SYLLABUS

Name: ***Computer Architecture (InfAAu>SI6CA19)***
Name in Polish:
Name in English: ***Computer Architecture***

Information on course:

Course offered by department: Faculty of Automatic Control, Electronics and Computer Science
Course for department: Silesian University of Technology

Default type of course examination report:

EGZ

Language:

English

Course homepage:

https://platforma2.polsl.pl/rau2/course/view.php?id=1073

Short description:

The goal of the lecture (semester 5) is to familiarize students with current solutions in the architecture and organization of processors, and subsequently, computer systems. Particular attention is paid to parallelism mechanisms in computer organization. The goal of the laboratory (semester 6) is to provide students with practical knowledge of various computer architectures and parallel and distributed programming tools. Before participating in the laboratory, students should be familiar with the lecture material related to the given exercise and the corresponding instructions. Furthermore, students should have basic computer programming skills.

Description:

ECTS: 4
Total workload: 100 hours (50 contact hours / 50 hours of student independent work)
Contact hours:
Laboratory: 30 hours
Other (review and discussion of reports): 20 hours
Student independent work: preparing for classes, processing results, writing reports, preparing for tests, preparing for exams.

After attending 5 lectures on Computer Architecture during the semester, students complete laboratory exercises in this subject in semester 6 and take a final exam.
Laboratory – list of exercises:
1) AS/400 Architecture,
2) SPARC or mutithreading Architecture,
3) PVM or MPI Parallel Programming Environment,
4) MOSIX Cluster Management System,
5) Vector Computing,
6) CUDA Architecture.

Bibliography:

Literatura podstawowa:
A. Tanenbaum „Strukturalna organizacja systemów komputerowych”, WNT 2006.
W. Stallings „Organizacja i architektura systemu komputerowego”, WNT 2004.
Literatura uzupełniająca:
J. Hennessy, D. Patterson „Computer Architecture: A Quantitative Approach”, Elsevier 2019
S. Kozielski „Architektura procesorów. Mechanizmy równoległości obliczeń – równoległość poziomu rozkazów” – Wydawnictwo Politechniki Śląskiej, 2024.
https://repolis.bg.polsl.pl/dlibra/publication/90432

Learning outcomes:

Learning outcomes specific to the Computer Architecture course - after completing the course, the student:
knows the architecture and organization of modern CISC, RISC, ARM, and superscalar processors (lab report, final exam) - K1A_W05, K1A_W10;
knows the details of how commonly used superscalar processors and graphics processors operate (lab report, final exam) - K1A_W05, K1A_W10, K1A_U18;
knows the architecture and organization of modern multiprocessor systems with shared memory (servers) and distributed memory (clusters) (lab report, final exam) - K1A_W05, K1A_W10, K1A_U18;
knows the development trends of specific computer architectures (exam) - K1A_W13;
can evaluate the types of computational parallelism occurring in a designed program and can identify the parallelism mechanisms available in the computer system used, useful for parallelizing the designed computations (lab report) - K1A_U10, K1A_U18;
can design and implement parallel computations with various types of parallelism in programs, using various parallelism variants in the architecture of the computer systems used (lab report) - K1A_U10, K1A_U18;

Assessment methods and assessment criteria:

The Computer Architecture course consists of two parts: lectures and labs. According to the study regulations, attendance at lectures is optional (but highly recommended), while participation in laboratory exercises is mandatory.

Lectures (semester 5) are assessed on the basis of a multiple-choice test; students must obtain at least half of the total points available.

Credit lab (semester 6) are awarded to students who receive a positive grade in all laboratory exercises. A short quiz is required at the beginning of the laboratory exercise. The final grade for the laboratory exercise is the average of the grades from the quiz and the laboratory assignment.

The final exam (semester 6) consists of three parts: a multiple-choice test covering the lecture topics, a test requiring students to provide short, descriptive answers to five questions covering the lecture topics, and a practical part section covering five laboratory exercises. A positive grade is required for each of these three parts of the exam. The final grade is the average of the grades from the individual exam sections and the laboratory assessment.
The syllabus is valid from the summer semester of the academic year 2024/2025, and its content is not subject to change during the

semester.

Course credits in various terms:

Informatics, full-time first degree engineering studies 7 sem. (InfAAu-SI7)			
Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	4	2020/2021-L	