COURSE UNIT (MODULE) DESCRIPTION

Course unit (module) title	Code
INFORMATION SYSTEMS AND DATABASES	

Academic staff	Core academic unit(s)
Coordinating: Assoc. prof. dr. Ilona Veitaitė **Other:**	Kaunas Faculty Institute of Social Sciences and Applied Informatics

Study cycle	Type of the course unit
First	Compulsory

Mode of delivery	Semester or period when it is delivered	Language of instruction
Auditorium	2 semester	English

Requisites	
Prerequisites:	**Co-requisites (if relevant):**

Number of ECTS credits allocated	Student's workload (total)	Contact hours	Individual work
5	130	52	78

Purpose of the course unit		
Development of the ability to understand, analyze, model and explain: information systems (IS) and their main part - databases (DB) (structure, properties, practical methods of development); to design a DB and implement the designed application projects.		
Learning outcomes of the course unit	**Teaching and learning methods**	**Assessment methods**
Will know about the structure and classification of modern IS, data organization models, features of the relational data model, data normalization principles and conceptual modeling methods, and the composition of a logical DB structure model.	Lectures, practice, individual work.	Practical works, exam.
Will be able to assess the possibilities of modern database management systems (DBMS), based on the requirements of DB information and its properties, model driven methods, DBMS composition and basic tools.		
Will be able to adapt relational DB design methods conceptually and logically.		
Will be able to create the necessary DB and implement the planned program projects in DBMS.		

Content	Contact hours							Individual work: time and assignments	
	Lectures	Tutorials	Seminars	Workshops	Laboratory work	Internship	**Contact hours, total**	**Individual work**	**Tasks for individual work**
Introduction to the course, criteria, concepts, deadlines. Definition and role of IS, types and meaning of IS, examples.	2			4			6	8	Literature analysis; practical work; individual work on assigned tasks; practical exercises
Organization Analysis & Key Management Functions. Organizational structure, Information Flow Diagrams (IFD), Data Flow Diagrams (DFD). PW1 task presentation.	2			4			8	8	Literature analysis; practical work; individual work on assigned tasks; practical exercises
Database Introduction: Structure and Types. Database Definition, DBMS Overview, Types of Databases, Relational vs Non-Relational DBs, DB Components	2			4			6	8	Literature analysis; practical work; individual work on assigned tasks; practical exercises
Information Systems Lifecycle & Development: IS Development Phases, Requirement Gathering, Analysis and Design, Implementation & Testing, Maintenance & Evaluation and Database Development: Lifecycle Stages of Database Development, Conceptual Design, Logical Design, Physical Design, Implementation & Maintenance. UML Modeling in Database Design.	2			4			6	8	Literature analysis; practical work; individual work on assigned tasks; practical exercises
DB Tables. PW2 task presentation.	4			4			6	8	Literature analysis; practical work; individual work on assigned tasks; practical exercises
Data normalization.	2			6			8	8	Literature analysis; practical work; individual work on assigned tasks; practical exercises
DB Queries, Forms, and Reports. Testing.	2			6			8	8	Literature analysis; practical work; individual work on assigned tasks; practical exercises
Exam		4					4	22	
Total	**16**	**4**		**32**			**52**	**78**	

Assessment strategy	Weight %	Deadline	Assessment criteria
Practical Work 1 (PW1)	25 %	3-7 week	The assessment of the work takes into account the completeness of the analysis, the accuracy of the data, the logical consistency, the reports compliance with methodological requirements. It is important that three organisations are selected and properly described, each with clear information flow diagrams (IFDs) corresponding to their structure and operational principles. A single process for improvement is reasonably selected, the necessary Data Flow Diagrams (DFDs) are drawn up, the data to be

			processed, the users, the constraints and the potential challenges are clearly defined. The database development plan should be detailed, cover all phases of the lifecycle and be planned for four weeks. The UML diagrams developed must be clear, structured and based on previous analysis. The work must be of high quality and submitted on time, without delays.
Practical Work 2 (PW2) (Teamwork)	20 %	10-15 week	The assessment takes into account teamwork, completeness of analysis, technical accuracy, logical consistency and methodological relevance. It is important to form a team, to select one organisation for further work, to make an appropriate choice of a database development tool and to refine the database development plan. Based on the steps of the database development life cycle, a clear and logical ER model should be created, data normalised, a logical DB structure developed and tables created to meet the design requirements. The necessary queries must be implemented in the database, forms and reports must be created, testing activities must be carried out and the performance of the database must be evaluated. The report (based on methodological requirements) and presentation of the practical work must be clear, structured and comprehensive, and the team must be able to demonstrate the functionality of the database and answer questions during the defence. The work must be of high quality and submitted on time, without delays.
Practical Tasks Report (PTR)	25 %	15-16 week	The assessment takes into account whether all tasks have been carried out in accordance with the requirements of the assignment and are properly described in the report, which must comply with the methodological requirements.
Exam	30 %	Exam Session	The exam covers the theoretical and practical material of the entire course and is scored on a 10-point scale according to the VU assessment criteria. The examination consists of open-ended questions to which the student is required to respond in writing, providing theoretical answers as well as practical examples to illustrate the answers to the question.
The use of an Artificial Intelligence (AI) generative model must be disclosed, so if an AI generative model has been used in a text, paper, report or other work, this must be clearly stated (with appropriate citations and/or a declaration of the use of an AI generative model). Failure to disclose the use of an AI generative model in an academic work is considered academic dishonesty. In order to ensure that generative AI tools (ChatGPT, etc.) have not been used in the preparation of the essay (i.e. the content of the essay has not been generated by the AI tools), if not disclosed, the lecturer has the right to ask follow-up questions, to use the AI detection tools and, if necessary, to modify or cancel the grade of the assignment.			
Exam grade must be ≥5			
Final Grade = PW1*0,25+PW2*0,2+PTR*0,25+E*0,3			
Final Grade (as an external student) = ((PW1+PW2)/2)*0,5+E*0,5			

Author (-s)	Publishing year	Title	Issue of a periodical or volume of a publication	Publishing house or web link
Required reading				
Darwen H.	2012	An introduction to relational database theory		https://dvikan.no/ntnu-studentserver/kompendier/an-introduction-to-relational-database-theory.pdf
Watt, A., Eng, N.	2021	Database Design - 2nd Edition		http://solr.bccampus.ca:8001/bcc/file/5b6f010a-0563-44d4-94c5-67caa515d2c5/1/Database-Design-2nd-Edition-1549306327._print.pdf

Darwen H.	2012	An introduction to relational database theory		https://dvikan.no/ntnu-studentserver/kompendier/an-introduction-to-relational-database-theory.pdf
Recommended reading				
Bagui, S., Earp, R.	2012	Database Design using Entity relationship Diagrams.		http://kingcall.oss-cn-hangzhou.aliyuncs.com/blog/pdf/Database%20Design%20Using%20Entity-Relationship%20Diagrams%20Second%20Edition67191606114731229.pdf

NOTE: *Including Open Educational Resources in the reading list is recommended*