

## Course description

<b>Course abbreviation:</b>	KPV/OVS	<b>Page:</b>	1 / 3
<b>Course name:</b>	Operations Research in Engineering		
<b>Academic Year:</b>	2023/2024	<b>Printed:</b>	03.06.2024 09:51

<b>Department/Unit /</b>	KPV / OVS			<b>Academic Year</b>	2023/2024
<b>Title</b>	Operations Research in Engineering			<b>Type of completion</b>	Exam
<b>Accredited/Credits</b>	Yes, 4 Cred.			<b>Type of completion</b>	Combined
<b>Number of hours</b>	Lecture 2 [Hours/Week] Tutorial 2 [Hours/Week]			<b>Course credit prior to</b>	YES
<b>Occ/max</b>	Status A	Status B	Status C	<b>Counted into average</b>	YES
<b>Summer semester</b>	0 / -	0 / -	0 / -	<b>Min. (B+C) students</b>	10
<b>Winter semester</b>	27 / -	0 / -	0 / -	<b>Repeated registration</b>	NO
<b>Timetable</b>	Yes			<b>Semester taught</b>	Winter semester
<b>Language of instruction</b>	Czech			<b>Internship duration</b>	0
<b>Optional course</b>	Yes			<b>Ev. sc. – cred.</b>	S/N
<b>Evaluation scale</b>	1 2 3 4				
<b>No. of hours of on-premise</b>					
<b>Auto acc. of credit</b>	Yes in the case of a previous evaluation 4 nebo nic.				
<b>Periodicity</b>	K				
<b>Substituted course</b>	KPV/OV1				
<b>Preclusive courses</b>	N/A				
<b>Prerequisite courses</b>	N/A				
<b>Informally recommended courses</b>	N/A				
<b>Courses depending on this Course</b>	N/A				

### Course objectives:

Aims are to familiarize the student with the problematics of operational research and its application in a business environment. A further aim is to equip the student with knowledge of modelling and solving business practice situations using operations research.

### Requirements on student

Conditions for gaining credit are to pass a test, write and successfully defend semestral work. Examination comprises of written and oral part.

### Content

The course acquaints students with the problematics of operational research and its applications for use in the company environment.

1. General overview of operational research methods, modeling, task classification
2. Mathematical programming
3. Optimization analysis
4. Distribution models of linear programming I.
5. Distribution models of linear programming II.
6. Distribution models of linear programming III.
7. Network analysis methods I.
8. Network analysis methods II.
9. Theory of mass service
10. Recovery theory, line balancing methods, sequential models
11. Game theory
12. Localization models
13. Modern approaches to operational research

**Fields of study**

Studentům je k dispozici prostředí MS Teams a Courseware, kde jsou k dispozici studijní materiály pro přednášky i cvičení, možnost diskuze a odevzdávání semestrálních prací.

**Guarantors and lecturers**

- **Guarantors:** Doc. Ing. Milan Edl, Ph.D. (100%)
- **Lecturer:** Doc. Ing. Milan Edl, Ph.D. (100%)
- **Tutorial lecturer:** Doc. Ing. Milan Edl, Ph.D. (100%)

**Literature**

- **Basic:** Fiala, Petr. *Operační výzkum : nové trendy*. 1. vyd. Praha : Professional Publishing, 2010. ISBN 978-80-7431-036-2.
- **Extending:** GROS, I. *Kvantitativní metody v manažerském rozhodování*. 1. vyd. Praha : Grada Publishing, 2003. ISBN 80-247-0421-8.
- **Extending:** JABLONSKÝ, J. *Operační výzkum : kvantitativní modely pro ekonomické rozhodování*. 2. vyd. Praha : Professional Publishing, 2002. ISBN 80-86419-42-8.
- **Recommended:** Edl, Milan; Kudrna, Jiří. *Metody průmyslového inženýrství*. [Plzeň] : SmartMotion, 2013. ISBN 978-80-87539-40-8.
- **Recommended:** Plevný, Miroslav; Žižka, Miroslav. *Modelování a optimalizace v manažerském rozhodování*. Vyd. 2. Plzeň : Západočeská univerzita, 2010. ISBN 978-80-7043-933-3.
- **Recommended:** Dostál, Petr; Sojka, Zdeněk; Rais, Karel. *Pokročilé metody manažerského rozhodování*. Praha, 2006.

**Time requirements****All forms of study**

Activities	Time requirements for activity [h]
Contact hours	52
Preparation for an examination (30-60)	45
Individual project (40)	20
<b>Total:</b>	<b>117</b>

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

- Oral exam
- Test
- Seminar work

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

- Skills demonstration during practicum
- Oral exam
- Individual presentation at a seminar

**Competences - competence achieved by taking this course are verified by the following means:**

- Oral exam

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

- prerequisite for the course is an elementary knowledge of mathematical analysis and algebra
- describe and explain analytical methods for description of business processes

use theoretical knowledge independently in the field of industrial engineering, project management, algebra

provide clear and convincing information to experts and laymen about the description of selected business processes using mathematical tools

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

apply independently own knowledge of the theoretical fundamentals of operational research to solve practical problems in the field of business process analysis

obtain additional professional skills independently on the basis of practical experience and their evaluation

analyze selected business processes

**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:**

Interactive lecture

Discussion

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

Practicum

Discussion

Multimedia supported teaching

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

Interactive lecture

**learning outcomes**

**Knowledge - knowledge resulting from the course:**

to know the issue of operational research and its applications for use in the company environment

to know the software environment for solving operational research tasks

obtain further professional knowledge independently by studying theoretical knowledge of the field of operational research

**Skills - skills resulting from the course:**

apply own theoretical knowledge in the field of operational research and application of its methods

analyze simple model situations using selected operational research methods

independently develop models related to the application of operational research methods in industrial practice

interpret the results obtained by calculation in a comprehensible way to experts and laymen

obtain additional professional skills independently on the basis of practical experience in the field

**Course is included in study programmes:**

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Industrial Engineering and Management	Postgraduate Master	Combined	Industrial Engineering and Management	1	2020	2023	Compulsory courses	A	2	ZS
Industrial Engineering and Management	Postgraduate Master	Full-time	Industrial Engineering and Management	1	2020	2023	Compulsory courses	A	2	ZS