

# Course description

<b>Course abbreviation:</b>	KIV/PPA	<b>Page:</b>	1 / 5
<b>Course name:</b>	Computers and Programming		
<b>Academic Year:</b>	2024/2025	<b>Printed:</b>	01.06.2024 11:16

<b>Department/Unit /</b>	KIV / PPA			<b>Academic Year</b>	2024/2025
<b>Title</b>	Computers and Programming			<b>Type of completion</b>	Exam
<b>Accredited/Credits</b>	Yes, 5 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>	not determined
<b>Winter semester</b>	0 / -	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>	0				
<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>	None				
<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:

The aim of the course is to acquire a clearly defined set of basic knowledge and skills in programming as a fundament for other programming courses.

## Requirements on student

Credit:

The student must obtain the minimum number of points from the control test, and from homework.

The deadline for fulfilling the conditions for granting credit is the same as the end of teaching in the winter semester.

Due to the continuous updating of the course, in order to obtain credit for repeated registration of the course, the consent of the guarantor of the course is necessary.

Exam:

Written form with possible oral and/or practical parts. To pass the exam, it is necessary to obtain a minimum number of points from the written part.

## Content

1. Basic concepts of computers and programming; programs and programming languages; conventions and comments; data types; variables, declarations, assignments, operators
2. Terminal input and output; command line
3. Basic mathematical functions; random numbers; program validation, debugging
4. Control structures (branching and cycles)
5. Subroutines, return value, parameters; magic numbers and constants
6. Classes and objects; memory layout
7. Arrays, multidimensional arrays, arrays of objects;
8. Examples of fields, methods, and objects
9. Strings; work with characters; algorithm design procedure
10. Basic sorting and searching algorithms

11. Exceptions; working with files and folders; file input and output  
 12. Display of data in computer memory, coding of integers and real numbers, characters; comparison of object-oriented and procedural programming

## Fields of study

## Guarantors and lecturers

- **Guarantors:** Ing. Petr Vaněček, Ph.D.
- **Lecturer:** Ing. Petr Vaněček, Ph.D. (100%)
- **Tutorial lecturer:** Ing. Vojtěch Bartička (100%), Ing. Jakub Frank (100%), Ing. Milan Hotovec (100%), Mgr. Martin Maňák, Ph.D. (100%), Ing. Vítěk Poór (100%), Ing. Tomáš Potužák, Ph.D. (100%), Ing. Martin Prantl, Ph.D. (100%), Ing. Michal Seják (100%), Ing. Petr Vaněček, Ph.D. (100%), Ing. Natálie Vítová, M.Sc. (100%)

## Literature

- **Recommended:** Wróblewski, Piotr. *Algoritmy : datové struktury a programovací techniky*. Vyd. 1. Brno : Computer Press, 2004. ISBN 80-251-0343-9.
- **Recommended:** Lutz, Mark; Ascher, David. *Naučte se Python*. 1. vyd. Praha : Grada Publishing, 2003. ISBN 80-247-0367-X.
- **Recommended:** Beazley, David M. *Python : referenční programátorská příručka*. Praha : Neocortex, 2002. ISBN 80-86330-05-2.

## Time requirements

### All forms of study

Activities	Time requirements for activity [h]
Preparation for comprehensive test (10-40)	15
Individual project (40)	30
Preparation for an examination (30-60)	30
Contact hours	65
<b>Total:</b>	<b>140</b>

## assessment methods

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

- Written exam
- Combined exam
- Test

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

- Skills demonstration during practicum
- Combined exam
- Written exam
- Continuous assessment
- Test

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

- Written exam
- Continuous assessment

## Test

**prerequisite**

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

- describe the basic principles of computer operation and operating system
- explain the basics of propositional logic
- explain the solution of a system of linear equations

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

- use the operating system (install and run applications)
- work with the file system (create, copy and delete files and folders)

**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:**

- Task-based study method
- Skills demonstration
- Self-study of literature
- One-to-One tutorial
- Interactive lecture

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

- Practicum
- Skills demonstration
- One-to-One tutorial
- Lecture with visual aids
- Task-based study method
- Lecture

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

- Practicum
- Skills demonstration
- Lecture
- Task-based study method
- Individual study

**learning outcomes**

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

- characterize the basic language constructions and data structures of the programming language
- explain the basic approaches for algorithm design
- characterize ways of creating, verifying and debugging programs
- explain basic sorting and searching algorithms
- characterize work with files

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

- analyze and solve simple problems
- design and implement programs in the selected programming language
- apply basic sorting and searching algorithms

**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.
Applied Physics and Physical Engineering	Bachelor	Full-time	Aplikovaná fyzika a fyzikální inženýrství	1	2023	2024	Povinné předměty	A	1	ZS
Applied Physics and Physical Engineering	Bachelor	Full-time	Aplikovaná fyzika a fyzikální inženýrství	1	2024	2024	Povinné předměty	A	1	ZS
Computer Modelling in Mechanics	Bachelor	Full-time	Computer Modelling in Mechanics	1	2024	2024	Povinné předměty	A	1	ZS
Computer Modelling in Mechanics	Bachelor	Full-time	Computer Modelling in Mechanics	1	2023	2024	Povinné předměty	A	1	ZS
Cybernetics and Control Engineering	Bachelor	Full-time	Artificial Intelligence and Automation	1	2024	2024	Povinné předměty	A	1	ZS
Cybernetics and Control Engineering	Bachelor	Full-time	Artificial Intelligence and Automation	1	2023	2024	Povinné předměty	A	1	ZS
Cybernetics and Control Engineering	Bachelor	Full-time	Automatic Control and Robotics	1	2024	2024	Povinné předměty	A	1	ZS
Cybernetics and Control Engineering	Bachelor	Full-time	Automatic Control and Robotics	1	2023	2024	Povinné předměty	A	1	ZS
Geomatics	Bachelor	Full-time	Geomatika	1	2024	2024	Povinné předměty	A	1	ZS
Geomatics	Bachelor	Full-time	Geomatika	1	2023	2024	Povinné předměty	A	1	ZS
Informační systémy	Bachelor	Full-time	Informační systémy	1	2023	2024	Povinné předměty	A	1	ZS
Informační systémy	Bachelor	Full-time	Informační systémy	1	2024	2024	Povinné předměty	A	1	ZS
Informatika	Bachelor	Full-time	Počítačové vědy	1	2023	2024	Povinné předměty	A	1	ZS
Informatika	Bachelor	Full-time	Počítačové vědy	1	2024	2024	Povinné předměty	A	1	ZS
Informatika	Bachelor	Full-time	Výpočetní technika	1	2024	2024	Povinné předměty	A	1	ZS
Informatika	Bachelor	Full-time	Výpočetní technika	1	2023	2024	Povinné předměty	A	1	ZS
Information Systems Management	Bachelor	Full-time	Informační management	1	23	2024	Block A: Mandatory courses	A	1	ZS
Information Systems Management	Bachelor	Full-time	Informační management	1	24-	2024	Block A: Mandatory courses	A	1	ZS
Mathematics and its Applications	Bachelor	Full-time	Matematika a její aplikace	1	2024	2024	Povinné předměty - fakultní základ	A	1	ZS
Mathematics and its Applications	Bachelor	Full-time	Matematika a její aplikace	1	2023	2024	Povinné předměty - fakultní základ	A	1	ZS
Mathematics for Business Studies	Bachelor	Full-time	Matematika a finanční studia	1	2023	2024	Faculty Core Subjects	A	1	ZS
Mathematics for Business Studies	Bachelor	Full-time	Matematika a finanční studia	1	2024	2024	Faculty Core Subjects	A	1	ZS
Software Engineering	Bachelor	Full-time	Softwarové inženýrství	1	2023	2024	Povinné předměty	A	1	ZS
Software Engineering	Bachelor	Full-time	Softwarové inženýrství	1	2024	2024	Povinné předměty	A	1	ZS
Certifikátové programy	Bachelor	Full-time	Sociology	1	1	2024	Povinné volitelné předměty - Základy programování	B		ZS

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Certifikátové programy	Bachelor	Full-time	Sociology	1	1	2024	Povinně volitelné předměty - Základní počítačová gramotnost	B		ZS
Stavební inženýrství - Bachelor Pozemní stavby		Full-time	Stavební inženýrství - Pozemní stavby	1	2023	2024	Povinně volitelné předměty - skupina 5	B	4	ZS
Stavební inženýrství - Bachelor Pozemní stavby		Full-time	Stavební inženýrství - Pozemní stavby	1	2024	2024	Povinně volitelné předměty - skupina 5	B	4	ZS