



RTU Course "Algorithmization and Programming of Solutions"

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General data

Code	DIP106
Course title	Algorithmization and Programming of Solutions
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Undergraduate Studies
Course type	Academic
Field of study	Computer Science
Responsible instructor	Jurijs Lavendels
Academic staff	Jurijs Ivanovs Gints Jēkabsons Marija Dobkeviča Lāsma Lēruma-Gūtmane Natalija Prokofjeva Vadims Žuravļovs
Volume of the course: parts and credits points	2 parts, 5.0 Credit Points, 7.5 ECTS credits
Language of instruction	LV, EN
Annotation	Students receive academic knowledge in computer applications, as well as pragmatic skills in development of application using such programming languages as Java and VBA. The acquired knowledge and skills ensure further successful mastering of computer science courses.
Goals and objectives of the course in terms of competences and skills	The aim of the course is to prepare students for further computer science courses, to provide practical software development skills. The results are achieved providing: - academic knowledge on algorithms, their properties and their development, formal syntax, semantics, data types, structures, as well as data processing operations; - practical knowledge in high-level programming languages, their syntax and semantics; - development of set of different difficulties programs and its documentations.
Structure and tasks of independent studies	Individual work consists of: -learning of methodological materials and literature; -practical development of algorithms; -designing, documenting, coding, and testing of software.
Recommended literature	1.PI katedras datorizētīe mācību līdzekļi. 2.Herbert Schildt. Java: beginner's guide : create, compile, and run Java programs today. NewYork, McGraw-Hill, 2014. 699 p. 3.Herbert Schildt. Java: The Complete Reference. NewYork, McGraw-Hill, 2014. 1274 p. 4. Josh Juneau. Java EE7 receipes: a problem - solution approach.New York, Apress. 2013. 699 p. 5.Robert Sedgewick. Algorithms in Java, Fundamentals, Data Structures,Sorting, Searching. NewYork, Addison-Wesley, 2002., 768 p. 6. Algorithms Unlocked. Thomas H. Cormen. MIT Press, 2013. 222 p. 7.Excel 2013 Power Programming with VBA. John Walkenbach. Willey, 2013. 1104 p. 8. Marina Uhanova. Programmēšana valodā VBA un VB.NET. RTU, 2015. 94 lpp. 9. Programmēšanas e-kursi. www.startit.lv
Course prerequisites	Knowledge of informatics within the scope of secondary school program is desirable.

Course outline

Theme	Hours
Part 1. Algorithms in daily life and their implementation in computers, development of algorithms.	4
Main data types, data processing operations in high-level programming languages. Flow control statements of high-level programming languages.	6
Organizing of cycles, one dimensional and multi dimensional arrays.	12
Strings.	2
Subprograms and their structure. Subprograms and class libraries.	4
Algorithms for searching and sorting.	2
The analysis of algorithms. O notation	2
Development of the first programs, familiarization with the integrated development environment and debugging tools provided by development environment.	16
Part 2. Programming paradigms and introduction to object oriented programming.	4
Data sets on external mediums (files), logical and physical files, serial and direct access. Streams.	4
Graphic user interface development. Graphic functions.	8
Development of practically applicable software.	16

Learning outcomes and assessment

Learning outcomes	Assessment methods
Part 1. Skills in using integrated development environment.	Can use integrated programming environment tools.
Skills in development of algorithms (including) on the level of flowcharts, skills in software development, skills in debugging.	Description of laboratory works, which includes flowcharts and software documentation.
Skills in simple program development.	Laboratory works

Study subject structure

Part	CP	Hours per Week			Tests		
		Lectures	Practical	Lab.	Test	Exam	Work
1.	3.0	2.0	0.0	1.0		*	
2.	2.0	1.0	0.0	1.0		*	