COURSE DESCRIPTION

1. Information about the programme

1.1 Institution of higher education	**Alexandru Ioan Cuza University of Iasi**
1.2 Faculty	**Faculty of Economics and Business Administration**
1.3 Department	**Department of Accounting, Information Systems and Statistics**
1.4 Field of study	**Business Informatics**
1.5 Level	**Master**
1.6 Study programme/ Qualification	**Software Development and Business Information Systems**

2. Information about the course

2.1 Course name	**Knowledge Management and Data Science**						
2.2 Course coordinator	**Prof. Daniela Popescul, Habil. Dr.**						
2.3 Seminar coordinator	**Nicolai Romanov, Ph.D. Student**						
2.4 Year of study	II	2.5 Semester	I	2.6 Type of assessment	**Mixed**	2.7 Discipline status	**E**

Mixed – evaluation along the semester, exam; E - Elective

3. Total estimated time (hours alloted to didactic activity per semester)

3.1 Total number of hours per week	3	of which: 3.2 lectures	1	3.3 seminar/lab	2
3.4 Total number of hours in the curriculum	42	of which: 3.5 lectures	14	3.6 seminar/lab	28
Time distribution					hours
Study of the handbook, course book, bibliography and notes					28
Additional research in the library, online and on the field					20
Preparation of seminars/labs, home works and projects					40
Tutorials					10
Assessment					10
Other activities.....					
3.7 Total number of self-study hours					108
3.9 Total number of hours per semester					150
3. 10 Number of credits					6

4. Prerequisites (if applicable)

4.1 curriculum-based	• Not applicable
4.2 competence-based	• Basic Knowledge of Data Processing in Python

5. Conditions (if applicable)

5.1. for courses	• Lecture room shall be provided with video projector; • Functional (wireless) Internet connection; • Students will attend lectures.

5.2. for seminars/labs	• Students are invited to bring and use their own laptops; • Labs will have enough computers for students not owning a laptop; • Labs will provide connection to appropriate servers/nodes; • Lab computers will have installed Python and JupyterLab.

6. Assimilated specific competences

Professional competences	• C2.1 Mastering theoretical and technological knowledge and tools concerning business data modeling, query, processing, administration and analysis, including Big Data (1 credit) • C2.2 Selection and refinement of the methods and techniques for data modeling, persistence, query and analysis, according to the nature of problems and available resources (0.5 credits) • C2.5 Develop projects and case-studies concerning modeling, implementation (database logic), administration and analysis of data for real-world applications (0.5 credits) • C4.1 Gaining detailed knowledge on all aspects of methodological and technological regarding the representation and persistence of data formats, the protocols and means of communication and integration of applications and services within distributed business information systems (0.5 credits) • C4.3 Identification of information sources, application modules and available services, both inside and outside the business system; estimate the solutions of their integration in order to match the current and future information needs of the organization (0.5 credits) • C4.4 Define the most appropriate solutions for data and modules integration, in order to meet the organizational requirements towards information integrity and security (0.5 credits) • C4.5 Write the specifications and deploy the modules regarding data, applications and services integration (0.5 credits) • C5.4 Development of decision and analysis models to be applied in the dynamic IT environment (1 credit)
Transversal competences	• CT1 – The ability to communicate and collaborate in teams of different professionals (0.5 credits) • CT3 – Continuous improvement of specific skills and knowledge towards approaching information systems, development of new software technologies and management of information systems (0.5 credits)

7. Discipline objectives (provided by the assimilated specific competences grid)

7.1 The general objective of the discipline	• To provide the core knowledge, methodologies and tools in order to understand the place of Information Technology and Knowledge Management in the life of individuals, companies and society
7.2 Specific objectives	After successfully finalizing this course, students will be able to: • make informed decisions in the field of data, information and knowledge management; • consciously support new knowledge creation and acquisition in companies; • critically analyze a problem in the area of data, information and knowledge management, to weigh opposite points of view and to formulate pertinent personal opinions and solutions; • use open-source tools for statistical analysis and organizational information visualization;

	• use the main methods and tools for transforming (large volumes of) data into information, knowledge and insights.

8. Content

8. 1 Lectures	**Teaching methods**	**Observations**
Knowledge in contemporary organization: definition, taxonomy, role, particularities 1st Interactive Activity - Kahoot! quiz, Google Classroom/Moodle test	PPT presentation, Conversation	2 hours Davenport, T., Prusak, L. (1998), Alavi, M., Leidner, D. (2001), Nonaka, I., Toyama, R., Konno, N. (2000), Bard, A., Söderqvist, J. (2010), Ein-Dor, P. (2006)
The hierarchical view of data, information, knowledge and wisdom (DIKW pyramid)	PPT presentation, Conversation	2 hours Fotache, M. (2002), Davenport, T., Prusak, L. (1998)
Knowledge flows, relevant models in knowledge creation and sharing. A positive-transitive connection: knowledge flows- technological innovation – competitive advantage 2nd Interactive Activity – Innovators' DNA	PPT presentation, Conversation	2 hours Chan Kim, W., Mauborgne, R. (2007), Christensen, C., Raynor, M. (2006), Dayer, J., Gregersen, H., Christensen, C. (2011), Popescul, D., Georgescu M. & Alcantara Pilar, J. M. (2015)
Organizational KM processes & KM systems in organizations. The critical succes factors of KM and KM systems	PPT presentation, Conversation	2 hours Nonaka, I., Toyama, R., Konno, N. (2000), Popescul, D., Georgescu M. & Alcantara Pilar, J. M. (2015)
The major barriers encountered in KM and the utilization of KM systems. Solutions 3rd Interactive Activity – Knowledge Bingo	PPT presentation, Conversation	2 hours Chan Kim &Mauborgne (2007), Christensen & Raynor (2003), Dayer, J., Gregersen, H.,

		Christensen, C. (2011), Schwartz (2006)
Knowledge Sharing platforms in IT or Good practices in learning	PPT presentation, conversation	2 hours
Do we know what we don't know? Fake news (deep fakes), information overload, manipulation, chatGPT etc.	PPT presentation, conversation	2 hours Georgescu, M., Popescul, D. (2016), Pasek, J., Weeks, B., Potter, W. (2017), Davies, R. T. (2019)

References

Alavi, M., Leidner, D. (2001), *Review: Knowledge Management and Knowledge Management Systems: conceptual foundations and research issues*, în „MIS Quarterly”, Volume 25, No. 1, pp. 107-136
Bard, A., Söderqvist, J. (2010), Netocraţia - Noua elită a puterii şi viaţa după capitalism, Editura Publica, Bucureşti
Berthon, P., Leyland, P., Watson, R. (2008), From Genesis to Revelation: The Technology Diaspora, „Communications of the ACM”, December 2008, Vol. 51, No. 12, pp. 151-154
Carr, N., (2010), The Shallows: What the Internet Is Doing to Our Brains, W. W. Norton and company, New York, London
Chan Kim, W., Mauborgne, R. (2007), Strategia oceanului albastru, Ed. Curtea Veche, Bucureşti
Christensen, C., Raynor, M. (2006), Inovaţia ca soluţie în afaceri, Ed. Curtea Veche, Bucureşti
Davies, R. T. (2019), Years and Years TV series
Davenport, T., Prusak, L. (1998), *Working knowledge. How organizations manage what they know*, Harvard Business School Press, Boston, Masssachusetts
Dayer, J., Gregersen, H., Christensen, C. (2011), The Innovator's DNA. Mastering the Five Skills of Disruptive Innovators, Harvard Business Review Press, Boston, Massachusetts
Desouza, K., Hensgen, T. (2005), Managing information in complex organizations: semiotics and signals, complexity and haos, New York, USA
Ein-Dor, P. (2006), *Taxonomies of Knowledge*, in Schwartz, D., Encyclopedia of Knowledge Management, Idea Group Reference
Fotache, M. (2002), *Date*, *informaţii, cunoştinţe*, în Oprea, D., Airinei. D., Fotache, M. (coord.), *Sisteme informaţionale pentru afaceri*, Editura Polirom, Iaşi, pp. 64 – 90
Grim, P., Philosophy Of Mind: Brains, Consciousness And Thinking Machines, la http://www.youtube.com/watch?v=WrEHqIp1NEI
Hubbard, D. (2014), How to Measure Anything: Finding the Value of Intangibles in Business Hardcover, 3rd edition, John Wiley and Sons, New Jersey
Nicol, H. (2010), One for the lexophiles, „Inside Knowledge”, August 2010, Vol. 13, Issue 10, pp. 5-6
Nonaka, I., Toyama, R., Konno, N. (2000), *SECI, BA and Leadership: a unified model of dynamic knowledge creation,* Long Rage Planning, no. 33/2000
Nature, Science (2017), The Social Lives of Trees, http://www.openculture.com/2017/10/the-social-lives-of-trees.html
Popescul, D., Fotache M. (2018), MIC și Data Science, UAIC, FEAA, Iaşi, (disponibil pe portalul FEAA și GitHub)
Pasek, J., Weeks, B., Potter, W. (2017), Fake News, Facts, and Alternative Facts Teach-Out, University of Michigan Teach Out - https://online.umich.edu/teach-outs/fake-news-facts-and-alternative-facts-teach-out/
Popescul, D., Georgescu, M., Alcantara Pilar, J. M. (2015), Projects as Knowledge Swirls in the Technological Innovation Romania's Situation, New Contributions in Information Systems and

Technologies, Volume 1, Series: Advances in Intelligent Systems and Computing, Vol. 353, http://link.springer.com/chapter/10.1007/978-3-319-16486-1_1, Rocha, A., Correia, A.M., Costanzo, S., Reis, L.P. (Eds.), 2015, Springer International Publishing
Georgescu, M., Popescul, D. (2016), Students in Social Media: Behavior, Expectations and Views, Proceedings of the 15th International Conference on INFORMATICS in ECONOMY (IE 2016)- Education, Research & Business Technologies, Cluj-Napoca, Romania June 02 – 05, 2016, Published by Bucharest University of Economic Studies Press, www.conferenceie.ase.ro, pp. 198-204 ISI Proceedings DOI: 10.1007/978-3-319-73459-0_6
Schwartz, D., Encyclopedia of Knowledge Management, Idea Group Reference, 2006 (portal)

8. 2 Seminars/labs	**Teaching methods**	**Observations**
Python recap: basic programming elements, data structures, data import and export. Setting up project environment.	Demonstration, Scripts and code execution, Questioning.	2 hours
Data processing using *numpy* and *pandas*	Demonstration, Scripts and code execution. Questioning.	4 hours
Functional programming in Python	Demonstration, Scripts and code execution. Questioning.	6 hours
1st Individual Assessment (DS1IA) – Functional programming (Ad-hoc problem)	Presentation of the teams' solutions.	2 hours
Graphics with *matplotlib* and *seaborn*. Exploratory Data Analysis	Demonstration, Scripts and code execution. Questioning.	2 hours
Regression and Classification Models in Python. Performance evaluation. Model selection	Demonstration, Scripts and code execution. Case studies	2 hours
Tree-based Machine Learning methods for classification and Regression. CART. Bagging. Random Forests. Boosting	Demonstration, Scripts and code execution. Case studies	2 hours

Cross-validation in Python. Model tunning	Demonstration, Scripts and code execution. Case studies.	2 hours
Regression and Classification techniques using *scikit-learn*	Demonstration, Scripts and code execution. Case studies.	2 hours
2nd Team Assessment (DS2TA) – Data Science Project	Presentation of the teams' solutions.	2 hours
Introduction to Neural Networks	Demonstration, Scripts and code execution. Case studies.	2 hours

References

Official Documentation of *Numpy,* https://numpy.org
Official Documentation of *Pandas*, https://pandas.pydata.org/
Official Documentation of *Scikit Learn*, https://scikit-learn.org/stable/
Official Documentation of *Matplotlib*, https://matplotlib.org/
Official Documentation of *Seaborn*, https://seaborn.pydata.org/
Coursera - Python for Data Science, AI & Development, https://www.coursera.org/learn/python-for-applied-data-science-ai
Coursera - Applied Data Science with Python Specialization, https://www.coursera.org/specializations/data-science-python
Romanov N. (2021), Knowledge Management Analytics and Data Science, https://gitlab.com/owlhowl/knowledge-management-analytics-and-data-science

9. Corroboration of the course content with the expectations of epistemic community representatives, professional associations as well as of representative employers in the programme related field.

- The content of this discipline has been decided upon by taking into account both the curricula of some prestigious Western Universities and the demands of the economic environment provided by potential employers, either in the public or in the private IT companies.

10. Assessment

Type of activity	10.1 Assessment criteria	10.2 Assessment methods	10.3 Share of final grade
Course	Theoretical and applied knowledge	Exam	35%
	Theoretical and applied knowledge	Presentation	15%

	Active participation, opinion relevance	Interactive activities	10%
Laboratory	Ability to solve programming problems	DS1IA - Individual test	20%
	Ability to understand the project problem, explain the solution and present arguments	DS2TA -Team project	30%

10.6 Minimum performance standard

- Final grade >=4.50

Date of completion
24.09.2023

Lecture Coordinator
Prof. Daniela Popescul, Ph.D.

Seminar Coordinators
Nicolai Romanov, Ph.D.

Date of approval within the department
27.09.2023

Head of Department
Prof. Mircea Asandului, Ph.D.