Technology Arts Sciences
TH Köln

Course Manual IIS

Intelligent Information Systems

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— General information

Long name	Intelligent Information Systems
Approving CModule	IIS_MaTIN
Responsible	Prof. Dr. Andreas Behrend Professor Fakultät IME
Valid from	summer semester 2021
Level	Master
Semester in the year	summer semester
Duration	Semester
Hours in self-study	60
ECTS	5
Professors	Prof. Dr. Andreas Behrend Professor Fakultät IME
Requirements	programming skills, knowledge about data structures and algorithms
Language	German, English if necessary
Separate final exam	Yes

Literature

G. Hutton: Programming in Haskell, 2nd Ed., Cambridge University Press, 2016

L. Sterling, E. Shapiro: The Art of Prolog, 2nd Ed., MIT Press, 1994

Uwe Schöning. Logik für Informatiker. 5. Auflage, Spektrum Akademischer Verlag, 2000

Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph. Foundations of Semantic Web Technologies. CRC Press 2009.

S.J. Russell, P. Norvig: Artificial Intelligence. A Modern Approach, 2. Aufl. Prentice Hall, 2003

Final exam

Details	written exam
Minimum standard	roughly 50%
Exam Type	EN Klausur

− Lecture / Exercises

Learning goals

Goal type	Description
Knowledge	Foundations of Knowledge Representation - First-order logic - relational, functional, tree-based, graph-oriented fact representation (semantic networks, ontologies) - rule-based systems Automatic reasoning and inference methods - resolution principle (incl. unification) - forward and backward chaining - fixpoint semantics Declarative Programming languages - Functional programming - relational (logical) programming , e.g., Prolog, Datalog, SQL and SPARQL Outlock on current research issues, e.g., query languages, parallel algorithms, distributed systems, combinatorial optimization and language processing.
Skills	Students have acquired basic knowledge about methods for representing knowledge, automatic reasoning as well as declarative programming languages. They understand the various ways of operationalizing declarative expressions and are able to realize suitable programming solutions for given problems.

Special requirements

Accompanying material	Lecture slides Exercises and solutions lecture homepage
Separate exam	No

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	2
Exercises (whole course)	2
Exercises (shared course)	0

Tutorial (voluntary)   0

— Practical training

Learning goals

Goal type	Description
Skills	Representing knowledge by sets of tuples, relations, semantic networks as well as logic-based systems
	Implementing calculation problems with a functional programming language (e.g. Haskell) using expressions, algebraic data types, infinite data structures and higher-order functions
	Solving search problems with a logical programming language and recursive expressions
	Formulating relational queries over knowledge bases (e.g. using SPQAQL or Datalog)

Special requirements

Accompanying material	Script "Intelligent Information Systems" repository of sample programs (Haskell, Prolog)
Separate exam	No

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Practical training	1
Tutorial (voluntary)	0