Design for Engineers
Minor regulation 2019-2020

Terug naar begin

1. Name minor: Design for Engineers

2. English name: Design for Engineers

3. Minor content

Introduction

In our everyday life we encounter a lot of products that are designed and manufactured. There's a lot that takes place before such products come into existence. The actual engineering often focusses on the last part of the development-proces. These products were all in some way designed. So design plays an important role in the creation of products. Within companies, teams often consist of designers as well as engineers to create innovative products.
Knowledge of the design process is essential for successful engineering.
The minor Design for Engineers combines theory and skills with practical work in a project.

The project is the core of this minor. Theoretic modules support the core. The minor contains 'self select modules', offered to enable students to elaborate in Engineering (e.g. Solidworks Motion,) or in Industrial Design (e.g. Web design, Digital sketching, Advanced Product Photography). Self select modules give students the opportunity to create a course which best suits his/hers interests and experience. In order to offer the students to follow the latest trends or a better fit to the core project, the organization of the minor has the right to add or replace self select modules during the academic year.
The list of self selection modules will be updated before the start of the minor and communicated to the participants.

Goals

Students will be able to:

- Develop or optimize a product.
- Gain a thorough helicopter view of the product's renewal- or innovation cycle
- communicate and collaborate with students from different courses and nationalities.
- communicate and collaborate with client companies in a professional manner.
- communicate (write, speak, present and listen) in English.
- develop an own expertise based on the courses they select (see self select modules).
- gather information and obtain the skills to succesfully implement in a product development project.
- Use the Product Design and Development Process, as a means to manage the development of an idea from concept through to production.
- Employ research and analysis methodologies as it pertains to the product design process, meaning, and user experience.
- Apply creative process techniques in synthesizing information, problem-solving and critical thinking.
- Demonstrate and employ hand drawing and drafting principles to convey concepts.
- Use basic fabrication methods to build prototype models.
- Demonstrate, apply, explain, and recognize basic engineering, mechanical, and technical principles.

Summary

The minor gives the students an opportunity to experience product development in teams. Collaboration with (foreign) students and communication with group members play an important role. Students as a group (i.e. bringing own expertise and expertise of other group members deliver the best possible solutions during product development cycle. The purpose of the minor is to gain a thorough helicopter view of the product renewal- or innovation cycle.

4. Overview of the courses in the minor *(see article 12, general section TER)*
The work load for this minor 30 European Credits, duration is 1 semester. The following minor parts (modules) have been defined:

Project module		*Self select modules**	*workload*		*Self select modules**	*workload*
Multidisciplinary Project of a complex product		Market research	28		Human Factors	56
		Materials & Production	28		Design Competition	56
		Sustainability	28		Solid works Motion	56
		Business Management	28		Solid works Surface Modeling	56
		Patent research	28		Solid Works Topology	56
		Ethics	28		Composites	56
		3D printing basics	28		Digital Sketch Tablet	28
		3D printing intermediate	28		Photography Basics	28
					Photography Advanced	28
					Web design	56
					Rhinoceros 3D	28
					Keyshot	56
					Automotive Engineering	56
Total 560 hours					select total	840 hours

* A student needs to select form the modules in the list which represent a minimum workload of 280 hours. This list is an example of the self select modules offered in 2018 and is subject to changes; adding or replacing modules that offer more suitable themes.

Description of the modules
Project module
The project element aims to provide an experience of multi-disciplinary integration within a complex design project.
In the project students will have the opportunity to:

- Gain experience of the complexities of multi and interdisciplinary working.
- Broaden their knowledge of disciplines on the periphery of their main study.
- Gain or further their experience of generating and developing conceptual ideas.
- Analyse and evaluate design concepts against established criteria.
- Work as part of an integrated team developing a product to a working prototype stage.
- Define product specifications based on user and situation analysis.
- Develop product design solutions meeting established performance criteria
- Research and evaluate a relevant study topic.

Self select modules (subject to changes; adding or replacing modules that offer more suitable themes)

Modules	*Description*	*Studyload in hours*
Market research	Lecture on the theory of market research, how to organize, how to interpret the results, how to report etc. The students will have to do a market research in groups and in relation to the project.	28
Materials and Production	Series of (guest) lectures on materials and production techniques	28
Sustainability	Series of lectures on sustainability (methods and theories)	28
Business Management	Series of (guest) lectures on the business side of product development, organization-structures, financing etc.	28
Patent research	Series of (guest) lectures on copyright, patent right, patent search, etc. The students will have to do a patent research.	28
Ethics	Introduction module to the basics of ethics. Discussions based on ethical flows.	28
3D printing basics	background and basic knowledge about 3D printing and additive manufacturing. About the What, Why and How.	28
3D printing intermediate	practical module. From 3D modeled digital object to 3D print.	28
Human Factors	Practical module in which groups of students take on an ergonomic problem and apply an ergonomic research set-up.	56
Solid Works Motion	Practical module, introducing the Solid Works Motion module. The student will learn how to analyse the kinematic and dynamic behaviour of Solid Works assemblies	56

Solid Works Surface Modeling	Practical module, introducing free form Surface modeling. The student will learn how to construct complicated free form surfaces and surface transitions in Solid Works.	56
Solid Works Topology	Practical module, introducing software that enables you to make designs inspired by nature. This approach is especially interesting in combination with 3D printing	56
Composites	Series of lectures and practical tests on the use of composite materials and engineering constructions	56
Digital Sketch Tablet	Practical module, improving the presentation skills. The student will learn how to make product renderings with a digital sketch tablet in combination with the software Painter and Photoshop	28
Photography Basic	Practical module, learning the basics of photography and the use of the photo studio.	28
Photography Advanced	Practical module, expanding the possibilities on product photography, based on the Photography Basic module.	28
Web design	Practical module, broadening your presentation skills. The student will learn how to set up a web pages, lay-out, do's and don'ts.	56
Rhinoceros 3D	Practical module, broadening your presentation skills. The student will learn to use the 3D modeling software Rhinoceros. This software is common for concept visualization where the concept needs to be detailed to a more convincing level then a (digital) sketch, but not to an engineering level as you would do in Solid Works.	28
Keyshot	Practical module in which more advanced surface modelling will be combined with professional rendering software (Keyshot).	56
Design Competition	Entering a design competition (National or international). Like a small design project, the student must study the brief, make conceptual designs and present the final design on a professional level.	56
Automotive Engineering	Series of lectures on several automotive principles such as steering geometry, suspension, drive systems etc.	56

5. Procedure for enrolment for the courses of the minor
Minor enrolment follows regular procedure, as stated on the Fontys website.
External students can contact Remko Killaars (r.killaars@fontys.nl)

6. Tests and procedure for enrolment for the tests *(see article 18 & 22, general section TER)*
Students don't have to enrol themselves for the tests.

Modules	Assessment	individual / group	Assessment scale
Project	Report + presentation + peer assessment	group	1 .. 10
Market research	Report	group	1 .. 10
Materials & Production	Presentation	in pairs	1 .. 10
Sustainability	Presentation	in pairs	1 .. 10
Business Management	Assignment	group	1 .. 10
Patent research	Assignment	individual	1 .. 10
Applied Ergonomics	Report	group	1 .. 10
Solid works Motion	Assignment including report	in pairs	1 .. 10
Solid works Surface Modelling	Assignments	individual	1 .. 10
Solid Works Topology	Assignments	individual	1 .. 10
Composites	Assignments	individual or in pairs	1 .. 10
Digital Sketch Tablet	Assignment	individual	1 .. 10
Photography Basic	Assignment	individual	1 .. 10
Photography Advanced	Assignment	individual	1 .. 10
Web design	Assignment	individual	1 .. 10
Rhinoceros 3D	Assignment	individual	1 .. 10

Advanced Modeling and Rendering	Assignment	individual	1 .. 10
Automotive Engineering	Assignment including report	in pairs	1 .. 10
Design Competition	Assignment	individual	1 .. 10
Ethics	Report	individual	1 .. 10
3D printing basics	Assignment	individual	1 .. 10
3D printing intermediate	Assignment	individual	1 .. 10

7. Examination of the minor *(see article 19, paragraph 3, general section TER)*
The minor end grade is a weighted average (weights correspond to workload) of the module grades. A student passes the minor if all modules are >= 5,5 or 'pass'.
A student will only get credits assigned as soon as he brings all above mentioned (part 4) modules to an end successfully, so either 30 EC or no credits at all (0 EC's) are assigned.

8. Examencommissie (*article 38, general section TER)*
The examination board for this minor is represented by the examination board of Fontys Hogeschool Techniek en Logistiek Venlo (fhtenl-excie@fontys.nl).

9. Validity period
This information remains valid for the duration of the 2019-2020 Academic Year.

10. Entry Level minor
Students must have successfully completed their propaedeutic year. If the propadeutic year is not (yet) completed, students have to get permission by the examination board to enrol in the minor. Students from outside Fontys FHTenL have to explicitely ask for admission. This is given by the contact persons, mentioned in point 12. English language at IELTS level 6 is strongly recommended.

11. Accessability
There are no specific groups excluded from enrolment, other than mentioned in part 10.

12. Contact
This minor is offered by Fontys Hogeschool Techniek en Logistiek Venlo. For further information please contact Remko Killaars (r.killaars@fontys.nl)

In terms of participation and completion of their minors, students will not be required to satisfy any other requirements than those as hereby determined in these Minor Regulations.