

FACULTY OF ENGINEERING STUDY COURSE DESCRIPTION

Course Title:	Data Mining				
Course code (LAIS):	MKI_027				
Study programme:	CYBERSECURITY ENGINEERING				
Level of Study programme:	<input type="checkbox"/> 1st level professional higher education				
	<input type="checkbox"/> Professional Bachelor				
	<input checked="" type="checkbox"/> Professional Master				
	<input type="checkbox"/> PhD level				
Type of Study programme:	<input checked="" type="checkbox"/> Compulsory course (Part A)				
	<input type="checkbox"/> Professional specialization courses (Part B, compulsory)				
	<input type="checkbox"/> Professional specialization optional courses (Part B, optional)				
	<input type="checkbox"/> Elective courses (Part C)				
Course Workload:	Credits	ECTS	Academic hours	Contact hours	Independent work hours
	2	3	80	24	56
Course Author/ Tutor:	Kaspars Osis				
	Academic position scien./acad.degree			Assoc. Prof., Dr.sc.ing.	
	kaspars.osis@va.lv				
	Consultation: according to the schedule for each semester				
Course Form:	Full time				
Study year, semester:	2018./2019.	3.sem.			
Language:	Latvian and English				
Prerequisites for the Course:	Basic knowledge and experience in programming languages; knowledge / insight about development of information systems				
Course Summary:	The aim of this course is to provide theoretical and practical knowledge about current data mining solutions, including to gain insight about data mining application areas, concepts, and particular development ways. By performing practical assignments students will have an opportunity to improve their practical skill in area of data mining solutions development. There is work done in small groups within the course. The study course is the preparatory step to enhance practical skills in development of data mining solutions and by combining them with in other courses acquired cybersecurity and other solutions to provide the foundation for multidisciplinary solutions development				
Course Methods:	Lectures, practical workshops, discussions, group work				
The Type of Final examination	Exam				
Requirements for Credits:	Practical work 60%, final exam 40%				
Course Contents:	Introduction into Incident Response Policies. Intrusion Detection – definition and overview. Intrusion attack types. Introduction into Intrusion Detection tool types (hardware and Software). Introduction into Lifecycle of Vulnerability. Network Flows and introduction into Anomaly detection approaches.				
Learning Outcomes	Learning Outcomes			The evaluation methods and criteria	
	Knowledge				
	Student knows and understand the basic of data mining solutions and application, R programming language basics, machine learning solutions, applicable algorithms and knowledge discovery.			lectures, practical classes, seminars, discussions, group work	
	Skills				
	Students are able to develop data mining solutions based on association rules and decision trees, medium complexity knowledge discovery solutions in context of machine learning			lectures, practical classes, seminars, discussions, group work	
Learning Outcomes	Competency				
	The student is able to analyse, evaluate, use correct data mining solutions terminology. To choose appropriate solution approaches for			practical classes, seminars, discussions, group work	

	particular assignment implementation.	
Course Compulsory literature:	J.Han, J.Pei., M.Kamber. Data Mining: Concepts and Techniques, 3ed, Morgan Kaufmann Publishers In, 2011. V.Kumar, P.Tan, A.Karpatne, M.Steinbach. Introduction to Data Mining, 2ed, Pearson, 2017.	
Course additional literature:	M. Bramer. Principles of Data Mining, 3ed, Springer, 2016. L.Torgo, P.C.Bruce, G.Shmueli, I.Yahav, N.R.Patel, K.C.Lichtendahl. Data Mining for Business Analytics: Concepts, Techniques, and Applications in R, Wiley-Blackwell, 2017.	
Course approval date:	2021-02-23	
Course last revision date:		

Study Course Plan:

Date*	Theme	Academic hours		Study Form
		contact lessons	Independent work hours	
	Introduction. Data Preprocessing. Fundamentals of R programming. Data Visualization.	6		Lecture, situation analysis, discussions
	Association Rule. Classification Basics. Decision Tree, Bayes Classifier; K nearest neighbor.	6		Lecture, situation analysis, discussions
	Clustering in data mining, analysis, methods, evaluation. Data mining and machine learning. Neural nets. Genetic algorithms.	4	20	Lecture, situation analysis, discussions, practical tasks
	Web mining. Data mining and Web Advertising. Mining Social Networks	4	36	Course project development and presentation
	Group project	4		Open book exam
Hours total:		24	56	

* The date is specified before the implementation of the course