



RTU Course "Fundamentals of Computer Graphics and Image Processing"

12214 null

General data

Code	DAA300
Course title	Fundamentals of Computer Graphics and Image Processing
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Undergraduate Studies
Course type	Academic
Field of study	Computer Science
Responsible instructor	Katrina Boločko
Academic staff	Mihails Kovaļovs Olga Krutikova Marija Dobkeviča Lāsma Lēruma-Gūtmane Artjoms Suponkovs
Volume of the course: parts and credits points	1 part, 2.0 Credit Points, 3.0 ECTS credits
Language of instruction	LV, EN
Annotation	During this course, students will learn how digital visual information is created, visualized and processed on different digital systems. The course will review fundamental methods of computer graphics and image processing. Methods and algorithms for creating, transforming and visualizing graphical objects will be explored. Students will be introduced to fundamental image processing methods that are connected to image quality enhancement and preparation of images for further analysis. Students will use the acquired knowledge in practice, implementing 2D object creation and transformation algorithms in programs that will be developed independently.
Goals and objectives of the course in terms of competences and skills	To learn about raster graphics algorithms, 2D and 3D object visualization and transformation, as well as learn about image processing methods and algorithms. To use the acquired knowledge for formulating and solving different specific tasks.
Structure and tasks of independent studies	Independent work of a student is closely related to the acquired theoretical knowledge and implemented practical assignments. Students construct graphical objects in 2D space without assistance.
Recommended literature	
Course prerequisites	Basic knowledge of Mathematics and Informatics (secondary education)

Course outline

Theme	Hours
Introduction to Computer Graphics and Image Processing.	2
Graphical primitives. Straight line generation algorithm.	4
Graphical primitives. Circle line generation algorithm.	4
Graphical primitives. Ellipse line generation algorithm.	4
Curve generation algorithms. Interpolation and approximation. Bezier curves.	4
2D object visualization. Geometrical transformation of 2D objects.	4
3D objects visualization. Projections.	4
Image processing. Image quality enhancement. Fundamental principles of image analysis.	6

Learning outcomes and assessment

Learning outcomes	Assessment methods
Students are able to discuss the fundamentals, advantages and limitations of computer graphics and image processing. Students have knowledge of different raster graphics algorithms.	Written exam, that includes theoretical questions, as well as practical assignments.
Students are able to develop a program that performs 2D object creation, transformation and visualization.	Practical assignments that include programming different algorithms of computer graphics.

Study subject structure

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