

SYLLABUS

Name: Computer Construction (InfAAu>SI7CC19)

Name in Polish:

Name in English: Computer Construction

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:

ZAL

Language:

English

Course homepage:

<https://platforma2.polsl.pl/rau2/course/view.php?id=1120>

Short description:

The Computer Construction course is oriented towards the presentation of hardware solutions for the construction and design of simple digital systems based on reprogrammable circuits, the construction of basic modules of a computer system and methods for maintaining the operation of computer systems.

Description:

Lectures:
Information systems: technical, biological, quantum, nanotechnology. Specialized ASICs. Digital programmable devices PLD, FPGA CAD systems for designing digital structures. Hardware description languages - VHDL. Computer systems on chip - smart cards. Buses in computer systems: FSB, HyperTransport, Dual channel, ATA, SCSI, SATA, SAS, PCIE. Semiconductor memories and mass storage: magnetic, optical, holography. Timing circuits, chipsets, motherboards. Maintenance of computer system: UPS, RAID, backup, Fault Tolerance System, electromagnetic compatibility.

Topics of laboratory classes:

1. Interactive simulation using CAD systems
2. Hardware description languages – VHDL
3. Computer systems on chip - Basic Card
4. A computer system in an FPGA system
5. ADAS systems
6. EMC electromagnetic compatibility

Number of hours of classes with the direct participation of the academic teacher or other persons conducting the classes and students

- Lecture: 30h

- Laboratory: 30h

Number of hours devoted to the student's own work

- Preparation for the colloquium, reading the literature, consultations: 30h

- Preparation for laboratory exercises and reports, consultations: 30h

Total Hours: 120h

Number of ECTS credits: 4

including

Number of ECTS points obtained during classes conducted with the direct participation of the academic teacher or other teachers and students: 2

Lecture: 30 / 30h

Laboratory: 30 / 30h

The sum of all hours: 120

Number of ECTS credits: 4

Bibliography:

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- L. Znamirowski, A. Ziębiński, M. Skrzewski, R. Pawłowski, S. Warecki: Komputerowospomagane projektowanie systemów mikroelektronicznych, Część II, Wydawnictwo Politechniki Śląskiej, Gliwice 2006, ISBN 83-7335-302-X.
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- Red. L. Znamirowski. Autorzy: E. Korbiel, R. Maceluch, W. Mielczarek, M. Skrzewski, L. Znamirowski: Wprowadzanie i wyprowadzanie informacji w systemach cyfrowych, Skrypt Pol. Śl., Nr 1167, Gliwice 1984.
- Grzywak A.: Laboratorium budowy i projektowania komputerów. Wyd. Polit. Śl., Gliwice 1988.
- Literatura uzupełniająca:
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 - Weston, David A.. Electromagnetic Compatibility: Methods, Analysis, Circuits, and Measurement, Third Edition. Stany Zjednoczone, CRC Press, 2016.
 - Vanderbauwhede, Wim, and Khaled Benkrid, eds. High-performance computing using FPGAs. Vol. 3. New York: Springer, 2013.
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 - Manenti, Riccardo, and Mario Motta. Quantum information science. Oxford University Press, 2023.
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 - Ramsden, Jeremy. Nanotechnology: an introduction. William Andrew, 2016.
 - Niederliński A.: Mikrokomputery i minikomputery. WSzIP, Warszawa 1978.
 - Niederliński A.: Mikroprocesory, mikrokomputery, mikrosystemy. WSzIP, Warszawa 1987.
 - Metzger P. Jełowicki A.: Anatomia PC. HELION, Gliwice 1997.

- Misiurewicz P.: Podstawy techniki cyfrowej. WNT, Warszawa 1982.
- Łuba T., Zbierzchowski B., Jasiński K.: Programowalne moduły logiczne w syntezie układów cyfrowych, WKŁ Warszawa 1992
- Łuba T., Zbierzchowski B.: Komputerowe projektowanie układów cyfrowych WKŁ Warszawa 2000
- Łuba T., Zbierzchowski B., Jasiński K.: Specjalizowane układy cyfrowe w strukturach PLD i FPGA WKŁ Warszawa 1997
- Węgrzyn J.: Podstawy informatyki. PWN, Warszawa 1982.
- Molski M.: Modułowe i mikroprogramowane układy cyfrowe. WKŁ, Warszawa 1986.
- Prince B.: High performance memories. J. Wiley. London 1996.

Learning outcomes:

E1: Knowledge:

Has elementary knowledge in the scope of:

- construction of reprogrammable digital modules (final test) (K1A_W16)
- construction of basic modules of computer system (final test) (K1A_W16)
- methods for the continuous maintenance of computer system (final test) (K1A_W16)

E2:Skills:

Has elementary skills in

- design and simulation of simple digital systems on the basis of reprogrammable circuits using CAD and HDL tools (report) (K1A_U11, K1A_U20)
- design of simple applications for embedded systems (report) (K1A_U11, K1A_U20)

Assessment methods and assessment criteria:

Signing up for a course on the Remote Education Platform.

The student obtains a pass from laboratory exercises from a minimum of 2.75 points. The laboratory score is calculated from the average of the points obtained from the individual laboratory exercises. All lab exercises must be passed. Participation in lab exercise is mandatory.

The student obtains a pass from the lecture with at least 2.75 points. The score from the lecture is the average of the grades obtained from the colloquium (eventually a project or a developed report). The obligatory material covers both lecture and laboratory issues.

The grade in the subject is the sum of the scores from 3/4 of the test + 1/4 of the laboratory.

Completion of the subject is possible after obtaining a grade of 3.0 (at least 2.75 points).

The syllabus is valid from the winter semester/academic year 2025 and its content is not subject to change during the semester.

Practical placement:

missing practical placement in English

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	2022/2023-Z	