

UNIVERSITY OF ECONOMICS - VARNA
MASTER DEGREE CENTER
DEPARTMENT OF INFORMATICS

Adopted by the FC (record №8 / 05.03.2020)

Adopted by the DC (record №7 / 28.02.2020)

ACCEPTED BY:

Dean:

(prof. Vladimir Sulov, PhD)

SYLLABUS

SUBJECT: “DATA SCIENCE”;

DEGREE PROGRAMME: „Computer Science“ MASTER’S DEGREE

YEAR OF STUDY: 5; SEMESTER: 10 (same field graduates);

YEAR OF STUDY: 6; SEMESTER: 12 (other fields graduates);

TOTAL STUDENT WORKLOAD: 240 hours; incl. curricular 75 hours

CREDITS: 8

DISTRIBUTION OF STUDENT WORKLOAD ACCORDING TO THE CURRICULUM

<i>TYPE OF STUDY HOURS</i>	WORKLOAD, hours	TEACHING HOURS PER WEEK, hours
CURRICULAR:		
incl.		
• LECTURES	45	3
• SEMINARS (lab. exercises)	30	2
EXTRACURRICULAR	165	-

Prepared by:

1.
(assoc. prof. Todorka Atanasova, PhD)

2.
(chief. assist. prof. Yanka Aleksandrova, PhD)

Head of department

of Informatics:
(prof. Julian Vasilev, PhD)

I. ANNOTATION

The discipline Data Science introduces some of the main concepts in this interdisciplinary and fast developing field. During study, the students are taught how to extract useful insight and knowledge from data. Covered are some of the most used algorithms, techniques and methods such as machine learning (decision trees, clustering, association analysis, etc.), big data analytics, data visualization tools, OLAP cubes, exploratory and confirmatory analysis, etc.

During the training students acquire abilities to choose and apply a proper set of tools and methods depending on the available data sets and desired outcome. Topics connected to business intelligence are also included within the scope of the course. In order to achieve the learning objectives students are taught how to use advanced software environments and tools.

Students can implement the acquired theoretical knowledge by solving different problems and tasks set by their assignment. By finishing the course students can gain a solid basis for further improvement of their knowledge and skills needed to become data scientists,

II. THEMATIC CONTENT

№	TITLE OF UNIT AND SUBTOPICS	NUMBER OF HOURS		
		L	S	L.E.
	Theme 1. Data science – scope, science fields, tasks. The data science process.	6		
	Theme 2. Business intelligence (BI) systems.	14	10	
2.1.	Nature, architecture, functions of BI systems.	2	2	
2.2.	Data warehouse architectures.	4	2	
2.3.	BI tools and methods. OLAP cubes	8	6	
	Theme 3. Big data analytics.	5		
	Theme 4. Machine learning (ML) algorithms.	10	12	
4.1.	Classification of ML algorithms	2		
4.2.	Supervised ML algorithms.	3	5	
4.3.	Unsupervised ML algorithms.	3	5	
4.4.	Reinforcement learning.	2	2	
	Theme 5. Data visualization tools.	10	8	
	Total:	45	30	

III. FORMS OF CONTROL:

№	TYPE AND FORM OF CONTROL	Number	extracurricular, hours
1.	Midterm control		
1.1.	Tests (open and/or closed answers)	1	40
1.2.	Project assignment	1	65
	Total midterm control:	2	105
2.	Final term control		
2.1.	Exam (open and/or closed answers)	1	60
	Total final term control:	1	60
	Total for all types of control:	3	165

IV. LITERATURE

REQUIRED (BASIC) LITERATURE:

1. Burkov, A., The Hundred-Page Machine Learning Book, Burkov, 2019.
2. Larose, D., Larose, D., Data Mining and Predictive Analytics, 2nd edition, Wiley publishing, 2020.

RECOMMENDED (ADDITIONAL) LITERATURE:

1. Neapolitan, R., Jiang, X., Artificial Intelligence: With and introduction to Machine Learning, Chapman and Hall/CRC, 2018.
2. Powell, B., Mastering Power BI: Expert techniques for effective data analytics and business intelligence, Packt Publishing, 2018.