COURSE DESCRIPTION CARD - SYLLABUS

Course name
Research Lab

Course

Field of study
Computing

Year/Semester
1/2

Area of study (specialization)
Distributed and cloud systems

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars
45

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
Master's thesis supervisors
email: office_cat@put.poznan.pl
phone: 61 6653420
Faculty of Computing and Telecommunications
address: Piotrowo 2, 60-965 Poznań

Responsible for the course/lecturer:
prof. dr hab. inż. Jerzy Brzeziński
(email: Jerzy.Brzezinski@put.poznan.pl)

dr hab. inż. Anna Kobusińska, prof. PP
(email: Anna.Kobusinska@cs.put.poznan.pl)

Prerequisites

A student should have basic knowledge of mathematics allowing him/her to formulate and solve complex computer science tasks. A student should have structured, theoretically grounded general knowledge of algorithms and complexity theory, computer systems architecture, operating systems and distributed operating systems, networking technologies, cloud technologies, programming languages and paradigms, graphics and human-computer communication, artificial intelligence, databases, software engineering, decision support, and embedded systems. He/she should be aware of the trends and the most important new achievements in IT and selected related scientific disciplines.

He/she should have the ability to employ information and communication techniques used in IT projects, analytical methods, perform simulation studies and experiments to formulate and solve engineering tasks and simple research problems, to formulate and test hypotheses related to engineering/research problems, to integrate knowledge from various areas of computer science, and

the ability to acquire information from the indicated sources and to give an oral presentation on specific issues in the field of computer science.

He/she should also understand the need to broaden his/her competencies and be ready to cooperate within the team. Also, in terms of social competencies, the student must present attitudes such as honesty, responsibility, perseverance, cognitive curiosity, creativity, personal culture, respect for other people.

Course objective

1. Participation of students in scientific research conducted by the faculty and providing students with basic knowledge on research methods used in the field of computer science to solve selected fundamental problems in various areas of computer science.

2. Developing students' ability to conduct scientific research, including acquiring information from scientific sources, developing students' problem-solving skills regarding selecting appropriate analytical, simulation, and empirical methods to solve scientific problems, and disseminating research results.

3. Developing students' skills to identify appropriate tools for a given research problem.

4. Developing students' social competencies necessary in research teams, teamwork skills, defining and taking various roles in research teams, work organization, and time management.

Course-related learning outcomes

Knowledge

has organized and theoretically grounded general knowledge related to key topics in the field of computer science, the performance of selected solutions, consistency and correctness of selected algorithms (K2st_W2)

has a theoretically grounded detailed knowledge related to selected topics in the field of computer science, depending on the assigned research problems to be solved (K2st_W3)

knows development trends and the most important new achievements in computer science and selected related scientific disciplines (K2st_W4)

has a basic knowledge of the simulation and testing programs life-cycles (K2st_W5)

knows the fundamental methods, techniques, and tools used to solve complex tasks in the selected area of computer science (K2st_W6)

has knowledge of ethical codes related to scientific and research work in the field of computer science (K2st_W7)

Skills

is able to acquire information from literature, databases and other sources (in the mother tongue and English), integrate them, interpret and critically evaluate them, draw conclusions and formulate and exhaustively justify opinions (K2st_U1)

can plan and carry out experiments, including measurements and computer simulations, interpret the obtained results and draw conclusions, as well as formulate and verify hypotheses related to complex engineering problems and simple research problems (K2st_U3)

can use analytical, simulation, and experimental methods to formulate and solve research problems (K2st_U4)

can assess the usefulness and the possibility of using new achievements (methods and tools) and new IT products (K2st_U6)

can (e.g., by using new methods) solve complex IT tasks with a research component (K2st_U10)

is able to prepare and present a report (in Polish and English) presenting the results of scientific research or give an oral presentation on specific topics in the field of computer science; (K2st_U13)

is able to interact in a team, fulfilling different roles (K2st_U15)

is able to determine the directions of further learning and implement the process of self-education, also including other people (K2st_U16)

Social competences

understands that in computer science, knowledge and skills become obsolete very quickly (K2st_K1)

understands the importance of using the latest achievements in the field of computer science while solving research and practical problems (K2st_K2)

understands the importance of popularizing new achievements in the field of computer science (K2st_K3)

is aware of the need to develop professional achievements and adhere to the professional ethics rules (K2st_K4)

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative evaluation:
- based on the evaluation of the current progress of the tasks,
- continuous assessment, rewarding the incremental skill of using the learned principles and methods,
- ability to manage time in the design and implementation of research work.

Summative evaluation:
- based on the completion of the assigned tasks.

Programme content

The program covers the following topics:

1. Performing a literature review in the area of the selected problem.

2. Defining the research problem to be solved, defining the research hypothesis, defining the expected results.

3. Establishing a research team, assigning roles, defining a research project plan,

4. Designing a research study, identifying the required software and hardware tools.

5. Developing the environment for simulation or experiments.

6. Executing experiments, simulations, tests, or other types of research activities. Collecting the research results.

7. Processing and analysis of research results. Visualization of research results. Introducing necessary improvements to the research procedure and re-executing/continue the experiment.

8. Verification of the research hypothesis based on the study results.

Teaching methods

Consultations, discussions, case studies, project work.

Bibliography

Basic

Depending on a research topic.

Additional

Depending on a research topic.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	45	1,5
Student's own work (acquiring information from scientific literature, databases, and other sources; development and implementation of experiments, collecting and analyzing results) [1]	5	0,5

[1] delete or add other activities as appropriate