UNIVERSITY OF DEBRECEN
Doctoral School of Informatics

Complex exam major subject

Didactics of Informatics

Syllabus

The aim is to provide the theoretical background and practice for developing the students' computational thinking, algorithmic skills in traditional and non-traditional computational environments, and to find statistical tools and methods to measure the students' knowledge.
The students get familiar with the typology of computer problem solving, the characteristics of the deep and surface approaches, and the connection with fast and slow thinking. They provide methods which both in traditional and non-traditional programming environment can effectively develop their students' computational thinking and problem solving abilities. They get familiar with knowledge transfer items both within informatics and computer sciences and between other school subjects and sciences which can be applied in teaching informatics and in using digital tools in teaching other subjects. They report how to create knowledge-transfer-based competency measuring tools for testing and developing students' computational thinking skills, their computer problem solving abilities, and revealing informatics- and computer-related misconceptions. Along with the digital tools, they realize the effectiveness of unplugged and semi-unplugged tools in teaching informatics, they develop such tools, and report how these tools can be effectively applied in real school environments. Students are familiar with National Base Curriculum, the frame curricula, and additional teaching-learning documents, especially course books and online materials.

Bibliography

1. Doignon, J., & Falmagne, J. (1999). Knowledge spaces. Springer Verlag.
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4. Weller, M. (2007). Virtual Learning Environments: Using, Choosing and Developing your VLE. New York NY: Routledge.
5. Fives, H. Gill, M. G. (2015) International Handbook of Research on Teachers' Beliefs. Routledge.
6. Hattie, J. (2012). Visible Learning for Teachers. Routledge.
7. Merribenboer, J. & Sweller J. (2005). Cognitive Load Theory and Complex Learning: Recent developments and future directions. Educational Psychology Review, 17, 147-177.
8. Sestoft, P. (2011) Spreadsheet technology. Version 0.12 of 2012-01-31. IT University Technical Report ITU-TR-2011-142. IT University of Copenhagen, December 2011.
9. Booth, S. (1992) Learning to program: A phenomenographic perspective. Gothenburg, Sweden: Acta Universitatis Gothoburgensis.
10. Csernoch, M. & Biro, P. (2015) Sprego Programming. Lambert Academic Publishing.
11. Shaffer, D., Doube, W., Touvinen, J., (2003) Applying Cognitive Load Theory to Computer Science Education. In M. Petre & D. Budgen (Eds) Proc. Joint Conf. EASE & PPIG 2003

Compulsory subjects for this major subject

With the approval of the program's leader:

1) Four courses from the following list of courses:

- Knowledge space theory in practice (Abari Kálmán)

- Developing computational thinking (Csernoch Mária)
- Examining qualitative variables (Máth János)
- Sprego Programming (Csernoch Mária)
- Virtual reality systems (Gilányi Attila)
- Informatics education in ICT rich environment (Biró Piroska)
- Knowledge-Transfer Items in Teaching Informatics (Csernoch Mária)

2) Three courses must be selected from the other programs of the Doctoral School of Informatics.

3) One course must be selected from the programs of the Hungarian Doctoral Schools.

Recommended subjects for this major subject