

Course description

Course abbreviation:	KKS/DFX	Page:	1 / 3
Course name:	Designing for properties		
Academic Year:	2023/2024	Printed:	03.06.2024 08:54

Department/Unit /	KKS / DFX			Academic Year	2023/2024
Title	Designing for properties			Type of completion	Exam
Long Title	Designing and evaluating a technical product from viewpoints of properties				
Accredited/Credits	Yes, 4 Cred.			Type of completion	Combined
Number of hours	Lecture 2 [Hours/Week] Tutorial 2 [Hours/Week]				
Occ/max	Status A	Status B	Status C	Course credit prior to	YES
Summer semester	0 / -	0 / -	0 / -	Counted into average	YES
Winter semester	19 / -	0 / -	5 / -	Min. (B+C) students	20
Timetable	Yes			Repeated registration	NO
Language of instruction	Czech			Semester taught	Winter semester
Optional course	Yes			Internship duration	0
Evaluation scale	1 2 3 4			Ev. sc. – cred.	S N
No. of hours of on-premise					
Auto acc. of credit	Yes in the case of a previous evaluation 4 nebo nic.				
Periodicity	K				
Substituted course	None				
Preclusive courses	N/A				
Prerequisite courses	N/A				
Informally recommended courses	N/A				
Courses depending on this Course	N/A				

Course objectives:

The course aims to provide students with interdisciplinary knowledge to achieve the required crucial properties (Design for X - DfX) and their soon prediction (Prediction of X - PoX) for evaluation of the achieved properties during designing of technical products. On principles of a selected knowledge from the theory of technical systems and a complementary design methodology the previous education will be completed and generalized in the final of bachelor's study .

Requirements on student

To obtain the credit of exercises:

- at least 75% active participation in seminars (only present study)
- fulfilment of the semester project task at the latest in limit date

To pass the exam:

- fulfilled credit
- mastering the knowledge of the subject according to the syllabus and its creative applications in semester project

Content

Technical products as technical systems. Properties of technical systems and their essential domains. Basic principles of Design for X and Prediction of X knowledge and methods. Crucial DfX and PoX for knowledge and methods for achievement of required and soon prediction of the achieved essential interdisciplinary properties of technical products - functions, reliability, safety, appearance, manufacturability, environmental friendliness, production and operational cost, general and elemental properties, and so on. Summary and conclusions.

Lectures:

1. Introduction
2. Problem Solving - Design as a solution of a problem
3. Problem Solving - specification of a task, finding a solution
4. Problem Solving - evaluation, communication of solutions, continuous parallel activities
5. Technical system (TS) - its properties and structures
6. Design and prediction of product properties X (DfX & PoX) - Fundamentals of the theory and methodology

7. DfX & PoX for (Product-Business Management, Operational Effects, Operability) of TS
8. DfX & PoX to man and other living beings
9. DfX & PoX to other technical systems and technologies
10. DfX & PoX for active and reactive environments

Fields of study

Viz COURSEWARE

Guarantors and lecturers

- **Guarantors:** Doc. Ing. Ladislav Němec, CSc. (100%)
- **Lecturer:** Prof. Ing. Stanislav Hosnedl, CSc. (50%)
- **Tutorial lecturer:** Ing. Dominik Fink (50%), Ing. Jakub Radkovský (50%)

Literature

- **Basic:** Hubka, V. *Konstrukční nauka : Obecný model postupu při konstruování*. Praha : Konservis, 1995. ISBN 80-90 1135-0-8.
- **Recommended:** Doplňující podklady k vypracování konstrukčně zaměřené bakalářské práce. Plzeň, ZČU, FST, 2009. (Hosnedl, S.) - courseware KKS/BPDM >

Time requirements

All forms of study

Activities	Time requirements for activity [h]
Preparation for an examination (30-60)	20
Team project (50/number of students)	10
Undergraduate study programme term essay (20-40)	20
Presentation preparation (report) (1-10)	4
Contact hours	40
Preparation for comprehensive test (10-40)	10
Total:	104

assessment methods

Knowledge - knowledge achieved by taking this course are verified by the following means:

Combined exam

prerequisite

Knowledge - students are expected to possess the following knowledge before the course commences to finish it successfully:

- to orientate himself in the knowledge of basic preparatory subjects of the general engineering education
- to design technical products at the level of knowledge of machine design in bachelor's study
- to understand the relationship between the construction structure of the product and its properties
- to orientate himself in basic knowledge from theory (technical) systems

Skills - students are expected to possess the following skills before the course commences to finish it successfully:

- to present the designing ideas in the form of sketches
- to perform technical calculations in connection with the design of technical products

to work with the software MS Office

teaching methods

Knowledge - the following training methods are used to achieve the required knowledge:

Project-based instruction

learning outcomes

Knowledge - knowledge resulting from the course:

- to identify a wider range of essential interdisciplinary properties of designed technical product, which are fundamental for its product-design competitiveness and are necessary for its product-business competitiveness on the market
- to specify the requirements for the proposed technical product in terms of its entire lifecycle
- to evaluate the expected properties of the proposed technical product

Skills - skills resulting from the course:

- to perform the engineering design process with respect to the sub-optimal fulfilment of requirements on the mentioned properties of designed technical product and early evaluation of their predicted achievement
- to perform the engineering design task in terms of the essential interdisciplinary properties of technical product as a comprehensive task
- to apply software means to efficiently setting of requirements for a future technical product with respect of its lifecycle and to predict the future features of the proposed product

Course is included in study programmes:

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Engineering	Bachelor	Full-time	Automotive Industry Specialist	1	2020	2023	Compulsory courses	A	3	ZS
Mechanical Engineering	Bachelor	Full-time	Design Engineering of Machines and Technical Devices	1	2020	2023	Compulsory courses	A	3	ZS
Mechanical Engineering	Bachelor	Combined	Design Engineering of Machines and Technical Devices	1	2020	2023	Compulsory courses	A	3	ZS
Engineering	Bachelor	Full-time	Quality Control	1	2020	2023	Doporučené výběrové předměty - 4. ročník	C		ZS