**MSc in Artificial Intelligence and Data Analytics**

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| **ΜΑΘΗΜΑ “Ανάλυση δικτύων και εξόρυξη γνώσης από τον παγκόσμιο ιστό” AIDA204** | |
| **code** | **AIDA204** |
| **title** | **Network analysis and web mining** |
| **type (compulsory/optional)** | compulsory |
| **cycle (first/second/third)** | second |
| **year of study when the component is delivered (if applicable)** | 2022-23 |
| **semester/trimester when the component is delivered** | spring |
| **number of ECTS credits allocated** | 7,5 |
| **name of lecturer(s), with information about how, when and where to contact them.** | Georgia Koloniari |
| **learning outcomes** | • Knowledge o The aim is the study, analysis and mining from the world wide web and social networks. The course will focus on two axes, that of network analysis and web mining. The first axis focuses on the measurement, analysis and visualization of relationships and flows between entities participating in a network with emphasis on properties and applications on the web and social networks. In the context of web mining, there will be a study of methods and tools for content, structure and usage mining with emphasis on the management of non-relational data, such as semi-structured data in the form of graphs or even unstructured as text. • Skills o Use of data mining and data analytics tools such as Python (NetworkX) and Rapidminer, and graph management and visualization tools such as Neo4j and Gephi. • Competencies o Modeling and management of network data in the form of graph o Selection and application of appropriate methods of network analysis and web mining o Interpreting network analysis and web mining results |
| **mode of delivery (face-to-face/distance learning etc.)** | face to face |
| **prerequisites and co-requisites (if applicable)** |  |
| **course content** | The architecture of the web. Centrality and other network metrics. Homophily and community detection. Link analysis and web search. Random networks, formation and evolution of social networks. Influence, epidemics and information diffusion. Graph embeddings and link analysis. Knowledge graphs. Social networks visualization. Text mining-opinion mining. Web usage mining. Recommendation systems. |
| **recommended or required reading and other learning resources/tools** | • David Easley, Jon Kleinberg, “Networks, Crowds, and Markets -Reasoning about a Highly Connected World”, Cambridge University Press, 2010. • Albert-László Barabási. Network Science. 1st Edition, Cambridge University Press, 2016. • Bing Liu, “Web Data Mining - Exploring Hyperlinks, Contents, and Usage Data”, Springer 2011. • Jure Leskovec, Anand Rajaraman, Jeff Ullman, “Mining of Massive Datasets”, 3rd Edition, Cambridge University Press, 2020. • Steve Borgatti, Martin Everett and Jeff Johnson, “Analyzing Social Networks”, 2nd Edition, Sage, 2018. • Reza Zafarani, Mohammad Ali Abbasi, Huan Liu. Social Media Mining: An Introduction. Cambridge University Press, 2014. • Mohammed Zuhair Al-Taie, Seifedine Kadry, “Python for Graph and Network Analysis”, Springer, 2017. • Dmitry Zinoviev, “Complex Network Analysis in Python: Recognize - Construct - Visualize - Analyze – Interpret”, Pragmatic Bookshelf , 2018. |
| **planned learning activities and teaching methods** | Lectures, with the use of ICT equipment |
| **assessment methods and criteria** | Projects and final written exams |
| **language of instruction** | Greek or English |