Complex exam minor subject	The philosophical, cognitive, leadership theoretical, library and information science aspects of the knowledge and its organization
Syllabus	<ul> <li>Web information retrieval: Main types and characteristics of search engines. The related research fields of search engine subject (e.g. semantic web, network theory; hidden web, text mining and web data mining etc.). The structure and operation of search engines. The principles of ranking the web pages, the PageRank algorithm. Measuring the retrieval effectiveness of web search engines with relevant statistical models and procedures.</li> <li><i>Knowledge management in libraries</i>: Elements of intellectual capital and their management in libraries. Relations between organization and knowledge management. Tacit and explicit knowledge. Relationship of knowledge spiral (Nonaka's SECI model) and learning. Possibilities of knowledge creation. Components of knowledge market. Knowledge codification: knowledge maps, knowledge catalogues, knowledge bases. Tools used for knowledge organization and representation of the content on the web: topic maps, concept maps, ontologies, thesauri.</li> <li><i>Cognitive science:</i> Problems and main concepts of cognitive science and related disciplines. Types and taxonomies of human knowledge. The emergence and development of cognitive science. The organization of human memory and the mental representations. The concept of representation in cognitive science. Donald's view about the origin of human mind and cognition. Cognitive science and artificial intelligence. The development of human knowledge. The body-mind problem, Karl Popper's ,three worlds" theory.</li> </ul>
Bibliography	<ol> <li>Baeza-Yates, Ricardo; Ribeiro-Neto, Berthier: Modern Information Retrieval. The Concepts and Technology behind Search. 2<sup>nd</sup> ed. Harlow [etc.]: Pearson, 2011.</li> <li>Barabási Albert-László: Bursts. The Hidden Patterns Behind Everything We Do. New York: Dutton, cop. 2010.</li> </ol>

- 3. Barabási Albert-László: Linked. The New Science of Networks. Cambridge MA: Perseus Publishing, 2002.
- 4. Broughton, Vanda: Essential Thesaurus Construction. London: Facet Publishing, 2006.
- 5. Cognitive Science. Bly, Benjamin Martin; Rumelhart, David E. (eds). Academic Press, 1999.
- 6. Davenport, Thomas H.; Prusak, Laurence: Working Knowledge. How Organizations Manage What They Know. Cambridge, MA: Harvard Business School Press, 1998.
- Handbook of Semantic Web Technologies. John Domingue, Dieter Fensel, James A. Hendler (eds). Berlin [u.a.]: Springer, 2011-. 1-2. vol.
- 8. Indexing and Retrieval of Non-text Information. Rasmussen, Diane Neal (ed.). Berlin London: De Gruyter Saur, 2012.
- 9. Lambe, P.: Organising Knowledge. Taxonomies, Knowledge and Organisational Effectiveness. Oxford, England: Chandos Publishing, 2007.
- Nonaka, Ikujiro; Takeuchi, Hirotaka: The Knowledge-creating Company. How Japanese Companies Create the Dinamics of Innovation. New York: Oxford University Press, 1995.
- 11. Ontology for Knowledge Organization. Smiraglia, Richard P.; Lee, Hur-Li (eds). Würzburg: Ergon Verl., 2015.

- 12. The Palgrave Handbook of Knowledge Management. Syed, Jawad [et al.] (eds). Palgrave Macmillan, 2018.
- Popper, Karl R.: Three Worlds. The Tanner Lecture on Human Values, Delivered at The University of Michigan (April 7, 1978). https://tannerlectures.utah.edu/\_documents/a-to-z/p/popper80.pdf (2018-11-10)
- 14. Thagard, Paul: Mind. Introduction to Cognitive Science. The MIT Press, 2005.

Compulsory subjects for this minor subject

Recommended subjects for this minor subject

## Appendix. Detailed description of the proposed items of the syllabus.

### Web information retrieval

Main types of web search services (search engines, subject directories, metasearch engines, intelligent agents) and their characterization. Related research fields of search engine subject (e.g. semantic web, network theory; hidden web, text mining and web data mining etc.) The semantic analysis and retrieval of multimedia content in two- and three-dimensional spaces. The structure and operation of search engines. The principles of ranking the web pages, the PageRank algorithm. Measuring the retrieval effectiveness of web search engines with relevant statistical models and procedures. The special features of searches conducted in Online Public Access Catalogues (OPACs) and Shared Cataloguing systems.

### **Bibliography**

Baeza-Yates, Ricardo; Ribeiro-Neto, Berthier: Modern Information Retrieval. The Concepts and Technology Behind Search. 2<sup>nd</sup> ed. Harlow [etc.] : Pearson, 2011.

Barabási Albert-László: Bursts. The Hidden Patterns Behind Everything We Do. New York: Dutton, cop. 2010.

Barabási Albert-László: Linked. The New Science of Networks. Cambridge MA: Perseus Publishing, 2002.

Ceri, Stefano; Bozzon, Alessandro; Brambilla, Marco [et al.]: Web Information Retrieval. Berlin - Heidelberg: Springer, 2013.

Handbook of Semantic Web Technologies. John Domingue, Dieter Fensel, James A. Hendler (eds). Berlin [u.a.]: Springer, 2011- . 1-2. vol.

Harter, S. P.; Hert, C. A.: Evaluation of Information Retrieval Systems. Approaches, Issues and Methods. Annual Review of Information Science and Technology, Vol. 32. (1997) 3-79.

Indexing and Retrieval of Non-text Information. Rasmussen, Diane Neal (ed.). Berlin - London: De Gruyter - Saur, 2012.

Langville, A. N.; Meyer, C. D.: Google's PageRank and Beyond. The Science of Search Engine Rankings. Princeton-Oxford: Princeton University Press, 2006.

Liu, Bing: Web Data Mining. Exploring Hyperlinks, Contents, and Usage Data. 2<sup>nd</sup> edition. Berlin; Heidelberg: Springer, 2011.

Oppenheim, C. [et al.]: The Evaluation of WWW Search Engines. Journal of Documentation, Vol. 56. (2000) No. 2. 190-211.

Representation of knowledge and search engines in the Internet. Textbook / Chapters 1-3 are by Erzsébet Tóth, Chapter 4 is by Erzsébet Dani. Debrecen: University of Debreceni, 2015. URL: <u>http://szaknyelvtudas.unideb.hu/images/tananyagok/Representation of Knowledge and Search Engines in the</u><u>Internet1.pdf</u> (2018-12-30)

Semantic Search over the Web. Virgilio, Roberto De; Guerra, Francesco; Velegrakis, Yannis (eds). Berlin - Heidelberg: Springer, 2012.

Wiza, W.: Interactive 3D Visualization of Search Results. 253-291. In: Interactive 3D Multimedia Content. Cellary, W., Walczak, K. (eds). London: Springer, 2012.

# **UNIVERSITY OF DEBRECEN Doctoral School of Informatics**

#### **Knowledge management in libraries**

Elements of intellectual capital and their management in libraries. Definition of knowledge management in the field of research and innovation. Concept of technology transfer and innovation paradigms. Relations between organization and knowledge management. Tacit and explicit knowledge. Relationship of knowledge spiral (Nonaka's SECI model) and learning. Possibilities of knowledge creation: purchase, hiring, aim-oriented resources, combining professionals' knowledge of different fields, adaptation to a new and changed business environment, the increase of knowledge through informal and autonomous networks of the organizations. Components of knowledge market. Knowledge codification: knowledge maps, knowledge catalogues, knowledge bases. Tools used for knowledge organization and representation of the content on the web: topic maps, concept maps, ontologies, thesauri. Knowledge management projects as case studies in practice.

#### **Bibliography**

Broughton, Vanda: Essential Thesaurus Construction. London: Facet Publishing, 2006.

Davenport, Thomas H.; Prusak, Laurence: Working Knowledge. How Organizations Manage What They Know. Cambridge, MA: Harvard Business School Press, 1998.

Lambe, P.: Organising Knowledge. Taxonomies, Knowledge and Organisational Effectiveness. Oxford, England: Chandos Publishing, 2007.

Nonaka, Ikujiro; Takeuchi, Hirotaka: The Knowledge-creating Company. How Japanese Companies Create the Dinamics of Innovation. New York: Oxford University Press, 1995.

Nonaka, Ikujiro; Toyama, Ryoko; Konno, Noboru: SECI, Ba and Leadership. A Unified Model of Dynamic Knowledge Creation. Long Range Planning Vol. 33. (2000) No. 1. 5-34.

Ontology for Knowledge Organization. Smiraglia, Richard P.; Lee, Hur-Li (eds). Würzburg: Ergon Verl., 2015.

The Palgrave Handbook of Knowledge Management. Syed, Jawad [et al.] (eds). Palgrave Macmillan, 2018.

Sveiby, Karl Erik: The New Organizational Wealth. Managing & Measuring Knowledge-based Assests. San Francisco: Berrett-Koehler Publishers, 1997.

#### **Cognitive science**

Problems and main concepts of cognitive science and related disciplines. Types and taxonomies of human knowledge. The emergence and development of cognitive science. The classic view of cognitive science. The organization of human memory and the mental representations. The symbolic and connectionist processing approach. The evolutional thought. The concept of representation in cognitive science. Donald's view about the origin of human mind and cognition. Cognitive science and artificial intelligence. The development of human knowledge. The body-mind problem, Karl Popper's "three worlds" theory.

#### **Bibliography**

Cognitive Science. Bly, Benjamin Martin; Rumelhart, David E. (eds). Academic Press, 1999.

Donald, Merlin: Origins of the Modern Mind. Three Stages in the Evolution of Culture and Cognition. Cambridge, MA; London, England: Harvard University Press, 1993.

Fodor, Jerry; Massimo Piatelli-Palmarini: What Darwin Got Wrong. London: Profile Books, 2011.

# **UNIVERSITY OF DEBRECEN Doctoral School of Informatics**

Mayr, Ernst: What Evolution Is. From Theory to Fact. London: Orion, 2014.

Popper, Karl R.: Three Worlds. The Tanner Lecture on Human Values, Delivered at The University of Michigan (April 7, 1978). https://tannerlectures.utah.edu/\_documents/a-to-z/p/popper80.pdf (2018-11-10)

Stillings, Neil A. [et al.]: Cognitive Science. An Introduction. The MIT Press, 1995.

Tegmark, Max: Life 3.0. Being Human in the Age of Artificial Intelligence. New York: Alfred A. Knopf, 2017.

Thagard, Paul: Cognitive Science. In: Stanford Encyclopedia of Philosophy. http://plato.stanford.edu/entries/cognitive-science/ (2018-11-10)

Thagard, Paul: [A Collection of] Cognitive Science Web Sites. http://cogsci.uwaterloo.ca/courses/resources.html (2018-11-10)

Thagard, Paul: Mind. Introduction to Cognitive Science. The MIT Press, 2005.