Course description

Department/Unit /	KPV / ŘOPA			**Academic Year**	2023/2024
Title	Labour Organization and Management			**Type of completion**	Exam
Accredited/Credits	Yes, 5 Cred.			**Type of completion**	Oral
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 / -	8 / 15	**Counted into average**	YES
Winter semester	0 / -	0 / -	0 / -	**Min. (B+C) students**	10
Timetable	Yes			**Repeated registration**	NO
Language of instruction	English			**Semester taught**	Summer 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	every year				
Specification periodicity					
Substituted course	KPV/ŘOP				
Preclusive courses	N/A				
Prerequisite courses	N/A				
Informally recommended courses	N/A				
Courses depending on this Course	KPV/ZSZP1				

Course objectives:

The human is one of the main factors that must be considered when designing a production system. Human factors (or ergonomics) is therefore one of the most important areas. The main goal of this course is to familiarize students with basic aspects of human factors which are crucial when design industrial workplaces. Aspects like anthropometry, physiology, mental workload or environmental conditions will be addressed. Also the support of those aspects by modern information technologies is included.

Requirements on student

Continuous assessment: successful passing of credit tests
Final assessment: combined examination

Content

The main attention in this course is paid to the field of ergonomics and its importance in the design of production systems. Students will get acquainted with a systemic view on ergonomics and links to other scientific disciplines. Attention is paid in detail to the three main components of production systems, which are man - machine - environment. The majority of practical exercises are devoted to the introduction of modern software tools for virtual ergonomics. Students will gain experience in how to use these tools in design activities. Specific thematic areas discussed in this course are:

1. Introduction to ergonomics & human factors
2. Importance of ergonomics in work design process
3. ANTHROPOMETRY - Influence of on the design of workplaces
4. ANTHROPOMETRY - Analysis and measurement methods/tools
5. BIOMECHANICS AND WORK PHYSIOLOGY - Influence on the design of workplaces, Ergonomic criteria, General recommendations.
6. BIOMECHANICS AND WORK PHYSIOLOGY - Tools for ergonomic workloads assessment and redesign
7. MENTAL WORKLOAD - Influence on the design of workplaces

8. MENTAL WORKLOAD - Measurement methods and simulation tools
9. ENVIRONMENTAL CONDITIONS - Visual comfort
10. ENVIRONMENTAL CONDITIONS - Acoustic comfort
11. ENVIRONMENTAL CONDITIONS - Thermal comfort
12. MODERN SOFTWARE TOOLS FOR VIRTUAL ERGONOMICS - Tecnomatix Jack
13. MODERN SOFTWARE TOOLS FOR VIRTUAL ERGONOMICS - Tecnomatix Process Simulate

Fields of study

Guarantors and lecturers

- **Guarantors:** Ing. Marek Bureš, Ph.D. (100%)
- **Lecturer:** Ing. Marek Bureš, Ph.D. (100%)
- **Tutorial lecturer:** Ing. Marek Bureš, Ph.D. (100%)

Literature

- **Basic:** KROEMER-ELBERT, Katrin; KROEMER, Henrike; KROEMER-HOFFMAN, Anne. *Ergonomics-How to design for ease and efficiency*. 3rd Edition. Elsevier Science Publishing, 2018. ISBN 978-0-128-13296-8.
- **Basic:** Stanton, Neville. *Handbook of human factors and ergonomics methods*. Boca Raton : CRC Press, 2005. ISBN 0-415-28700-6.
- **Basic:** TILLMAN, Barry; FITTS, David J.; WOODSON, Wesley E.; ROSE-SUNDHOLM, Rhonda; TILLMAN, Peggy. *Human Factors and Ergonomics Design Handbook*. 3rd Edition. McGraw-Hill Education, 2016. ISBN 978-0071702874.
- **Basic:** BRIDGER, Roger. *Introduction to Human Factors and Ergonomics*. 4th Edition. CRC Press, 2017. ISBN 978-1-498-79594-4.
- **Extending:** *Specific EN and ISO standards*.
- **Recommended:** SHORROCK, Steven; WILLIAMS, Claire. *Human Factors and Ergonomics in Practice: Improving System Performance and Human Well-Being in the Real World*. 1st Edition. CRC Press, 2016. ISBN 978-1472439246.
- **Recommended:** Zandin, Kjell B. *MOST work measurement systems*. Third edition, revised and expanded. 2003. ISBN 0-8247-0953-5.
- **Recommended:** Chaffin, Don B.; Andersson, Gunnar B. J.,; Martin, Bernard J. *Occupational biomechanics*. Fourth edition. 2006. ISBN 978-0-471-72343-1.

Time requirements

All forms of study

Activities	Time requirements for activity [h]
Contact hours	26
Presentation preparation (report) (1-10)	12
Preparation for an examination (30-60)	42
Graduate study programme term essay (40-50)	32
Practical training (number of hours)	26
Total:	**138**

assessment methods

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

Combined exam

Test

Skills - skills achieved by taking this course are verified by the following means:

Seminar work

Project

Skills demonstration during practicum

Competences - competence 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 be able to optimize the production system with the help of industrial engineering methods

to be able to independently use theoretical knowledge of industrial engineering

to acquire additional professional knowledge independently by independent study

to be able to think critically

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

to acquire additional professional skills on the basis of practical experience and their evaluation

on the basis of the acquired knowledge to be able to optimize the elements of the production system

to be able to process individual project on the basis of a framework assignment

to have basic experience for working on a PC

Competences - students are expected to possess the following competences before the course commences to finish it successfully:

N/A

N/A

N/A

teaching methods

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

Lecture supplemented with a discussion

Interactive lecture

Self-study of literature

Individual study

One-to-One tutorial

Multimedia supported teaching

Skills - the following training methods are used to achieve the required skills:

Task-based study method

Individual study

Practicum

Self-study of literature

Skills demonstration

Competences - the following training methods are used to achieve the required competences:

Skills demonstration

Lecture supplemented with a discussion

learning outcomes

Knowledge - knowledge resulting from the course:

to define the concepts of ergonomics and work rationalization

to know the principles of physiological and psychological stress

to define the ergonomic parameters of the workplace

to describe the basics of selected ergonomic analyses

Skills - skills resulting from the course:

to utilise the human anthropometric parameters in the workplace optimization

to perform the ergonomic analyses

to use software tools for the workplace optimisation

Competences - competences resulting from the course:

N/A

N/A

N/A

Course is included in study programmes:

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Design of Power Machines and Equipment	Postgraduate Master	Full-time	Digital Manufacturing	1	2021	2023	Povinně volitelné předměty 1. roč. LS	B		LS
Design of Power Machines and Equipment	Postgraduate Master	Full-time	Manufacturing Machines and Technologies	1	2021	2023	Povinně volitelné předměty 1. roč. LS	B		LS