



COURSE OUTLINE

1. Information about the program

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 program/ 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	Assoc. Prof. Daniela Popescul, Ph.D.						
2.3 Seminar coordinator	Nicolai Romanov, Ph.D. Student						
2.4 Year of study	2	2.5 Semester	4	2.6 Type of assessment	EVP (M)	2.7 Course status	E

EVP – evaluation along the semester; M - mixed; E - Elective

3. Estimated time allocation (hours per semester and teaching activities))

3.1 Total number of hours per week	3	of which: 3.2 course	1	3.3 seminar/laboratory	2
3.4 Total number of hours per semester	42	of which: 3.5 course	14	3.6 seminar/laboratory	28
Time allocation					hours
Study based on course book, course materials, bibliography and other					28
Supplementary study in the library, on electronic platforms and on the field					20
Preparing seminars/laboratories, assignments, papers, portfolios and essays					40
Tutorship					10
Examination					10
Other activities					
3.7 Total hours of individual study					108
3.8 Total hours per semester					150
3.9 Number of credits					6

4. Prerequisites (if applicable)

4.1 Referring to curriculum	<ul style="list-style-type: none">Not applicable
4.2 Referring to competences	<ul style="list-style-type: none">Basic Knowledge of Data Processing in Python

5. Conditions (if applicable)

5.1. For the course	<ul style="list-style-type: none">Lecture room shall be provided with video projector;Functional (wireless) Internet connection;Students will attend lectures.
5.2. For seminar/laboratories	<ul style="list-style-type: none">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. Specific competences accumulated**

Professional competences	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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. Course objectives (based on specific competences accumulated)

7.1 General objective	<ul style="list-style-type: none">• To provide the core knowledge, methodologies and tools in order to understand the place of Data Science, Information Technology and Knowledge Management in the life of individuals, organisations and society
7.2 Specific objectives	<p>After successfully finalizing this course, students will be able to:</p> <ul style="list-style-type: none">• 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 Course	Teaching methods	Observations
Knowledge in contemporary organization: definition, taxonomy, role, particularities 1 st 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) D1. Is DIKW pyramid a useful tool for individuals/organizations?	PPT presentation, Conversation Debate	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 2 nd Interactive Activity – Innovators' DNA D2. Do Information Technologies create strategic competitive advantage in organizations? D3. Smart cities - are the ICT-driven solutions the panacea for urban problems?	PPT presentation, Conversation Debates	2 hours Chan Kim, W., Mauborgne, R. (2007), Christensen, C., Raynor, M. (2006), Dayer, J., Gregersen, H., Christensen, C. (2011), Popescu, D., Georgescu M. & Alcantara Pilar, J. M. (2015)
Knowledge value in organization. Information assets D4. Which of the following options is more beneficial for individuals / companies / organizations / states: Sharing knowledge (collaboration) or controlling and protecting them?	PPT presentation, Conversation Debate	2 hours Nonaka, I., Toyama, R., Konno, N. (2000), Popescu, D., Georgescu M. & Alcantara Pilar, J. M. (2015)
Knowledge transfer – barriers and solutions 3 rd Interactive Activity – Knowledge Bingo D5. Knowledge transfer – barriers and solutions at the individual, organisational and national level P1. Knowledge Sharing platforms in IT // Good practices in learning	PPT presentation, Conversation Debate Presentations	2 hours Chan Kim & Mauborgne (2007), Christensen & Raynor (2003), Dayer, J., Gregersen, H., Christensen, C. (2011), Schwartz (2006)





Do we know what we don't know? Fake news (deep fakes), information overload, manipulation	PPT presentation, conversation	2 hours Georgescu, M., Popescu, D. (2016), Pasek, J., Weeks, B., Potter, W. (2017), Davies, R. T. (2019)
D6. Is Social Media a valuable source of professional knowledge?	Debate	
P2. My cognitive biases	Presentations	
D7. Is Internet making us dumber?	Debates	2 hours Carr (2010), Schwartz (2006)
D8. KM – bluff and relevance		

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), *Netocrația - Noua elită a puterii și viața după capitalism*, Editura Publica, București
- 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, București
- Christensen, C., Raynor, M. (2006), *Inovația ca soluție în afaceri*, Ed. Curtea Veche, București
- 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, Massachusetts
- 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 chaos*, New York, USA
- Ein-Dor, P. (2006), *Taxonomies of Knowledge*, in Schwartz, D., *Encyclopedia of Knowledge Management*, Idea Group Reference
- Fotache, M. (2002), *Date, informații, cunoștințe*, în Oprea, D., Airinei, D., Fotache, M. (coord.), *Sisteme informaționale pentru afaceri*, Editura Polirom, Iași, pp. 64 – 90
- Grim, P., *Philosophy Of Mind: Brains, Consciousness And Thinking Machines*, la <http://www.youtube.com/watch?v=WrEHqlp1NEI>
- 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 Range Planning, no. 33/2000
- Popescu, D., Fotache M. (2018), *MIC și Data Science*, UAIC, FEAA, Iași, (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/>
- Popescu, 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., Popescu, 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/laboratories	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 <i>numpy</i> and <i>pandas</i>	Demonstration, Scripts and code execution. Questioning.	4 hours
Functional programming in Python	Demonstration, Scripts and code execution. Questioning.	6 hours
1st Team Assessment (DS1TA) – Functional programming (Ad-hoc problem)	Presentation of the teams' solutions.	2 hours
Graphics with <i>matplotlib</i> and <i>seaborn</i> . 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 tuning	Demonstration, Scripts and code execution. Case studies.	2 hours





Regression and Classification techniques using <i>scikit-learn</i> .	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. Bridging course content with the expectations of the community, professional associations and representative employers in the field of the program

- 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. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Allocation to the final grade
10.4 Course			
Written arguments for the debate	Quality (concision, non-overlapping arguments, literature coverage)	Essay	25%
Debate participation	Clarity of arguments, the ability to respond to the opponent in a polite and meaningful manner	Presentation	10%
Participation to the colleagues' debates	Active participation, constructive feedback	Participation, filling the feedback forms	5%
Individual presentation (KS platform/good	Clarity, originality	Presentation	10%





practices in learning or cognitive bias)			
10.5 Seminar/Laboratory			
Interactive activities	Active participation, opinion relevance	Depending on the nature of each activity	10%
DS1TA	Ability to solve programming problems	Team test	15%
DS2TA	Ability to understand the project problem, explain the solution and present arguments	Team project	35%

10.6 Minimal performance standard

- Final grade ≥ 4.50

Date
25.09.2021

Course Coordinator
Assoc. Prof. Daniela Popescu, Ph.D.

Seminar Coordinator
Nicolai Romanov, Ph.D. Student

Date of approval within the department

Head of Department
Prof. Florin Dumitriu, Ph.D.

