COURSE UNIT (MODULE) DESCRIPTION

Course unit (module) title	Code
Modern illumination technologies and light design	

Lecturer(s)	Department(s) where the course unit (module) is delivered
Coordinator: dr. Pranciškus Vitta	Faculty of Physics

Study cycle	Type of the course unit (module)
First cycle	Optional

Mode of delivery	Period when the course unit (module) is delivered	Language(s) of instruction
Permanent	V(autumn) semester	Lithuanian/English

Requirements for students	
Prerequisites: Basic knowledge of physics, math and technical graphics.	**Additional requirements (if any):**

Course (module) volume in credits	Total student's workload	Contact hours	Self-study hours
5	140	64	76

Purpose of the course unit (module): programme competences to be developed		
To introduce to the applications of physcs into the lighting field. To develop the competences of interdisciplinary collaboration. To provide with the practical and engineering knowledge of modern illumination systems, their structure and applications (design).		
Learning outcomes of the course unit (module)	**Teaching and learning methods**	**Assessment methods**
The students will manage to apply the theoretical knowledge to understand the cause of practical problem and to find the possible solution of it (1.1).	Problem lectures, seminars, brain-storming.	Tests, presentations.
The students will manage to plan, arrange and execute individual tasks substantially (2.1).	Seminars, excercises, accumulative folder	Presentations, exercises
The students will learn how to find, process and apply the knowledge from internet, scientific reports and textbooks. They will manage to assess critically, analyze and process the information obtained from different sources (5.1, 5.2).	Lectures, case studies, information search, literature reading	Exam, exercises, homework
The students will learn how to understand the operation principles of modern technologies basing on physics knowledge (9.2).	Problem lectures, seminars, case studies.	Studies of complex cases, presentations.
The students will manage to apply the knowledge of optics, practical and engineering competences to understanding, analysing and development of optical systems (11.1).	Problem lectures, seminars, brain-storm, project method	Group work, presentation.

Content: breakdown of the topics	Contact hours	Self-study work: time and assignments

	Lectures	Tutorials	Seminars	Exercises	Laboratory work	Internship/work placement	**Contact hours**	**Self-study hours**	**Assignments**
1. Quantities of light and lighting, colours, measurements units.	2			2			**4**	**4**	Preparation for the exercises and homework.
2. Perception of light and other psychophysical issues. Non-visual effects of light. Paradigm of Human centric lighting.	2			2			**4**	**10**	
3. Basic parts of luminaire construction: housing, optical, electrical and control circuitry and components. Evolution of the most widely used types of light sources.	6			2			**8**	**8**	
4. Standards and legal regulations of illumination devices and applications.	2			2			**4**	**4**	
5. Illumination design and planning. The process of planning, main components, application objectives, utilization of daylight.	6			2			**8**	**6**	
6. Control of illumination. Energy and economy efficiency, sustainability of illumination, and light pollution.	4			1			**5**	**8**	
7. Specific requirements and planning principles for the certain fields of lighting: artwork, educational, medical, office, home, industrial, retail etc.	6			3			**9**	**6**	
8. The principles and requirements of street and road lighting, traffic safety issues.	2			2			**4**	**6**	
9. Introduction to the main software packages for 3D architectural lighting planning (Dialux), ray-trace optical design (Lucid Shape, Photopia) and data calculation and optimization.	2			16			**18**	**24**	Individual and teamwork exercises concerning light planning and visualization issues.
Total	**32**			**32**			**64**	**76**	

Assessment strategy	**Weight,%**	**Deadline**	**Assessment criteria**
Accumulative mark	20	During the semester	Assessment of the activity in seminars and exercises, and individual presentations.
Accumulative mark	20	During the semester	Intermediate knowledge assessments.
Individual work mark	20	During the semester	Assesment of the individual work consisting light planning and visualization tasks.
Exam	40	At the end of the semester.	Assessment of the knowledge by examination.

Author	**Year of publication**	**Title**	**Issue of a periodical or volume of a publication**	**Publishing place and house or web link**
Compulsary reading				
David DiLaura, Kevin	2011	IES The lighting Handbook	ISBN 987-	New York, IESNA

Houser, Richard Mistrick, Gary Steffy		10th Ed,	087995-241-9	
G. Wyszecki and W. S. Stiles,	2000	Color Science. Concepts and Methods, Quantitative Data and Formulae.	ISBN-13: 978-0471399186	New York, Wiley
E. F. Schubert	2003	Light-Emitting Diodes	ISBN 0 521 82330 7	Cambridge University Press, Cambridge, UK.
Optional reading				
Ch. Cuttle	2015	Lighting Design: A perception-based approach.	ISBN 978-0-415-73196-6	Routledge, Taylor&Francis Group, London and New York.
A. Žukauskas	2008	Puslaidininkiniai šviestukai,.	ISBN 978-9955-781-12-7	Vilnius, Progretus, 2008