understanding the practical aspects of bringing a design from concept to reality.

The fourth course emphasizes branding and design language, teaching students to create cohesive design identities that resonate with users and differentiate products. Students will also apply their knowledge in a real-life design project, integrating branding principles with design language to address actual market needs and ensure their product stands out.

In the second semester of the first year, the programme includes two courses focused on material selection, production processes and sustainability related to product design. These courses provide students with an understanding of material properties, sustainable practices, and manufacturing methods, essential for making informed decisions in product development. As they progress, students deepen their knowledge, learning to select appropriate materials and production processes while applying sustainability strategies that minimize environmental impact throughout a product's lifecycle. Mastery of these topics is crucial for industrial designers to create eco-friendly products and meet the growing demands of sustainable industry practices.

Furthermore, the programme includes a course on user experience design, where students focus on the digital aspects of product design. In this course, they learn the principles of designing user-friendly digital interfaces and applications that complement physical products. This knowledge equips them to later integrate digital and physical design elements, ensuring that their products are both functional and intuitive in a connected, modern environment.

Students will also have a course in research methodology. This course is essential for their master thesis or if they would like to continue with an academic career. It provides them with the necessary skills to conduct research, analyze data, and write effectively, preparing them for advanced academic pursuits.

In the second year, students apply the knowledge and skills acquired in the first year through various project courses in collaboration with companies. These projects provide practical experience and real-world application of their industrial design expertise, preparing them for successful careers in the industry. Additionally, students will have the opportunity to collaborate with students from other master programmes in the project course, fostering interdisciplinary collaboration and enriching their learning experience.

Courses

Course changes can occur, as long as they do not substantially affect the programme's content and learning goals.

Mandatory courses

Semester	Course Name	Credits	Main field of study	Specialised in	Course Code
1	Fundamentals of Industrial design	15	Product Development	A1N	TGIR25
1	User Experience Design	7.5	Informatics	G1F	TUEK15
1	Visualization in Industrial Design	7.5	Product Development	A1F	TVIS25
2	Sustainable Product Realisation	7.5	Product Development	A1F	THFS25
2	Industrial Design Communications	7.5	Product Development	A1F	TKIS26
2	Materials and Process Selection for Product Design	7.5	Product Development	A1N	TMPR25
2	Prototyping in Industrial Design	7.5	Product Development	A1F	TPIS26
3	Possibility to study abroad	30			
3	Research Methodology on Advanced Level	7.5	Product Development, Production Systems	A1N	T2FPAN
3	Collaborative Design Studio	7.5	Product Development	A1F	TKDS26
3	Project Course	15	Product Development, Production Systems	A1N	TPJS22
4	Final Project Work in Product Development	30	Product Development	A2E	TETT23

Teaching and examination

The academic year is divided into two semesters, and the semesters into two study periods. In each study period two courses are generally taken in parallel. Assessment is part of each course or module. Modes of assessment and grades are shown in each course syllabus.

Entry requirements

The applicant must hold the minimum of a bachelor's degree (i.e the equivalent of 180 ECTS credits at an accredited university) with at least 90 credits in mechanical engineering, civil engineering, industrial design, product development, innovation, production engineering or industrial engineering or equivalent. The bachelor's degree should comprise a minimum of 15 credits in mathematics. Proof of English proficiency is required.

Continuation Requirements

In order to begin the second year, at least 37,5 credits from the programme's first year must be completed.

Qualification Requirements

To obtain a Degree of Master of Science (120 credits) with a major in Product Development, specialisation in Industrial design, students must complete a minimum of 120 credits in accordance with the current programme syllabus, at least 60 of which must be in the main field of study Product Development and 21 credits in Mathematics.
In addition a Degree of Bachelor of Science in Engineering/Degree of Bachelor of Science or an equivalent Swedish or foreign qualification is required.

Quality Development

At JTH, systematic quality assurance is carried out within JU's established quality system. This system, based on the requirements of the Higher Education Act, the Higher Education Ordinance, and the Standards and Guidelines for Quality Assurance in the European Higher Education Area, has been reviewed and approved by the Swedish Higher Education Authority.

Active and continuous course evaluation, including student feedback through course surveys, forms one of the cornerstones of this system. Annual programme evaluations and student representation in JTH's various

educational and industry councils are two additional examples.

Other Information

Admission is under ‘Admission regulations for first- and second cycle courses and study programmes at Jönköping University (Admission regulations)’.

This syllabus is based on ‘Regulations and guidelines for first-, second- and third-cycle education at Jönköping University’.