



COURSE UNIT (MODULE) DESCRIPTION

Course unit (module) title	Code
Internet of Things Technology	

Academic staff	Core academic unit(s)
Coordinating: dr. Saulius Niauronis	Vilnius University Šiauliai Academy
Other:	

Study cycle	Type of the course unit
First	Optional

Mode of delivery	Semester or period when it is delivered	Language of instruction
Face-to-face	Autumn/Spring	English

Requisites	
Prerequisites:	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		
To introduce the principles, typical equipment and tools, communications and their security in a field of Internet of Things (IoT). To provide practical skills in using the most popular open-source IoT platforms and conducting simple innovative product development projects which incorporate hardware and software and also communication parts.		
Learning outcomes of the course unit	Teaching and learning methods	Assessment methods
To know the structure of IoT systems and the variety, capabilities, and limitations of the most popular tools.	Interactive lecture	Exam
To understand and be able to apply IoT communications and to know their main security aspects.	Lecture, analysis of examples, demonstrations, problem-based learning, workshops, laboratory works	Laboratory work report
To be able to apply IoT technology in practical projects.	Workshops, Laboratory works, Individual or group (team) project, modeling of real-life situations (projects)	Laboratory work report, Project report, Oral illustrated presentation

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. The IoT paradigm and reasons for its emergence	2	0	0	0	0	0	2	2	Literature search

2. IoT concepts, characteristics, and specifics	4	0	0	0	0	0	2	5	Literature reading
3. Structure, components, and operating principles of IoT systems	4	0	0	2	4	0	8	20	Analysis of system examples, reading component documentation, programming
4. Principles of IoT system design	6	0	0	4	2	0	10	18	System structure and algorithm design
5. IoT system development platforms	8	0	0	6	4	0	10	16	Reading documentation, programming using specific development environments
6. Methods and tools for ensuring the security of IoT systems	4	0	0	2	4	0	8	16	Literature reading, practical application of methods by programming
Total	28	0	0	14	14	0	56	77	

Assessment strategy	Weight %	Deadline	Assessment criteria
Laboratory work report	40	During semester (during one week after laboratory work)	The quality of laboratory work reports is assessed. The average of all laboratory work grades is calculated.
Individual or teamwork report	20	Until end of semester	The quality of the written work and its formatting is evaluated (20%), the thoroughness and originality of the work (60%), as well as student answers to questions provided during the defence of the work (20%).
Exam	40	During exam session	During the exam, the student answers 5 closed questions. The accuracy and completeness of the answers are assessed. Each question is graded on a 10-point scale, and the average is calculated.

Author (-s)	Publishing year	Title	Issue of a periodical or volume of a publication	Publishing house or web link
Required reading				
IOT-OPEN.EU Consortium	2025	IOT-OPEN.EU Reloaded: A Coursebook Introduction to the IoT, 2nd Edition		IOT-OPEN.EU Reloaded Consortium
	https://iot-open.eu/download/iot-open-eu-introduction-to-the-iot-coursebook-in-english-2/			
Cirani, Ferrari, G., Picone, M., & Veltri, L.	2018	Internet of Things: Architectures, Protocols and Standards		John Wiley & Sons, Incorporated.
	https://virtualbiblioteka.vu.lt/permalink/370LABT_VU/1f31f0l/alma9912907331608452			
Kumar, Wheeler, D., Cheruvu, S., & Smith, N.	2020	Demystifying Internet of Things Security: Successful IoT Device/Edge and Platform Security Deployment.		Apress
	https://virtualbiblioteka.vu.lt/permalink/370LABT_VU/cb7j5i/cdi_biblioboard_openresearchlibrary_oai_biblioboard_com_adda9611_81f4_41ac_bfb1_9b3190afe7eb			
Recommended reading				
Schwartz M.	2016	Internet of Things with ESP: Build amazing Internet of Things projects using the Espressif Wi-Fi chip		Packt Publishing Ltd.
Buyya, & Vahid Dastjerdi, A.	2016	Internet of Things: Principles and Paradigms		Elsevier Science & Technology
	https://virtualbiblioteka.vu.lt/permalink/370LABT_VU/cb7j5i/cdi_askewsholts_vlebooks_9780128093474			

Vermesan O., Friess P.	2013	Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems		River Publishers
	http://www.internet-of-things-research.eu/pdf/Converging_Technologies_for_Smart_Environments_and_Integrated_Ecosystems_IERC_Book_Open_Access_2013.pdf			
TechTarget website		Internet of Things (IoT).		
	https://www.techtarget.com/iotagenda/definition/Internet-of-Things-IoT			
Madiseti V., & Bahga A.,	2014	“Internet of Things (A Hands-on-Approach)”, 1st Edition,		Arshdeep Bahga & Vijay Madiseti,
McEwe A.	2014	Designing the Internet of things.		John Wiley & Sons
da Costa F.	2013	“Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition,		Apress Publications
Vermesan O., Fries P.	2016	Digitising the Industry Internet of Things Connecting the Physical Digital and Virtual Worlds		River Publishers
Halvorsen H.P.	2019	Programming with Arduino		Hans-Petter Halvorsen