

Rubriken mit Lehrveranstaltungen (Englisch)

Sommersemester 2018

Master's Programme Computer Science according to the Curriculum 2012 (120 ECTS-Credits, 4 semesters)

LVNR	Titel	Typ SSt. / ECTS-AP	Zeit / Ort																	
Master's Programme Computer Science according to the Curriculum 2012 (120 ECTS-Credits, 4 semesters)																				
First and Second Semester																				
Compulsory Module 1: Compiler Construction (5 ECTS-Credits, 3 h)																				
703.601	VO Compiler Construction THOMAN Peter	VO 2 3																		
Start:	see dates																			
Mode of Repetition:	weekly																			
Language of Instruction:	English																			
Learning Outcome:	Graduates of this module can describe the structure and the tasks of the individual phases of a compiler. They are capable of explaining and using the employed methods and algorithms. They are capable of using compiler construction tools for building a complete compiler for a simple programming language.																			
Contents:	Lexical analysis; Syntactic analysis (top-down and bottom-up strategies); Semantic analysis; Attribute grammars and attribute evaluation; Intermediate code translation; Runtime environments; Code generation																			
Methods:	Lecture, assessment is based on a single examination at the end of the course.																			
Assessment:	Course examination according to § 7, statute section on "study-law regulations"																			
Literature:	Will be discussed in the first lesson.																			
Prerequisites:	Formal Language and Automata Theory																			
URL:	http://lms.uibk.ac.at/																			
Studien:	<table border="1"> <thead> <tr> <th>SKZ</th> <th>Studium</th> <th>Fakultät</th> <th>Modul</th> <th>Prozentanteil</th> </tr> </thead> <tbody> <tr> <td>921</td> <td>Masterstudium Informatik</td> <td>MIP</td> <td>Pflichtmodul</td> <td>100,00%</td> </tr> <tr> <td colspan="4" style="text-align: right;">Summe:</td> <td>100,00%</td> </tr> </tbody> </table>					SKZ	Studium	Fakultät	Modul	Prozentanteil	921	Masterstudium Informatik	MIP	Pflichtmodul	100,00%	Summe:				100,00%
SKZ	Studium	Fakultät	Modul	Prozentanteil																
921	Masterstudium Informatik	MIP	Pflichtmodul	100,00%																
Summe:				100,00%																
703.602	PS Compiler Construction HIRSCH Alexander	PS 1 2																		
Start:	see dates																			
Mode of Repetition:	weekly																			
Language of Instruction:	English																			
Learning Outcome:	Graduates of this module can describe the structure and the tasks of the individual phases of a compiler. They are capable of explaining and using the employed methods and algorithms. They are capable of using compiler construction tools for building a complete compiler for a simple programming language.																			
Contents:	Practical use and implementation of compiling algorithms. Use of compiler tools for lexical and syntactic analysis. Development of a compiler for a simple programming language.																			
Methods:	Continuous assessment (based on regular written and/or oral contribution by participants).																			
Assessment:	Course examination according to § 7, statute section on "study-law regulations"																			
Literature:	Will be discussed in the first lesson.																			
Prerequisites:	C, Operating Systems, Assembler Language																			
URL:	http://www.dps.uibk.ac.at/																			
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Summe:				100,00%																

LVNR

Titel

Typ SSt. /
ECTS-AP

Zeit / Ort

Third and Fourth Semester

Compulsory Module 4: Master Seminar 2 (5 ECTS-Credits, 2 h)

703.606

SE Master's Seminar 2

SE 2

BÖHME Rainer, BREU Ruth, FAHRINGER
Thomas, HARDERS Matthias, MIDDELDORP Aart,
SPECHT Günther

5

Start: see dates

Mode of
Repetition: weeklyLanguage of
Instruction: EnglishLearning
Outcome: Students who have completed this module should be able to deal with a computer science topic in a creative and methodically correct fashion and express it in an easily comprehensible way in writing as well as orally.

Contents: In-depth study of a specialised research topic of computer science, the content of which should go beyond the content of other modules; preparation for the master thesis; illustration of the results in the context of a seminar paper and a presentation

Methods: Continuous assessment (based on regular written and/or oral contribution by participants).

Assessment: continuous assessment

Literature: Will be discussed in the first lesson.

Remarks: GROUP 1 - [CL](#)
GROUP 2 - [DBIS](#)
GROUP 3 - [DPS](#)
GROUP 4 - [IGS](#)
GROUP 5 - [QE](#)
GROUP 6 - [SEC](#)

URL:

Studien:

SKZ	Studium	Fakultät	Modul	Prozentanteil
921	Masterstudium Informatik	MIP	Pflichtmodul	50,00%
745	Doctor of Philosophy-Doktoratsstudium Informatik	MIP	Pflichtmodul	50,00%
			Summe:	100,00%

Compulsory Module 5: Specialisation Module (20 ECTS-Credits)

703.756

Domain-specific Language Engineering

PS 2

FARWICK Matthias, HÄUSLER Martin, TROJER
Thomas

4

Start: see dates

Mode of
Repetition: weeklyLanguage of
Instruction: EnglishLearning
Outcome: After concluding the course a student is familiar with the concept of domain-specific language (DSL) engineering and is able to implement simple DSLs using Groovy, xText and the Meta-Programming System (MPS).Contents: This seminar discusses topics of modern software engineering that help to develop software more efficiently. Three different approaches are presented: Internal Domain-specific Languages (DSLs) in Groovy, external DSLs with xText and the paradigm of language-oriented programming using Meta-Programming System (MPS). These approaches all have the ability to extend features of a base programming language (like Java) or to create new languages. See e.g., <http://martinfowler.com/bliki/DomainSpecificLanguage.html>.

Methods: The first half of the semester will consist of lectures and small practical exercises introducing internal Domain-specific Languages (DSLs), external DSLs and language-oriented programming. The second half will be spent on medium-sized projects realizing and leveraging a DSL with one of the aforementioned approaches. These projects will be done in small groups of students.

Assessment: The final mark will be calculated from the submitted exercises as well as the outcome of the group-work project.

Literature: <http://martinfowler.com/bliki/DomainSpecificLanguage.html>URL: <https://qe-informatik.uibk.ac.at/>

Studien:

SKZ	Studium	Fakultät	Modul	Prozentanteil
921	Masterstudium Informatik	MIP	Wahlmodul	100,00%
			Summe:	100,00%

LVNR	Titel	Typ SSt. / ECTS-AP	Zeit / Ort																	
703.800	Computer Haptics HARDERS Matthias	VO 2 4																		
Start:	see dates																			
Mode of Repetition:	weekly																			
Language of Instruction:	English																			
Learning Outcome:	Haptics is related to the sense of touch. The lecture will provide insight into the new field of computer haptics. Students will understand the interdisciplinary nature of the field and be knowledgeable about major elements, such as psychophysics, haptic rendering, and applications using touch feedback.																			
Contents:	The underlying theories and methods will be taught, including the human haptic sense, the design of psychophysical studies, the control of haptic interfaces, the implementation of haptic rendering algorithms, and the application of touch feedback in different research fields and application areas.																			
Methods:	Lecture, assessment is based on a single examination at the end of the course.																			
Assessment:	Course examination according to § 7, statute section on study-law regulations.																			
Literature:	Will be discussed in the first lesson.																			
Remarks:	The course is conceived as VO+PS. It is recommended that students participate in both parts. The lecture and proseminar Computer Haptics (VO2, PS3) can be accredited as an optional elective module of the Master programme Computer Science. All Information about the recognition of exams are available here .																			
URL:	http://igs.uibk.ac.at																			
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703.801	Computer Haptics HA Van Quang	PS 3 6																		
Start:	see dates																			
Mode of Repetition:	weekly																			
Language of Instruction:	English																			
Learning Outcome:	Discussion, rehearsal and practical implementation of topics covered in the lecture via practical tasks. Central element is the construction of a simple haptic interface, on which diverse algorithms can be tested.																			
Contents:	Rehearsal and application of the topics covered in the lecture. In particular, a simple 1-DOF haptic interface - the Haptic Paddle - will be built by the students. Programming exercises to control the haptic interface and to haptically render virtual objects will be carried out.																			
Methods:	Continuous assessment based on project development, as well as written and/or oral contribution by participants.																			
Assessment:	Course examination according to § 7, statute section on study-law regulations.																			
Literature:	Will be discussed in the first lesson.																			
Remarks:	The lecture is conceived as VO+PS. It is recommended that students participate in both parts. The lecture and proseminar Computer Haptics (VO2, PS3) can be recognised as an optional elective module of the Master programme Computer Science. All Information about the recognition of exams are available here .																			
Prerequisites:	Programming will be carried out using C/C++ with OS Windows.																			
URL:	http://igs.uibk.ac.at																			
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			Summe:	100,00%																

LVNR	Titel	Typ SSt. / ECTS-AP	Zeit / Ort		
703.815	Online Communication FENSEL Dieter	SE 2 4			
Start:	see dates				
Mode of Repetition:	weekly				
Language of Instruction:	English				
Learning Outcome:	Students who have completed this module should have a good understanding of the technical foundations of online communication approaches. They should be able to understand the methods, techniques and algorithms for building scalable online presence by aligning content with channels in a flexible manner.				
Contents:	In-depth study for achieving the reusability and scalability of online communication by explicitly interweaving content and channels. This method relies mainly on the technical foundation which are related to "Knowledge Representation, Search, and Rules".				
Methods:	Compulsory attendance, presentation of a specific topic.				
Assessment:	Continuous assessment (based on presentations and oral contribution by participants).				
Literature:	Available at: http://oc.sti2.at/results/white-papers and http://oc.sti2.at/results/papers				
URL:	http://www.sti-innsbruck.at/teaching				
Studien:	SKZ	Studium	Fakultät	Modul	Prozentanteil
	921	Masterstudium Informatik	MIP	Wahlmodul	100,00%
				Summe:	100,00%
703.819	Machine Learning for Theorem Proving KALISZYK Cezary	VO 2 4			
Start:	see dates				
Mode of Repetition:	Block				
Language of Instruction:	English				
Learning Outcome:	Students who have completed this module are familiar with the learning problems in theorem proving, understand the design of automated and interactive theorem proving systems as well as proof certifiers and the various machine learning problems that correspond to the built in heuristics.				
Contents:	high-level learning problems in proof assistants; techniques for the selection of relevant lemmas in large libraries; strategy selection; strategy tuning using learning; internal guidance of automated reasoning systems; prediction of useful inference steps and tactics; evaluation of intermediate proof states				
Methods:	Lectures				
Assessment:	Written exam				
Literature:	Announced in the course				
Remarks:	Begin as announced				
Prerequisites:	None				
URL:	http://cl-informatik.uibk.ac.at/teaching/				
Studien:	SKZ	Studium	Fakultät	Modul	Prozentanteil
	921	Masterstudium Informatik	MIP	Pflichtmodul	100,00%
				Summe:	100,00%

LVNR	Titel	Typ SSt. / ECTS-AP	Zeit / Ort																	
Elective Modules (50 ECTS-Credits)																				
Elective Module 5: Decision Procedures (10 ECTS-Credits, 5 h)																				
703.620	VO Theory of Decision Procedures MIDDELDORP Aart	VO 2 4																		
Start:	see dates																			
Mode of Repetition:	weekly																			
Language of Instruction:	English																			
Learning Outcome:	Graduates of this course have a good understanding of various decision procedures that are used in automated reasoning.																			
Contents:	The course provides an introduction to some of the theories and decision procedures that are used in automated reasoning. The focus will be on satisfiability modulo theories (SMT).																			
Methods:	Lecture, assessment is based on a single examination at the end of the course.																			
Assessment:	Course examination according to § 7, statute section on "study-law regulations"																			
Literature:	The lecture slides contain pointers to the literature.																			
URL:	http://cl-informatik.uibk.ac.at/teaching/ss16/dp																			
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921	Masterstudium Informatik	MIP	Wahlmodul	100,00%																
Summe:				100,00%																
703.621	VO Practice of Decision Procedures STERNAGEL Christian	VO 1 2																		
Start:	see dates																			
Mode of Repetition:	weekly																			
Language of Instruction:	English																			
Learning Outcome:	Graduates of this module know how to encode other problems in SAT/SMT/etc.																			
Contents:	SAT-, PB- and SMT-Codings; Encoding non-linear arithmetic																			
Methods:	Presentation of the theory and demonstration on examples.																			
Assessment:	Written Exam																			
Literature:	Lecture slides contain pointers to further literature.																			
Remarks:	None																			
URL:	cl-informatik.uibk.ac.at/teaching/ss16/dp/																			
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921	Masterstudium Informatik	MIP	Wahlmodul	100,00%																
Summe:				100,00%																
703.622	PS Theory and Practice of Decision Procedures VAN OOSTROM Vincent	PS 2 4																		
Start:	see dates																			
Mode of Repetition:	weekly																			
Language of Instruction:	English																			
Learning Outcome:	Students who have completed this module know decision procedures for propositional logic and for restrictions of predicate logic. They can implement these decision procedures and formulate specifications in these logics and verify them using tools.																			
Contents:	Practicing of the themes of the lectures by applying the presented concepts																			
Methods:	Continuous assessment (based on regular written and/or oral contribution by participants).																			
Assessment:	Course examination according to § 7, statute section on "study-law regulations"																			
Literature:	Will be discussed in the first lesson.																			
URL:	http://cl-informatik.uibk.ac.at/teaching/																			
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Summe:				100,00%																

LVNR	Titel	Typ SSt. / ECTS-AP	Zeit / Ort		
Elective Module 9: Advanced Concepts and Techniques in Software Engineering (10 ECTS-Credits, 5 h)					
703.632	VO Advanced Concepts and Techniques in Software Quality FELDERER Michael	VO 2 4			
Start:	see dates				
Mode of Repetition:	weekly				
Language of Instruction:	English				
Learning Outcome:	Students know advanced concepts of software quality engineering techniques and are able to apply them.				
Contents:	Advanced concepts of software quality engineering like model-based testing				
Methods:	Lecture, assessment is based on a single examination at the end of the course.				
Assessment:	Course examination according to § 7, statute section on "study-law regulations"				
Literature:	Will be discussed in the first lesson.				
Remarks:	To the elective module 9 'Advanced Concepts and Techniques in Software Quality' belong also the lecture (VO) and the introductory seminar (PS) 'Advanced Concepts and Techniques in Software Engineering'!				
URL:					
Studien:	SKZ	Studium	Fakultät	Modul	Prozentanteil
	921	Masterstudium Informatik	MIP	Wahlmodul	100,00%
				Summe:	100,00%

Elective Module 15: Network Security (10 ECTS-Credits, 5 h)					
703.646	VO Network Security BÖHME Rainer	VO 2 4			
Start:	see dates				
Mode of Repetition:	weekly				
Language of Instruction:	English				
Learning Outcome:	This is an advanced course on topics related to information security. Students graduating from this course will have the capability to implement security mechanisms in practice in and with the help of distributed technical systems. They develop an understanding of strategic questions in information security and get to know the most relevant privacy-enhancing techniques.				
Contents:	Practical security of devices, systems, and networks; side channel attacks and defenses; secure programming; selected security protocols and their weaknesses; packet filters and anomaly detection; economic and game-theoretic aspects of information security; human factors; dataset anonymization; anonymous communication; privacy-enhanced applications (payments, voting, credentials)				
Methods:	Interactive lecture, assessment is based on a single examination at the end of the course.				
Assessment:	Course examination				
Literature:	http://informationsecurity.uibk.ac.at/teaching/infosec/#bibliography				
Prerequisites:	Programming experience and knowledge of the contents of "Information Security I" (Information Security) are helpful.				
URL:					
Studien:	SKZ	Studium	Fakultät	Modul	Prozentanteil
	921	Masterstudium Informatik	MIP	Wahlmodul	100,00%
				Summe:	100,00%

LVNR	Titel	Typ SSt. / ECTS-AP	Zeit / Ort																	
703.647	PS Network Security BÖHME Rainer, SCHÖTTLE Pascal	PS 3 6																		
Start:	see dates																			
Mode of Repetition:	weekly																			
Language of Instruction:	English																			
Learning Outcome:	This course deepens the field of information security. Graduates acquire skills for the practical implementation of security mechanisms in and with distributed technical systems. They develop an understanding of methods for the strategic handling of questions of information security and learn the most important techniques for the protection of privacy.																			
Contents:	The proseminar deepens the content of the lecture by introducing methodology and tools, exercise sheets for the preparation of the exam, practical demonstrations as well as carrying out experiments by the students, followed by presentation of the results. Topics include: practical security on end devices, systems and networks; side channel attacks and defenses against them; secure programming; selected security protocols and their vulnerabilities; the human factor; anonymization of data sets and communication relationships																			
Methods:	Practical exercises; Own project consisting of <ul style="list-style-type: none"> • Documentation and presentation of the related work • Implementation of the project • Documentation and presentation of the final result 																			
Assessment:	One graded exercise sheet, presentation and documentation of research project																			
Literature:	http://informationsecurity.uibk.ac.at/teaching/infosec/#bibliography																			
Prerequisites:	Programming experience and knowledge of the contents of "Information Security I" (Informationssicherheit) are helpful.																			
URL:																				
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921	Masterstudium Informatik	MIP	Wahlmodul	100,00%																
			Summe:	100,00%																

Elective Module 16: New Database Models (10 ECTS-Credits, 5 h)

703.648	VO New Database Models SPECHT Günther	VO 3 6																		
Start:	see dates																			
Mode of Repetition:	weekly																			
Language of Instruction:	English																			
Learning Outcome:	Students who have completed this module know and understand the foundations of newdatabase concepts and can compare them with and evaluate against the architecture of conventional database systems. They understand the concepts of object-oriented, document-oriented, XML and graph-based systems and possess the skill to apply them in the respective query languages. Furthermore they possess the ability to autonomously acquire further skills regarding the content of the different areas.																			
Contents:	Architecture of new database systems; NoSQL-database models and their processing algorithms; document-oriented, graph-based and in-memory database systems; object-relational and XML databases; current techniques and approaches																			
Methods:	Lecture, assessment is based on a single examination at the end of the course.																			
Assessment:	Written exam																			
Literature:	S. Edlich et.al.: NoSQL - Einsteig in die Welt nichtrelationaler Web 2.0 Datenbanken, Hanser 2010 H. Plattner, A. Zeier: In-Memory Data Management, Springer 2011 C. Türker, G. Saake: Objektrelationale Datenbanken, dpunkt.verlag 2006. C. Türker: SQL:1999 & SQL:2003 - Objektrelationales SQL, SQLJ & SQL/XML, dpunkt.verlag 2003. A. Geppert: Objektrelationale und objektorientierte Datenbankkonzepte und -systeme, dpunkt.verlag 2002. R. G. G. Cattell: The Object Database Standard: ODMG - 93, Morgan Kaufmann Publishers 1994. F. Bancilhon, C. Delobel, P. Kanellakis: Building an Object-Oriented Database System, Morgan Kaufmann Publishers 1992. W. Kazakos, A. Schmidt, P. Tomczyk: Datenbanken und XML, Springer Verlag, 2002. W. Lehner, H. Schönig: XQuery, dpunkt.verlag, 2004 M. Klettke, H. Meyer: XML & Datenbanken, dpunkt.verlag, 2003																			
URL:	https://dbis-informatik.uibk.ac.at/index.php?article_id=247																			
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			Summe:	100,00%																

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703.649	PS New Database Models ZANGERLE Eva	PS 2 4																		
Start:	see dates																			
Mode of Repetition:	weekly																			
Language of Instruction:	English																			
Learning Outcome:	Students who have completed this module know and understand the foundations of new database concepts and can compare them with and evaluate against the architecture of conventional database systems. They understand the concepts of object-oriented, document-oriented, XML and graph-based systems and possess the skill to apply them in the respective query languages. Furthermore they possess the ability to autonomously acquire further skills regarding the content of the different areas.																			
Contents:	Architecture of new database systems; NoSQL-database models and their processing algorithms; document-oriented, graph-based and in-memory database systems; object-relational and XML databases; current techniques and approaches																			
Methods:	Continuous assessment (based on regular written and/or oral contribution by participants).																			
Assessment:	Course examination according to § 7, statute section on "study-law regulations"																			
Literature:	S. Edlich et.al.: NoSQL - Einsteig in die Welt nichtrelationaler Web 2.0 Datenbanken, Hanser 2010 H. Plattner, A. Zeier: In-Memory Data Management, Springer 2011 C. Türker, G. Saake: Objektrelationale Datenbanken, dpunkt.verlag 2006. C. Türker: SQL:1999 & SQL:2003 - Objektrelationales SQL, SQLJ & SQL/XML, dpunkt.verlag 2003. A. Geppert: Objektrelationale und objektorientierte Datenbankkonzepte und -systeme, dpunkt.verlag 2002. R. G. G. Cattell: The Object Database Standard: ODMG - 93, Morgan Kaufmann Publishers 1994. F. Bancilhon, C. Delobel, P. Kanellakis: Building an Object-Oriented Database System, Morgan Kaufmann Publishers 1992. W. Kazakos, A. Schmidt, P. Tomczyk: Datenbanken und XML, Springer Verlag, 2002. W. Lehner, H. Schöning: XQuery, dpunkt.verlag, 2004 M. Klettke, H. Meyer: XML & Datenbanken, dpunkt.verlag, 2003																			
URL:	https://dbis-informatik.uibk.ac.at/index.php?article_id=247																			
Studien:	<table border="1"> <thead> <tr> <th>SKZ</th> <th>Studium</th> <th>Fakultät</th> <th>Modul</th> <th>Prozentanteil</th> </tr> </thead> <tbody> <tr> <td>921</td> <td>Masterstudium Informatik</td> <td>MIP</td> <td>Wahlmodul</td> <td>100,00%</td> </tr> <tr> <td colspan="4" style="text-align: right;">Summe:</td> <td>100,00%</td> </tr> </tbody> </table>					SKZ	Studium	Fakultät	Modul	Prozentanteil	921	Masterstudium Informatik	MIP	Wahlmodul	100,00%	Summe:				100,00%
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Summe:				100,00%																

Elective Moduel 19: Semantic Web Services (10 ECTS-Credits, 5 h)

703.654	VO Semantic Web Services FENSEL Anna	VO 3 6																		
Start:	see dates																			
Mode of Repetition:	weekly																			
Language of Instruction:	English																			
Learning Outcome:	This lecture will give an overview of Semantic Web Services technologies. It starts by introducing the principles of Web and Service sciences along with the various technologies that are used by Web services. A set of Semantic Web Services frameworks, including both top-down and bottom-up approaches are then discusses. Finally an overview of applications of semantic technologies in service-oriented systems is provided.																			
Contents:	Basic topics of Web Science; Service Science; Web services; Semantic Web und Services.																			
Methods:	Lecture, assessment is based on a single examination at the end of the course.																			
Assessment:	Final examination at the end of lecture based on course materials/slides. The test is passed if the total score of at least 50% of the highest score.																			
Literature:	D. Fensel, F. Facca, E. Simperl and I.Toma. Semantic Web Services, Springer, 2011.																			
Prerequisites:	Basic notions of distributed programming, optional Web services.																			
URL:	http://www.sti-innsbruck.at/teaching/																			
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Summe:				100,00%																

LVNR	Titel	Typ SSt. / ECTS-AP	Zeit / Ort																	
703.655	PS Semantic Web Services SIMSEK Umutcan	PS 2 4																		
Start:	see dates																			
Mode of Repetition:	weekly																			
Language of Instruction:	English																			
Learning Outcome:	The aim of this seminar (PS) is to further explore the topics discussed in the Semantic Web Services lectures by answering questions and solving problems directly related to Web services, Semantic Annotations for Services, service related tasks, etc. The seminar follows closely the lecture's material. Exercise sheets will be handed out each week. Students will present their solutions the following week.																			
Contents:	Semantic Web services are building on top of Web services technology by describing various aspects of services using explicit, machine-understandable semantics that enable a certain degree of automation for various service related tasks. This lecture will give an overview of Semantic Web Services technologies. It starts by introducing the principles of Web and Service sciences along with the various technologies that are used by Web services. A set of Semantic Web Services frameworks, including both top-down and bottom-up approaches are then discussed. Finally an overview of applications of semantic technologies in service-oriented systems is provided.																			
Methods:	Continuous assessment (based on regular written and/or oral contribution by participants).																			
Assessment:	Course examination according to § 7, statute section on "study-law regulations"																			
Literature:	Will be discussed in the first lesson.																			
URL:	http://www.sti-innsbruck.at/teaching/																			
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