COURSE UNIT DESCRIPTION

Course unit title	Code
Databases	

Annotation
Introduction to the use of databases in information systems. The physical and logical structure of the databases is analyzed. Introduction to database models. Teaching the relational and objective model of databases, how to design databases and implement them using database management systems.

Lecturer(s)	Department, Faculty
Coordinating: lect dr. Donatas Dervinis **Other:**	Šiauliai Academy

Study cycle	Type of the course unit
First cycle studies	Compulsory

Mode of delivery	Semester or period when it is delivered	Language of instruction
Face-to-face	3 semester	English

Requisites
Prerequisites: Procedural programming, Object-Oriented Programming.

	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: programme competences to be developed
The aim of the module is to know the physical and logical structure of databases, database models, database design stages and implementation possibilities to acquire knowledge of database management theory and its application, to develop subject area modeling, database design, development and management management, and to acquire work with skills in modern database management systems. *General competence:* • Communication and collaboration. • Continuous learning. **Subject competences:** • Knowledge and skills of conceptual foundations. • Knowledge and skills of software development. Technological, methodological knowledge and skills, professional competence.

Learning outcomes of the course unit	Teaching and learning methods	Assessment methods
Will be able to explain the concepts of databases, analyze their functional capabilities, know the	Problem-based teaching, literature analysis, discussions.	The answers to the theoretical questions of the exam are evaluated in a 10-point system, the

scope of databases, will be able to analyze good examples of information systems.		presentation of the DB project is evaluated in a 10-point system.
Will be able to describe and create data tables, perform their transfer to other repositories, perform data transformations, create connections, apply database normalization rules, perform database administration work.	Problem-based teaching, computer practical work on creating databases, group project preparation	The presentation of the project is evaluated taking into account the fulfillment of requirements and originality, discussions during seminars.
Will be able to use semantic web technologies to store and manage related data.	Problem-based teaching, computer practical work, group project preparation, discussion of works, discussions.	The presentation of the project is evaluated taking into account the fulfillment of requirements and originality, discussions during seminars.
Will be able to use database management system technologies in relational and object-oriented database management systems. Will be able to create such databases and manipulate data.	Problem-based teaching, computer practical work in data warehouse analysis, project presentation and discussion.	The presentation of the project is evaluated taking into account the fulfillment of requirements and originality, discussions during seminars.

Course content: breakdown of the topics	Contact hours							Individual work: time and assignments	
	Lectures	Tutorials	Seminars	Workshops	Laboratory work	Internship/work placement	Contact hours, total	Individual work	Assignments
1. Concepts, purpose and main functions of databases (DB), examples of application. DB and information systems development and life cycle.	3						**3**	7	Independent reading for deeper knowledge. Preparation for laboratory work.
2. Purpose and main functions of database management systems (DBMS). DBMS examples, functional differences. NoSQL databases.	3				2		**5**	7	
3. Basic concepts of relational data model. Design of relational DB: ER model, ER diagrams, their transformation into a relational data model.	3				6		**9**	9	
4. DB design rules, requirements assessment. DB normalization. Data types.	3				4		**7**	7	
5. SQL language: basic language elements, data definition, selection, modification and control elements.	3				8		**11**	7	
6. Physical and logical independence of data. Ensuring data integrity: requirements for values, table keys, foreign keys, rules, transactions.	3				4		**7**	9	
7. Object-relational databases and their management systems. Large data objects. User-defined data types and functions. Procedures.	3				4		**7**	9	
8. Triggers and automation.	3				4		**7**	9	

9. Exam preparation and exam (written).										**13**	Repeat of literature and preparation for the exam
	Total	**24**				**32**		**56**	**77**		

Assessment strategy	Weight %	Deadline	Assessment criteria
Laboratory works	60	During the semester	Ability to apply a specific data ordering model, the database management system used to provide the model, and the language of the questions. Each laboratory work performed and reported on time is evaluated with 1.5 points. If the payment is delayed by no more than 2 weeks, the score is more than 25%, no more than 4 weeks - 50%, no more than 6 weeks - 75%, no later possible.
Exam (written)	40	During the exam session	The exam can be taken by collecting at least 3 points during the semester. Up to 5 points can be scored during the exam, which corresponds to 40% of the final grade. The exam consists of 20 questions and tasks of different difficulty of open, semi-open and closed type. Each question is rated from 0.1 to 2 points (depending on the severity). The questions are formulated from the topics presented during the lectures. The exam is considered passed if at least 1.5 points out of 5 are scored.

Author	Publishing year	Title	Issue of a periodical or volume of a publication; pages	Publishing house or internet site
Required reading				
Dusan Petkovic	2019	Microsoft SQL Server 2019: A Beginner's Guide, Seventh	7th Edition	McGraw-Hill Education
Kellyn Gorman	2020	Introducing Microsoft SQL Server 2019: Reliability, scalability, and security both on premises and in the cloud		Packt Publishing
Recommended reading				
Microsoft		Microsoft SQL documentation		https://docs.microsoft.com/en-us/sql/?view=sql-server-ver15
W3schools		MySQL Tutorial		https://www.w3schools.com/mysql/
W3schools		SQL Tutorial		https://www.w3schools.com/sql/