

# Course description

<b>Course abbreviation:</b>	KIV/DB2	<b>Page:</b>	1 / 4
<b>Course name:</b>	Database Systems 2		
<b>Academic Year:</b>	2023/2024	<b>Printed:</b>	03.06.2024 10:12

<b>Department/Unit /</b>	KIV / DB2			<b>Academic Year</b>	2023/2024
<b>Title</b>	Database Systems 2			<b>Type of completion</b>	Exam
<b>Accredited/Credits</b>	Yes, 6 Cred.			<b>Type of completion</b>	Combined
<b>Number of hours</b>	Lecture 3 [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>	23 / -	8 / -	1 / 4	<b>Min. (B+C) students</b>	10
<b>Winter semester</b>	0 / -	0 / -	0 / -	<b>Repeated registration</b>	NO
<b>Timetable</b>	Yes			<b>Semester taught</b>	Summer 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>	No				
<b>Periodicity</b>	K				
<b>Substituted course</b>	None				
<b>Preclusive courses</b>	N/A				
<b>Prerequisite courses</b>	N/A				
<b>Informally recommended courses</b>	KIV/DB1				
<b>Courses depending on this Course</b>	and KIV/DBA KIV/PMZD, KIV/SZD, KIV/VS, KIV/ZDSZ, KMA/KAN				

## Course objectives:

The aim of course is to make sense of post-relational database systems (temporal, spatial, deductive, and multimediální). Various systems and their implementation techniques are discussed.

## Requirements on student

Semester work + practical verification  
Control test  
Combined exam

The deadline for obtaining credit is May 9, 2024.

Due to the continuous updating of the course, in order to obtain credit when re-enrolling the course (see SZŘ Article 24, paragraph 3), the consent of the guarantor of the course is required.

## Content

Standards in the field of database technologies. Relational data model. Overview of alternative data models and database systems. Big Data issues, principles of Big Data management - CAP theorem, distribution, scaling, replication, transactions in a distributed environment.  
Overview and classification of database systems and technologies for Big Data management and processing.  
Distributed file systems. MapReduce.  
NoSQL database - BASE vs. ACID.  
Database key / value, document, columnar database.  
Graph data and graph databases  
Data with multiple models. Multi-model database. Polystores  
SQL language in the Big Data environment. NewSQL database.

Trends in the development of modern databases, hybrid databases, field databases.

## Fields of study

### Guarantors and lecturers

- **Guarantors:** Doc. Dr. Ing. Jana Klečková (100%)
- **Lecturer:** Doc. Dr. Ing. Jana Klečková (100%)
- **Tutorial lecturer:** Doc. Dr. Ing. Jana Klečková (100%), Ing. Martin Kryl (100%)

### Literature

- **Basic:** Pokorný J., Valenta M. *Databázové systémy*. Praha, 2020. ISBN 978-80-01-06696-6.
- **Basic:** Elmasri R., Navathe S.B. *Fundamentals of Database Systems*. Pearson, 2017. ISBN 9780133971118.
- **Recommended:** Kroenke, David M. *Database Processing: Fundamentals, Design, and Implementation: International Edition, 10/E*. Pearson Higher Education, 2006. ISBN 9780131971042.
- **Recommended:** Rob, P., Coronel, C. *Database Systems: Design, Implementation And Management*. Course Technology Ptr, 2006. ISBN 9781418835934.
- **Recommended:** Sokolowsky, Peter; Peterka, Jiří; Pokorný, Jaroslav. *Distribované databázové systémy*. 1. vyd. Praha : Academia, 1992. ISBN 80-200-0442-4.
- **Recommended:** Bell D., Grimson J. *Distributed Database Systems*. Addison Wesley, 1992.
- **Recommended:** Klečková J. *Uživatelské rozhraní databázových systémů*. Plzeň, 1996.

### Time requirements

#### All forms of study

Activities	Time requirements for activity [h]
Preparation for comprehensive test (10-40)	11
Preparation for an examination (30-60)	40
Graduate study programme term essay (40-50)	40
Contact hours	65
<b>Total:</b>	<b>156</b>

### assessment methods

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

- Test
- Combined exam

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

- Test
- Individual presentation at a seminar
- Seminar work

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

- Project
- Skills demonstration during practicum

### prerequisite

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

demonstrate knowledge of the fundamentals of database technology  
 demonstrate knowledge of the theory of relational data model  
 explain the formalization of relational database design  
 understand the principles of data integrity, transactions and SQL language

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

suggest database system small and medium scale  
 design and implement a simpler standalone application

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

N/A

#### teaching methods

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

Lecture  
 Practicum  
 Students' portfolio

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

Individual study

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

Lecture

#### learning outcomes

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

Explain and illustrate methods of analysis, design and creation of database systems working with large data integrated from many communicating components.  
 Identify post-relational DB systems in selected categories and propose the implementation of these systems.  
 vysvětlit principy relačních databází, datové integrity a základních SQL příkazů, popsat postupy datového modelování

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

Analyze and standard requirements and situation and propose solutions built on trivial modification of existing procedures and components.  
 design and optimize extensive data model  
 select and effectively use methods and technologies for the processing, analysis and representation of large structured and unstructured data  
 create and administer Oracle database

**Competences - competences resulting from the course:**

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.
Computer Science and Engineering	Postgraduate Master	Full-time	Information Systems	1	2018	2023	Povinné předměty	A	1	LS
Computer Science and Engineering	Postgraduate Master	Full-time	Medical Informatics	1	2020	2023	Povinné předměty	A	1	LS
Computer Science and Engineering	Postgraduate Master	Combined	Software Engineering	1	2020	2023	Oborové povinné předměty	A	1	LS
Computer Science and Engineering	Postgraduate Master	Full-time	Software Engineering	1	2020	2023	Oborové povinné předměty	A	1	LS

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Computer Science and Engineering	Postgraduate Master	Full-time	Software Engineering	1	2021	2023	Oborové povinné předměty	A	1	LS
Geomatics	Postgraduate Master	Full-time	Geomatics	1	2020	2023	Oborové předměty	A	1	LS
Information Systems Management	Postgraduate Master	Full-time	Informační management	1	2022	2023	Blok A: Povinné předměty	A	1	LS
Land-Use Planning	Postgraduate Master	Full-time	Informační modelování staveb	1	2018 akr	2023	Povinné předměty	A	1	LS
Softwarové a informační systémy	Postgraduate Master	Full-time	Softwarové a informační systémy	1	2022 akr	2023	Povinné předměty	A	1	LS
Distribučované výpočetní systémy	Postgraduate Master	Full-time	Distribučované systémy	1	2022 akr	2023	Povinné volitelné předměty společné	B	2	LS
Distribučované výpočetní systémy	Postgraduate Master	Full-time	Výpočetní technika	1	2022 akr	2023	Povinné volitelné předměty společné	B	2	LS
Informatika a její specializace	Postgraduate Master	Full-time	Medicínská informatika	1	2022 akr	2023	Povinné volitelné předměty specializační	B	1	LS
Informatika a její specializace	Postgraduate Master	Full-time	Zpracování přirozeného jazyka	1	2022 akr	2023	Povinné volitelné předměty specializační	B	1	LS
Mathematics	Postgraduate Master	Full-time	Mathematics for Business Studies	1	2016	2023	Povinné volitelné oborové předměty	B	1	LS
Mathematics for Business Studies	Postgraduate Master	Full-time	Matematika a finanční studia	1	2023	2023	Povinné volitelné předměty	B	1	LS
Mathematics for Business Studies	Postgraduate Master	Full-time	Matematika a finanční studia	1	2018 akr	2023	Povinné volitelné předměty	B	1	LS
Computer Science and Engineering	Postgraduate Master	Full-time	Computer Graphics	1	2018	2023	Výběrové předměty	C	2	LS
Informatika a její specializace	Postgraduate Master	Full-time	Počítačová grafika	1	2022 akr	2023	Doporučené výběrové předměty	C	1	LS