

(1.) Course Title: INFPHD435 Current Trends in Logic Programming	Credits: 6
Course Classification: Optional	
Theoretical or Practical Nature of the Course, 'training character'¹³: 70 practice (credit%)	
Type of Class: lecture 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): performance test Additional (specific) methods⁴ applied in knowledge assessment <i>(if any)</i> : -	
Course Placement in Curriculum (Semester Number): -	
Prerequisites <i>(if any)</i> : Art of Logic Programming / Logikai programozás	
Course Description: A concise yet informative description of the knowledge to be acquired.	
Basics of logic programming (tutorial: paradigm, language, programming methodology). Constraint logic programming: goals and constraints, constraint store, full and partial consistency; transition, derivation, proof; different kinds of constraints, domains, domain-specific constraints, unification, variable elimination, constraint propagation, local consistency, labelling, program reformulations, constraint handling rules, top-down and bottom-up evaluation; concurrency, guards; applications. Parallel logic programming: explicit parallelism (committed choice languages); implicit parallelism (or-parallelism, and-parallelism), the Andorra programming model and language. Definite Clause Grammars (DCGs): parsing, error handling; generative DCGs, compiler writing. Logic grammars as deterministic, top-down parsers <i>or</i> bottom-up parsers. Purely declarative logic programming: strong, static, polymorphic type system, strong mode and determinism system, fast code, module system, foreign interfaces, enterprise applications: the Mercury functional logic programming language.	
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).	
• Clocksin, Mellish, <i>Programming in Prolog: using the ISO Standard</i>, Springer, 2003. • Deransart, Ed-Dbali, Cervoni, <i>Prolog: The Standard (Reference Manual)</i>, Springer-Verlag, 1996.	

- Richard O'Keefe, *The Craft of Prolog*, The MIT Press, 1990.
- Sterling, Shapiro, *The Art of Prolog* (Second Edition), The MIT Press, London, England, 1994.
- Marriott, Stuckey, *Programming with Constraints: An Introduction*, The MIT Press, London, England, 1998.
- SWI-Prolog documentation (2025): <https://www.swi-prolog.org/pldoc/index.html>
- Constraint Logic Programming (2025): <https://www.swi-prolog.org/pldoc/man?section=clp>
- Frühwirth, Abdennadher, *Essentials of Constraint Programming*, Springer, 2003.
- *Documentation for SICStus Prolog 4*, Swedish Institute of Computer Science, Kista, Sweden, 2012. <http://www.sics.se/isl/sicstuswww/site/documentation.html>
- Haridi, Janson, *Kernel Andorra Prolog and its Computation Model*, Swedish Institute of Computer Science, Kista, Sweden, 1990. <http://www.sics.se/~sverker/public/papers/kapiclp90.pdf>
- *The Mercury Project*, University Of Melbourne, Victoria, Australia, 2012. <http://mercurylang.org/>
- Nilsson, U., *AID: An Alternative Implementation of DCGs*, New Generation Computing, No 4, pp.383-399, Vol 4, 1986.
- Jukka Paakki, *A practical implementation of DCGs*, Lecture Notes in Computer Science, Volume 477/1991, Pages 224-225, Springer, 1991.
- Pereira F., Warren D., *Definite clause grammars for language analysis*, Artificial Intelligence, Elsevier, 1980.
- David H. D. Warren, *Logic programming and compiler writing*, Software: Practice and Experience, Volume 10 Issue 2, Pages 97 - 125, Published Online: 27 Oct 2006. (Copyright: 2010 John Wiley & Sons, Ltd.)
- Ásványi Tibor, *DCGs for Parsing and Error Handling*, <http://aszt.inf.elte.hu/~asvanyi/pp/dcgs1p3.pdf>, 2010.

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.
- Able to apply and further develop the specialized learning and problem-solving methods of the field.

¹Section 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.

- 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. Tibor Ásványi, Associate Professor, PhD**

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

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