COURSE DESCRIPTION CARD - SYLLABUS

Course name
Research and Implementation Project

Course

Field of study
Computing

Year/semester
2/3

Area of study (specialization)
Cybersecurity

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars
15

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
prof. dr hab. inż. Mariusz Głąbowski
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Faculty of Computing and Telecommunications

Responsible for the course/lecturer:
dr inż. Anna Grocholewska-Czuryło
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Prerequisites

The student should have a basic knowledge of mathematics useful for formulating and solving complex information technology tasks. He/she has a structured, theoretically supported general knowledge of algorithms and complexity, cryptography, cyber security, network technologies, application security, IoT security. He/she has knowledge of development trends and most significant new developments in computer science and selected related scientific disciplines. He/she should have the ability to use information and communication technology used in the realization of computer science projects, use analytical, simulation and experimental methods to formulate and solve engineering tasks and simple research problems, formulate and test hypotheses related to engineering problems and simple research problems, integrate knowledge from various areas of computer science and the ability to acquire information from indicated sources and deliver an oral presentation on detailed issues in computer science.

He/she should also understand the necessitý of expanding his/her competences and havé readiness to cooperate within a team. Moreover, in terms of social competence students should demonstrate such

attitudes 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 Institute of Computer Science at PP and providing students with the basic knowledge regarding the implementation of scientific research, in terms of solving selected elementary problems from various fields of computer science

To develop in students the ability to conduct scientific research, including: to use scientific sources, to develop in students the ability to solve problems by selecting appropriate analytical methods, simulation and experiments in scientific research and to write studies from conducted research.

3) Developing in students the ability to identify appropriate tools for the research problem.

To develop in students social competences necessary in research activity, the ability to work in a team, to define and take various roles in scientific teams, to organize work and manage time.

Course-related learning outcomes

Knowledge

Has structured and theoretically supported general knowledge related to key issues in computer science, performance of selected solutions, consistency and correctness of selected algorithms.

Has theoretically grounded detailed knowledge related to selected issues in the field of computer science, depending on the assigned research problems to solve.

He/she has knowledge about development trends and the most significant new achievements in computer science and in selected related scientific disciplines.

Has basic knowledge of the life cycle of simulation and test programs.

He/she knows basic methods, techniques and tools used in solving complex tasks from a selected area of computer science.

He or she has knowledge about ethical codes of conduct related to scientific and research work conducted in the field of computer science.

Skills

Can obtain information from literature, databases and other sources (in the native language and English), integrate them, interpret and critically evaluate, draw conclusions and formulate and fully justify opinions.

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 connected with complex engineering problems and simple research problems.

Can use analytical, simulation and experimental methods to formulate and solve research problems.

The student is able to assess the usefulness and applicability of new developments (methods and tools) and new computer products.

The student is able to solve complex information technology tasks containing a research component using new methods.

Can prepare and present a scientific study in Polish and English presenting research results or an oral presentation on specific issues related to computer science.

Can cooperate in a team, taking various roles in it.

Can determine directions of further learning and implement the process of self-education, including other people.

Social competences

Understands that in ICT security, knowledge and skills become obsolete very quickly.

Understands the importance of using the latest ICT security knowledge in solving research and practical problems.

Is aware of the necessity of a professional approach to solving ICT security problems and taking responsibility for his/her proposed projects.

Methods for verifying learning outcomes and assessment criteria

The learning outcomes outlined above are verified as follows:

- on the basis of assessment of the current progress of the tasks,

- continuous assessment at each class (oral answers) - bonuses for the growth of skills in using the known principles and methods,

- time management skills in the design and implementation of research work,

- evaluation of the final report prepared partly during the classes and partly after their completion; the evaluation includes the ability to work in a team,

- evaluation and defense by the student of the report on the implementation of the research project,

Obtaining additional points for activity during classes, especially for:

- discussion of additional aspects of the issue,

- the effectiveness of applying the knowledge gained when solving the given problem.

Programme content

The program includes the following:

1. Familiarization and analysis of primary literature related to the field of the selected problem.

2) Defining a research problem to be solved, defining a research hypothesis, determining the expected results of the work.

3. constitution of the research team, allocation of roles, defining the plan of the research project,

4) Designing research experiment, defining necessary software and hardware tools.

5. construction of environment for simulation and experimentation.

6. Implementation of experiments, simulations, tests and other types of research. Collection of research results. Processing and analysis of research results. Visualization of research results. Make any corrections and return to the implementation of the experiment. 8.

8) Verification of the research hypothesis.

9) Develop a presentation of the objectives, methods and results of the study.

10. writing the publication or report/final study in Polish or English.

Teaching methods

Depending on the research group: multimedia presentation, presentation illustrated with examples given on the blackboard, multimedia show, demonstration, performing experiments, discussion, teamwork, case study.

Bibliography

Basic

1. Dobre rady dla piszących teksty naukowe, David Lindsay; przeł. [z ang.]. - Wrocław: Politechnika Wrocławska, 1995.
2. Jak pisać prace uniwersyteckie: poradnik dla studentów, Paul Oliver; przekł. [z ang.]. - Kraków: Wydaw. Literackie, 1999.

3. Jak pisać teksty naukowe? Jolanta Maćkiewicz. - [Wyd.2 poszerz., dodr.]. - Gdańsk: Uniwersytet Gdański, 2001.

Additional

1. Józef Pieter, Ogólna metodologia pracy naukowej, Ossolineum, Wrocław 1967

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	30	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation)[1]	20	0,5

[1] delete or add other activities as appropriate