



COURSE UNIT (MODULE) DESCRIPTION

Course unit (module) title	Code
Computer Graphics and Visualization	

Academic staff	Core academic unit(s)
Coordinating: dr. Asta Margienė Other: dr. Rita Misiulienė	Šiauliai Academy

Study cycle	Type of the course unit
First cycle	Individual studies

Mode of delivery	Semester or period when it is delivered	Language of instruction
Distance learning	Spring semester	English

Requisites	
Prerequisites: Basics of working with a computer	Co-requisites (if relevant):

Number of ECTS credits allocated	Student's workload (total)	Contact hours	Individual work
5	133	56	77

Purpose of the course unit		
Introduce the principles of image formation, color theory, modern technologies of raster, vector and three-dimensional graphics.		
Learning outcomes of the course unit	Teaching and learning methods	Assessment methods
Will be able to plan his time, work independently, adhering to set deadlines.	Searching for information, reading literature	Homework
Will acquire the basics of computer graphics theory.	Traditional lecture, independent reading of literature	Test (exam)
Will gain knowledge about the principles of image formation and color theory.	Individual project, laboratory work, traditional lecture	Test (exam), homework, laboratory work
Will be able to work with modern raster, vector and three-dimensional graphics programs.	Individual project, laboratory work, traditional lecture	Homework, laboratory work.

Content	Contact hours							Individual work: time and assignments	
	Lectures	Tutorials	Seminars	Workshops	Laboratory work	Internship	Contact hours, total	Individual work	Tasks for individual work
1. Development of computer graphics, concepts and terms	1						1	2	Independent reading of literature
2. Color theory	1				2		3	3	Independent reading of literature, Homework

3. Raster graphic tools. Raster graphics file formats and their compression algorithms	2				4		6	10	Homework, Preparation for laboratory work
4. Principles of vector graphics. Bezier curves. Vector graphics tools. Vector graphics file formats	6				8		14	20	Homework, Preparation for laboratory work
5. 3D modeling and 3D graphics technologies	4				10		14	10	Independent reading of literature, Homework Preparation for laboratory work
6. Real-time visualization pipeline	2						2	4	Independent reading of literature
7. Absolute and local coordinate systems. Homogeneous coordinates	1						1	2	Independent reading of literature, Homework
8. 3D transformations	2				2		4	4	Independent reading of literature, Homework
9. Projections	1						1	2	Independent reading of literature, Homework
10. Features of creating textures and materials	2				4		6	6	Homework Preparation for laboratory work
11. Shading models	2				2		4	4	Independent reading of literature, Homework
12 Preparation for the exam								10	Independent reading of literature
Total	24				32		56	77	

Assessment strategy	Weight %	Deadline	Assessment criteria
Homework	35%	At the appointed time during the semester	<p>3 homework will be assessed during the semester:</p> <ul style="list-style-type: none"> • Photo editing. • The design of the ad or website homepage. • 3D modeling and animation. <p>Each homework assignment will be graded on a 10-point system: 0 - no or incorrect homework, ... 10 - excellent or with a few minor mistakes</p>
Laboratory works	35%	At the appointed time during the semester	<p>7 laboratory works will be evaluated during the semester:</p> <ul style="list-style-type: none"> • Composition of characters and background (Photopea.com or Adobe Photoshop, etc.) • Logo creation (Inkscape, CorelDraw, or Figma) • Creating a business card (Inkscape, CorelDraw, or Figma) • 3D modeling (Autodesk 3ds max or Blender) • Animation of 3D models. (Autodesk 3ds max or Blender) • Creating physical effects using particles. (Autodesk 3ds max or Blender) • Lighting, creating materials, visualizing the scene. (Autodesk 3ds max or Blender) <p>Each laboratory will be evaluated on a 10-point system: 0 - not performed or incorrect laboratory work, ... 10 - performed perfectly or with a few small errors.</p>
Exam	30%	At the appointed time during the	<p>The test consists of 20 questions (of varying difficulty), each valued at 0.5 points. The test is passed if at least 4.5 points are collected. The grade is written by rounding off the obtained score.</p> <p>Questions from theoretical lectures: development of computer graphics, concepts and terms, color theory,</p>

		exam session	features of raster graphics. Raster graphics file formats and their compression algorithms. Principles of using vector graphics and file formats, real-time visualization pipeline, absolute and local coordinate systems, homogeneous coordinates, 3D transformations, classification of projections, shading models.
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Author (-s)	Publishing year	Title	Issue of a periodical or volume of a publication	Publishing house or web link
Required reading				
Steve Marschner, Peter Shirley	2021	Fundamentals of Computer Graphics	5 th Edition	A K Peters/CRC Press
Akenine-Möller Tomas	2018	Real-time rendering (iki 292 psł.)		A K Peters/CRC Press
Recommended reading				
Brenda Curviz	2023	Mastering Blender 3D		Independently published
Paerl Rudgars	2023	Inkscape Drawing 2023 Guide for Beginners		Independently published
Conrad Chavez	2022	Adobe Photoshop Classroom in a Book		Adobe Press