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Analysis of software requirements

2023

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Course Name	
	Analysis of software requirements
Lecturer (s)	
	Oleksandr Nesterenko, professor at the Department of Information Technology, Doctor of Engineering, professor
Lecturer's profile	
	https://it.ieu.edu.ua/pro-yeash/struktura-yeash/kafedra-informatsiinykh-tekhnolohii/sklad#zzz-001
Consultations	
online consulting	https://meet.google.com/sww-grmx-cii
offline consulting	Thursday 3 p.m. – 5 p.m.
Contact number	
	0977572796
E-mail	
	oleksandr_nesterenko@ieu.edu.ua
Discipline page	
	https://dist.ieu.edu.ua/course/view.php?id=445

Form of final control	test	def. test	exam
	□	□	☒

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1 Brief discipline annotation

The Analysis of software requirements academic discipline is designed for Bachelors of the knowledge area: 12 Information Technology, specialty: 121 Software Engineering. It is one of the professional disciplines for future software developers.

2 Background for studying discipline

The program is based on the study of such disciplines as Fundamentals of software engineering, Group dynamics and communications, Methods and tools of information technology.

3 Goal and objectives of the discipline

The goal of the Analysis of software requirements discipline is to provide future Bachelors of Software Engineering with theoretical knowledge and practical skills in basics of analyzing properties, quality and functions of a software product to be developed or being in the process of modification, software requirements based on user needs and working conditions, taking into account potential contradictions between different software requirements and successfully resolve various conflict situations between its customer and developer.

Key objectives of the discipline:

- to master basic information about software requirements;
- to acquire the ability to define particularities of a future software product and model its functioning in a specific hardware and software environment;
- to acquire skills in forming a model of the subject area, identifying and analyzing software requirements, creating a software requirements specification based on the obtained results;
- to develop the ability to validate and verify software requirements using appropriate tools;
- the ability to build models of software system elements and to detail them using tools;
- to develop the ability to critically evaluate the results of software requirements development and, if necessary, to suggest requirements to meet the customer's needs.

4 Learning outcomes

To know the purpose, functionality and rules of using basic system applications, Internet services, rules of searching and processing information in the global network.
To be able to use Internet technologies for data collection and analysis.
To select initial data for design, relying on formal methods of requirements description and modeling.

After learning the discipline, students should
know:

- types of software requirements and properties of requirements;
- ways of requirements detection;
- key methods and techniques of software requirements engineering;
- advantages and disadvantages of used technologies of software requirements generation and analysis, areas of their development.

be able to:

- apply appropriate methods and techniques of requirements detection and analysis, taking into account regulatory and other constraints;
- model key aspects of developed software systems at the initial stages of software design, apply prototypes when forming and analyzing software requirements;

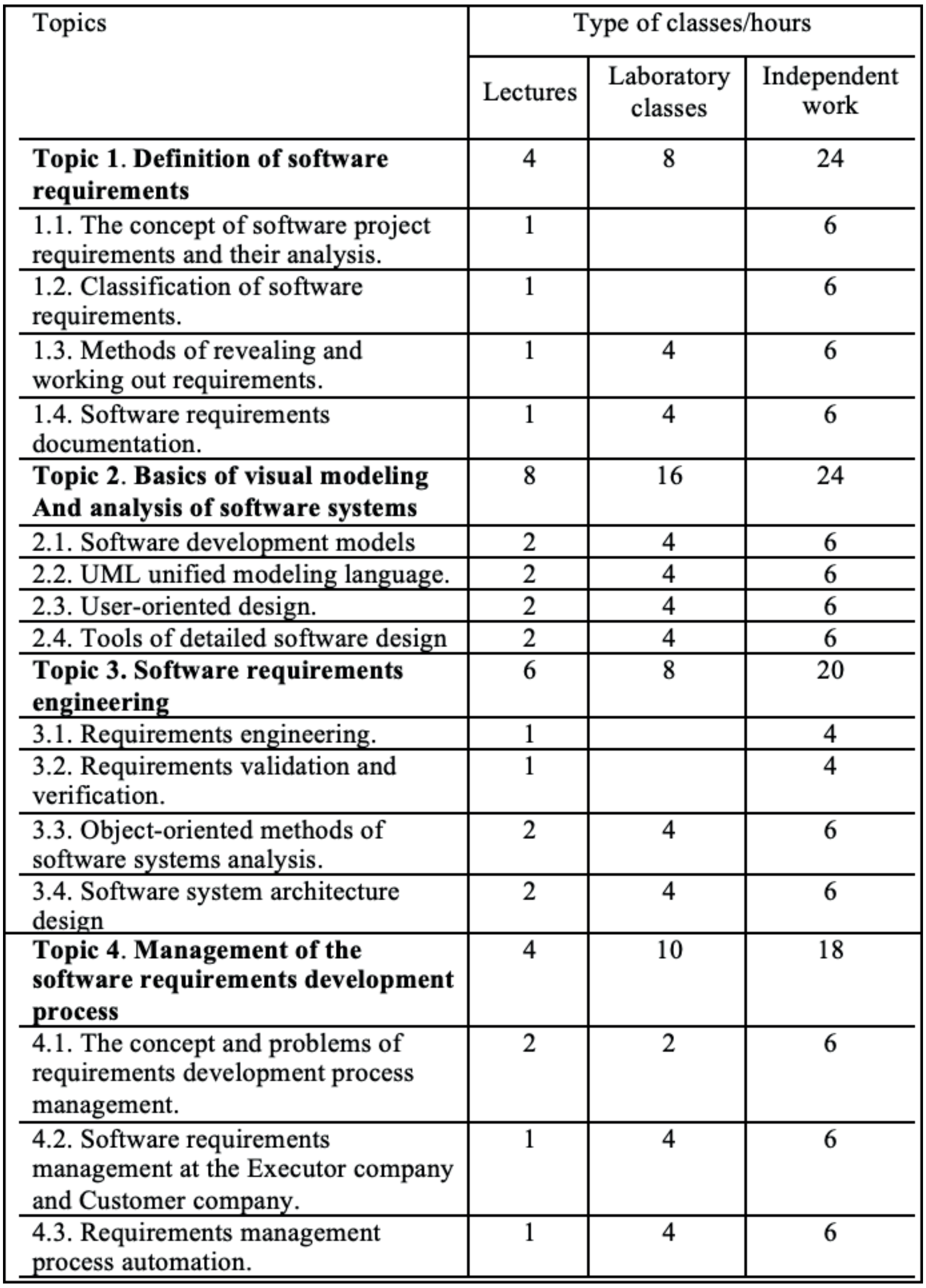
4 Learning outcomes

- apply diagrams of the UML 2.0 unified modeling language when working out requirements using modern software tools;
- compose and modify the specification of software requirements when performing a software project, explain the obtained solution in a reasoned manner.

5 ECTS credits

5

6 Course Content



Topics	Type of classes/hours		
	Lectures	Laboratory classes	Independent work
Topic 1. Definition of software requirements	4	8	24
1.1. The concept of software project requirements and their analysis.	1		6
1.2. Classification of software requirements.	1		6
1.3. Methods of revealing and working out requirements.	1	4	6
1.4. Software requirements documentation.	1	4	6
Topic 2. Basics of visual modeling And analysis of software systems	8	16	24
2.1. Software development models	2	4	6
2.2. UML unified modeling language.	2	4	6
2.3. User-oriented design.	2	4	6
2.4. Tools of detailed software design	2	4	6
Topic 3. Software requirements engineering	6	8	20
3.1. Requirements engineering.	1		4
3.2. Requirements validation and verification.	1		4
3.3. Object-oriented methods of software systems analysis.	2	4	6
3.4. Software system architecture design	2	4	6
Topic 4. Management of the software requirements development process	4	10	18
4.1. The concept and problems of requirements development process management.	2	2	6
4.2. Software requirements management at the Executor company and Customer company.	1	4	6
4.3. Requirements management process automation.	1	4	6

7 List of obligatory tasks

1. Glossary development.
2. UML diagrams of the developed system: state diagrams and activity diagrams.
3. Rational Rose and Together basic CASE tools.
4. Analysis of system requirements and development of conceptual diagrams in UML.
5. Development of system requirements specifications using object analysis tools (in UML language).
6. Development of Use Case Specification.
7. Integration of Requisite Pro with MS Project.

8 List of selective tasks

1. Application of UML in programming
2. Technologies for creating electronic glossaries.
3. SOLID principles and patterns of object-oriented programming

9 Discipline features

Period of teaching	**Semester**	**International disciplinary integration**	**Year of study**	**Courses: general training/ professional training/elective**
1 semester	5 semester	available	3nd year	Professional training

10 Assessment system and requirements. General system of discipline assessment

Personal computer, Windows and Linux OS, system utilities

11 Admission to final control

As part of discipline teaching, one carries out the current and final control of students' knowledge. The final grade is given according to the total rating of students.
The results of the current control of students' knowledge is assessed in general between 0 and 60 scores.
Students are admitted to the final control if they fulfil the requirements of the training program and obtain at least 36 scores for the current learning activity.
Final assessment of students' knowledge is conducted in the form of exam.
The maximum amount of scores that can be obtained during the exam is 40 scores.
The overall score of the discipline is 100. The total grade for the discipline is given according to the national and European scale.

12 Discipline policy

Teaching of the discipline is based on cutting-edge educational technologies aimed at increasing the level of students' interest in the course, providing theoretical and practical knowledge of the discipline.
To activate the learning and cognitive activity of students, the discipline includes the consolidation of knowledge obtained at the lecture and acquisition of practical skills in lecture topics during laboratory classes and independent work.

13 Policy of absence and late task performance

Scores are not given for missed lectures. If students miss a laboratory work, they should perform all tasks of the missed laboratory work before the next laboratory work and present the results to the lecturer.

Students who have missed classes without valid reasons and have not participated in current control activities are not admitted to the final semester control. In this case, a mark 'non-admission' is put in the exam record on the day of the exam.

Repeated taking of the exam of the discipline is appointed in case of accomplishing all types of educational, individual work stipulated by the working program of the academic discipline and is carried out according to the approved schedule of academic failure liquidation.

14 Academic integrity policy

Tasks and laboratory works submitted later are assessed with a lower grade. The grade is reduced by one point for each week of lateness.

15 Recommended sources of information

PRIMARY (BASIC) LITERATURE:

1. Eric J. Braude. Software Engineering Technology. Translated from English. St. Petersburg: Peter, 2004.
2. K. Wiegers. Software Requirements. Translated from English. 2004.
3. Andy Carmichael, Dan Haywood. Better Software Faster. Translated from English. M.: Williams, 2003.
4. Alistair Cockburn. Writing Effective Use Cases. Translated from English. M.: Lori, 2002.
5. Butch G., Rambo J., Jacobson A. The language of UML. Users guide. Translated from English. M.: DMK, 2000.

Additional

1. Donald F. Shafer, Robert T. Futrell, Linda Isabell Shafer. Quality Software Project Management. Translated from English. M.: Williams, 2003.
2. Boggs W. UML and Rational Rose. Translated from English. M.: Lori Press, 2004.
3. Leszek A. Matsyashek, Requirements analysis and system design, Development of information systems using UML. Translated from English. M.: Williams, 2002. 432 p.
4. Leffingwell D. and Widrig D. Managing Software Requirements. Translated from English. M.: Williams, 2002.
5. Jacobson A., Butch G., Rambo J. Unified Software Development Process. Translated from English. St. Petersburg: Peter, 2002. 496 p.

Internet resources

1. Microsoft website. – Available at: https://www.microsoft.com/uk-ua/
2. UML Tutorial. – Available at: https://www.tutorialspoint.com/uml/index.htm/
3. IT website. – Available at: https://dou.ua/
4. Rational Requisite Pro 7.1.4. – Available at: https://www.ibm.com/support/pages/rational-requisitepro-714
5. Problems of Programming Scientific and Technical Journal. – Available at: https://pp.isofts.kiev.ua/index.php/ojs1

16	Tips on successful study during the course

Note: examine lecture materials and perform tasks and laboratory works synchronously with the curriculum. Thus, your abilities and insistence will be the key to success!