**DOCTORAL (PHD) STUDIES**

# COURSE UNIT DESCRIPTION

| Course unit title | Scientific areas | Faculty | Institute, department |
|---|---|---|---|
| Requirements Engineering: methods and tools | Informatics Engineering (T 007) | Faculty of Mathematics and Informatics | Institute of Data Science and Digital Technologies |

| Study method | Number of credits | Study method | Number of credits |
|---|---|---|---|
| Lectures | 1 | Consultations | 1 |
| Individual works | 4 | Seminars | 1 |


Summary

**Necessary preparation**. The module's studies require knowledge of the master's level computer science and mathematics courses offered to the students of informatics specialties.

**The aim** of the course is to deepen knowledge of requirements acquisition and specification methods and tools of cyber-social systems (Enterprise information systems) and cyber-physical systems development.

**Main topics:**

• Classification of requirements engineering methods. Types of information system requirements. Requirements engineering framework [1]. Artefacts of requirements: objectives, scenarios, requirements for decision making, documentation requirements [1]. Requirements analysis and specification standards and languages: BPMN2.0, DMN, UML, SySML. Requirements validation and management [1, 2]. Requirements management software packages: JIRA, Jama Software, Orcanos, IBM RQA, and others. Traceability of requirements [1, 2]. MDA approach and requirements specification process. Extended MDA / MDD process. [5]. MBSE approach [4].

• Methods for analysis and specifying the requirements of the corporate social networks (enterprise information systems). Requirements analysis and specification for enterprise information systems. WEB-based Information System requirements rnalysis and specification methods [5]. Methods for analysis and specification of requirements for cyber-physical systems.

• Enterprise architecture frameworks DODAF, MODAF, TOGAF, UPDM, UAF.

• Knowledge-based requirements engineering: information needs of management process, specification requirements of management information [6].

**Practical tasks:** a report on the requirements engineering methods and program packages, the specific methods are tuned with the subject of the dissertation.


Main literature


1. K.Pohl Requirements engineering. Fundamentals, principles, and techniques. Springer, 2010 ISBN 978-3-642-12577-5
2. Laplante A.P. Requirements engineering for softwrae and systems. CRC Press, 2009
3. Tools and Algorithms for the Construction and Analysis of Systems: 22nd International Conference, TACAS 2016, Held as Part of the European Joint Conferences on Theory and Practice of Software, ETAPS 2016, Eindhoven, The Netherlands, April 2-8, 2016, Proceedings / Marsha Chechik, Jean-François Raskin Springer, 2016-04-08 - 961 psl.
4. Patrice Micouin, Model Based Systems Engineering: Fundamentals and Methods, 2014.
5. Gudas, S.; Valatavičius, A. Extending model-driven development process with causal modeling approach // Data science: new issues, challenges and applications / Dzemyda, Gintautas, Bernatavičienė, Jolita, Kacprzyk, Janusz (Eds.). Cham: Springer, 2020. ISBN 9783030392499. eISBN 9783030392505. p. 111-143. (Studies in Computational Intelligence, ISSN 1860-949X, eISSN 1860-9503 ; vol. 869). DOI: 10.1007/978-3-030-39250-5_7.
6. Saulius Gudas (2012). Foundations of the Information Systems Engineering Theory. Monograph, Vilnius, Vilniaus universiteto leidykla, 2012, 382 p. ISBN978-609-459-075-7

| Lecturer(s) (name, surname) | Science degree | Main publications |
|---|---|---|
| Saulius Gudas | Dr. | http://www.elaba.mb.vu.lt/dmsti/?aut=Saulius+Gudas |
| Audrius Lopata | Dr. | https://www.researchgate.net/profile/Audrius-Lopata/research |
| Audronė Lupeikienė | Dr. | http://www.elaba.mb.vu.lt/dmsti/?aut=Audronė+Lupeikienė |