

(1.) Course Title: INFPHD611 Programming methodology (complex exam preparatory)	Credits: 6
Course Classification: Mandatory chosen	
Theoretical or Practical Nature of the Course, 'training character'¹³: theoretical (credit%)	
Type of Class: practice and number of hours: 2/week in the given semester, <i>(If the course is not (only) taught in Hungarian, then the language: English)</i> Additional (specific) methods and characteristics² used in delivering the knowledge <i>(if any)</i> : -	
Assessment Method (Exam / Midterm Grade / Other³): practical course mark Additional (specific) methods⁴ applied in knowledge assessment <i>(if any)</i> : -	
Course Placement in Curriculum (Semester Number): -	
Prerequisites <i>(if any)</i> : -	
Course Description: A concise yet informative description of the knowledge to be acquired.	
-Everyday algorithms for introducing programming, programming models -Algorithms without a computer, CS unplugged -Programming patterns, their role in teaching programming -Composition of programming patterns, construction techniques -Program transformations -Derivation of programming patterns to the summation programming pattern -Generalizations of programming patterns -Recursion in solving programming problems -Problem-solving strategies -The thinking toolbox of programming: programming language abstraction, analogy, algorithmic abstraction, decomposition, superposition, information conversion, intuition, variation -Efficiency of algorithms	
2-5 Most Important Required and Recommended Literature List of required and recommended literature (notes, textbooks) with bibliographic data (author, title, publication details, (possibly pages), ISBN).	
1. Berthold Vöcking; Helmut Alt; Martin Dietzfelbinger; Rüdiger Reischuk; Christian Scheideler; Heribert Vollmer; Dorothea Wagner (Editors): Algorithms Unplugged. Springer 2011, e-ISBN 978-3-642-15328-0 2. Gregorics, T., Sike S.: Generic algorithm patterns. Proceedings of Formal Methods in Computer Science Education (2008) 3. Gregorics, T.: Abstract levels of programming theorems. ACTA UNIVERSITATIS SAPIENTIAE INFORMATICA 4 : 2 pp. 247–259. (2012) 4. Szlávi Péter; Zsakó László: The Cognitive Toolkit of Programming – Algorithmic Abstraction, Decomposition-Superposition. ACTA DIDACTICA NAPOCENSIA (ISSN: 2065-1430) 10: (4) pp. 33-40. (2017)	

5. Szlávi Péter; Törley Gábor; Zsakó László: Cognitive Operations in Use. In: Kovásznai Gergely; Terdik György (szerk.) ICAI 2017: 10th International Conference on Applied Informatics (<http://icai.uni-eszterhazy.hu/abstracts>).
6. Szlávi Péter; Törley Gábor; Zsakó László: The thinking toolkit of programming. In: Veronika Stoffová; Zsakó László; Szlávi Péter (szerk.): New methods and technologies in education and practice: Proceedinhs of XXIX. DIDMATTECH 2016.
7. Zsakó László; Szlávi Péter; Pap Gáborné Harangozó Éva: Joining Programming Theorems, a Practical Approach to Program Building. ANNALES UNIVERSITATIS SCIENTIARUM BUDAPESTINENSIS DE ROLANDO EOTVOS NOMINATAE SECTIO COMPUTATORICA (ISSN: 0138-9491) 17: (1) pp. 155-172. (1998)
8. SZLÁVI Péter, TÖRLEY Gábor, ZSAKÓ László: Programming Theorems Have the Same Origin. Central-European Journal of New Technologies in Research, Education and Practice Volume 1, Number 1, 2019. <https://doi.org/10.36427/CEJNTREP.1.1.380>
9. Erdősné Németh Ágnes; Zsakó László: The Place of the Dynamic Programming Concept in the Progression of Contestants' Thinking. OLYMPIADS IN INFORMATICS (ISSN: 1822-7732) (eISSN: 2335-8955) 10: pp. 61-72. (2016)
10. Erdősné Németh Ágnes; Zsakó László: The place of the greedy method concept in the progression of contestants' thinking In: Veronika Stoffová; Zsakó László; Szlávi Péter (szerk.): New methods and technologies in education and practice: Proceedinhs of XXIX. DIDMATTECH 2016. pp. 105-110.
11. Erdősné Németh Ágnes; Zsakó László: Online training and contests for informatics contestants of secondary school age. EDUKACJA TECHNIKA INFORMATYKA (ISSN: 2080-9069) (eISSN: 2450-9221) 11: (1) pp. 273-280. (2015)

List of Prescribed Professional Competencies and Competency Elements

(knowledge, skills, etc., KKK Section 8) that the course significantly contributes to developing (highlight the most important ones).

a) Knowledge

- Has a research-level understanding of the general and specific characteristics, major directions, and precisely developed boundaries of the subject area within the discipline, as well as the agreed and debated interrelations.
- Creatively comprehends the interrelations, theories, and conceptual frameworks and terminologies of the given field of study.¹
- Possesses research methodology knowledge necessary for independent research in the given discipline/field.

b) Skills

- Capable of creative analysis of the field, synthesizing comprehensive and specific interrelations with a new perspective, and conducting appropriate evaluative and critical activities.

¹**Section 108**, Article 37 of the National Curriculum Act (Nftv.) 37. lesson: a session (lecture, seminar, exercise, consultation) requiring the personal involvement of the instructor to fulfil the academic requirements specified in the curriculum, the duration of which is at least forty-five minutes and not more than sixty minutes.

² e.g. case studies, role play, thematic presentations, etc.

³ e.g. continuous debriefing, mid-year report

⁴ e.g. request for case studies, thematic papers, essays, business, organisational plans, etc.

- Able to apply and further develop the specialized learning and problem-solving methods of the field.
- Can creatively elaborate on the novel, previously unknown practical implications of theoretical issues.
- Capable of planning and executing new projects, conducting research in the field, and developing new techniques and approaches.
- Able to identify unforeseen professional problems and uncover the detailed theoretical and practical background necessary for their resolution at a research level.
- Can construct and communicate new relations relevant to the field, as well as comprehensive interrelations significant for personal and communal existence.

c) Attitudes

- Represents and further develops the relations that contribute to the process of human self-creation based on the field's characteristics.
- Possesses an interest and learning ability that enable identifying and solving currently unpredictable research problems in the field.
- Demonstrates a firm professional commitment, a continuous dedication to exploring new approaches, and an acceptance of the necessity for persistent effort.

d) Autonomy and Responsibility

- Builds and initiates new knowledge areas with creative independence and proposes new practical solutions.
- Participates in formulating theoretical and practical questions with a leadership role and high-level cooperation.
- Engages as an equal discussion partner with professionals in the field.
- Takes responsibility for raising and addressing new ethical questions concerning theoretical and practical aspects of the profession.

Course responsible (name, position, academic degree): **Dr. Győző Horváth, associate professor, PhD**

Instructor(s) involved in teaching the course (if any) (name, position, academic degree):

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