SYLLABUS

Name: *Analysis and Design of Information Systems (InfAAu>SM1AaDoIS19)*
Name in Polish:
Name in English: *Analysis and Design of Information Systems*

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=941

Short description:

The aim of the lecture is to provide students with information on models of software development processes, analyzing the features of IT systems and constructing models of IT systems and skilful use of them. Particular emphasis is placed on the use of the UML language and the use of design and architectural patterns.
The aim of the laboratory exercises is the students' acquiring skills in specification and requirements management, creating models in UML and their transformation, as well as determining, saving and managing relationships between project artefacts.

form of classes: contact

Description:

Lecture:
Features of information systems and related artefacts. Classic models of software development processes. Rational Unified Process (RUP).
Requirements engineering. Classifications of requirements. Requirements management. An example of a tool supporting documentation and requirements management. Product vision document. Combining requirements with other project artefacts (traceability). Rules for creating and using a use case model.
Selected methods of modelling information systems. Business modelling. Object and structural modelling. UML. Class, interaction, activity and state machine diagrams. Rules for selecting UML diagrams and recording relationships between their elements. Creating analytical, design and implementation models in UML. Applications of CASE tools.
Classic design patterns: adapter, gate, decorator, factories, facade, composite, separated interface, mediator, bridge, template method, visitors, observer, souvenir, agent, command, special case, singleton, condition, strategy, replacement service. Rules for using design patterns.
Modelling of IT systems architecture. Layered construction of IT systems.
Patterns and frameworks of enterprise application architecture.
Designing based on web services. Integration of corporate IT systems.
Data access layer - microservice architecture.
Quality assurance in the software development process. IT systems testing. Test automation.
Estimating software cost and effort and the method of use case points.
Practical aspects of design.

Laboratory:
  detailed programme's content:
The following tasks are carried out in the laboratory using IT tools:
1. Requirements analysis. Creating a vision document and terminology dictionary based on templates from RUP.
2. Modelling the use cases. Specification of the selected use case based on the document template from RUP and by activity diagrams. Documenting the relationship between requirements.
3. Development of system architecture. Application of architectural patterns.
4. Creating class diagrams for layers: presentations, applications, domain and resources. Specification for the implementation of use cases. Use of design patterns.
5. Generation of the database schema.
Tasks are carried out in groups of about 3 people, where students take turns the role of the team manager.

Number of hours of classes with direct participation of academic teachers or other persons teaching courses and students
Number of ECTS credits: 3
Total workload: 90 (60 contact hours / 30 student's own work hours)
Lecture: 30h
Laboratory: 30h
Student's own work: preparation for laboratory

including
Number of ECTS credits covered by the study programme to be earned as part of the courses taught with the direct participation of academic teachers or other persons teaching courses and students: 2

Bibliography:

Sommerville I.: Inżynieria oprogramowania. WNT, Warszawa, 2003 (polecane wydanie 9, Person Eduction, Inc. 2011).
2. Wrycza S., Marcinkowski B., Wyrzykowski K.: Język UML 2.0 w modelowaniu systemów informatycznych. Helion, Gliwice, 2005.
3. Larman C.: UML i wzorce projektowe. Wydanie 3. Helion 2011
4. Gamma E., Helm R., Johnson R., Vlissides J.: Wzorce projektowe. WNT, Warszawa, 2005 lub Helion Gliwice 2010.
5. Fowler M, Rice D., Foemmel M., Hieatt E., Mee R., Stafford R.: Architektura systemów zarządzania przedsiębiorstwem. Wzorce projektowe. Helion, Gliwice, 2005.
6. Erl T..:SOA Design Patterns. Prentice Hall, 2009.
7. Hohpe G., Woolf B.: Enterprise Integration Patterns. Designing, Building and Deploying Messaging Solutions. Addison-Wesley 2004.

8. Kroll P., Kruchten P.: Rational Unified Process od strony praktycznej. WNT, Warszawa, 2007.
9. Beck K., Andres C.: Wydajne programowanie. eXtreme Programming. MIKOM, Warszawa, 2006.
10. Leffingwell D., Widrig D.: Zarządzanie wymaganiami. WNT, Warszawa, 2003.
11. Schneider G., Winters J.: Stosowanie przypadków użycia. WNT, Warszawa, 2004.
12. Scientific manuscripts (available in e-resources of Silesian University of Technology https://www.bg.polsl.pl/ebazy/listaebaz_s3.html

Learning outcomes:

Student:
Is able to define requirements for the designed IT system. (laboratory report, oral answers during classes) [K2A_W05, K2A_W10]
Is able to create a use case diagram for the designed IT system. (laboratory report, oral answers during classes) [K2A_W05]
Is able to create use case implementation scenarios for the designed IT system. (laboratory report, oral answers during classes) [K2A_W05]
Is able to create an activity diagram for the designed IT system. (laboratory report, oral answers during classes) [K2A_W05]
Is able to create a class diagram for the designed IT system. (laboratory report, oral answers during classes) [K2A_W05, K2A_W08]
Is able to create a sequence diagram for the designed IT system. (laboratory report, oral answers during classes) [K2A_W05, K2A_W08]
Can acquire IT knowledge provided in English (oral answers during classes) [K2A_U04]
Can manage the work of a group of students performing assigned tasks. (oral answers during classes) [K2A_U05]
Can acquire new knowledge in a situation requiring solving assigned tasks. (oral answers during classes) [K2A_K02]

Assessment methods and assessment criteria:

Lecture - the final grade for the course is the grade from the laboratory classes.

Laboratory:
The conditions for passing the laboratory:
a) Attendance at all laboratories (unexcused absence causes failure to pass the laboratory and, consequently, the entire course).
b) Performing the tasks given by the teacher.
c) Submission of the final report.

The laboratory grade is issued from the final report covering all completed laboratories. The final report should be given at the last class or on the date agreed with the teacher.
The final report should be sent to your Leading Teacher and the head of the course to the following address: Robert.Brzeski@polsl.pl
The final grade of the report is issued based on its completeness, correctness and timeliness of submission and student activity during the laboratory.

The syllabus is valid from academic year 2024/25 and its content cannot be changed during the semester.

Course credits in various terms:

<without a specific program>			
Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	3	2020/2021-Z	