D3.2.1 Initial Learning Unit Collection Description

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Abstract.
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Deliverable D3.2.1(WP3.2)
This document describes the learning materials which were collected in the first six months as part of WP 3.2. 24 learning units are provided by 12 partners. They cover the areas Logic, Web Technology, Knowledge Representation, Ontologies, Semantic Web Technology and others. All learning units are described here in detail. As this activity is tightly aligned with the corresponding task in the NoE REWERSE, learning units collected in that NoE are also included (as annex).

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Work package participants

The following partners have taken an active part in the work leading to the elaboration of this document, even if they might not have directly contributed writing parts of this document:

- FUB
- FUBerlin
- INRIA
- UKARL
- UniTn
- VUM
- L3S
- VUA
- OU
- USFD
- CERTH
- UPM

This task was tightly coordinated with the NoE REWERSE. The following REWERSE partners took an active part in this cooperation:

- Institute of Computer Science, FORTH, Heraklion, Greece
- Linköping University, IDA, Linköping, Sweden

Changes

Version	Date	Author	Changes
0.1	25-06-2004	Wolf Siberski	First Draft
0.2	07-07-2004	Wolf Siberski	Second Draft
1.0	16-07-2004	Wolf Siberski	First Public Version
1.1	09-08-2004	Jörg Diederich	Small fixes to first public version

Executive Summary

This document describes the learning materials which were collected in the first six months as part of WP 3.2. 24 learning units are provided by 12 partners. They cover the areas Logic, Web Technology, Knowledge Representation, Ontologies, Semantic Web Technology and others.

Information about the learning material was collected by means of an extensive questionnaire. Partners provided information about content, target group(s), course type (face-to-face, distance learning, self-study, etc). Of special importance is the relation of the materials to the learning scenarios specified in deliverable D3.1.1. This will provide the basis for further efforts towards the Semantic Web curriculum.

As this activity is tightly aligned with the corresponding task in the NoE REWERSE, learning units collected in that NoE are also included (as annex).

The collected materials are soon available at http://ubp.learninglab.uni-hannover.de and http://ariadne.learninglab.uni-hannover.de. The material will also become accessible from the knowledgeweb portal later this year.

Contents

1. Introduction

1.1. Overview

This document describes the learning units collected from all participants as first step toward a comprehensive learning material repository. Also, the units are to be used as part of a specialized university degree program as joint activity of participating universities.

This document is structured as follows: subsection 1.2 discusses the relation to other deliverables. 1.3 describes how the information was collected, especially the questionnaire used to request the information. Detailed learning unit descriptions are provided in section 2 which are grouped according to a preliminary classification with respect to the covered topics.

This work is tightly aligned with the NoE REWERSE, and it is planned to create a joint learning unit repository. Therefore, the courses collected in REWERSE have been provided as well (in Annex A).

1.2. Relation to Other Deliverables

1.2.1. Specification of VISWE Tasks and Goals (D3.1.1)

This work heavily relies on the document D3.1.1 which describes the envisioned learning scenarios. They are summarized here; for more details see D3.1.1:

Semantic Web Education for Professionals envisions providing training programs for industrial learners such as: detailed technical courses for programmers, introductory technology seminars for software architects and executives, and individual consulting on concrete proposals for project leaders. Based on this scenario, a cooperation between the work packages *Industry* and *Education* is planned.

Shared Master Degree on Semantic Web and Ontologies outlines different levels of a shared master. Based on this scenario, University partners interested in cooperating to a shared M.Sc. course, specify administrative and organisational requirements as well as a curriculum.

Communities of Practice, Ph.D. program goes beyond the provision of courses and training programs to support learners in less formal contexts. The learning infrastructures, that is intended to construct, facilitates the creation of ontology based semantic layers over web resources to support interpretation. Furthermore, communication infrastructure supports synchronous and asynchronous communication. Tools and spaces for collaboration and communication as well as Semantic Web based learning system features support Ph.D. students and others new in the field to orient themselves and to learn by moving into the research community. Based on this scenario requirements for tools, designed in WP3.3 are specified.

Repository Usage outlines the provision and usage of a suitable infrastructure for course delivery to manage and deliver learning resources.

While all learning units are suitable for repository usage, they may be targeted to a selection of the first three scenarios. Therefore, information about intended scenarios has been explicitly requested in the questionnaire

1.2.2. Basic Repository Infrastructure

As part of WP 3.3, L3S set up and maintains two state-of-the-art portals for learning resources, namely EducaNext (http://ubp.learninglab.uni-hannover.de:3100/ EducaNext/ubp) and ARIADNE (http://kps.learninglab.uni-hannover.de:3000/silo/ and http://kps.learninglab.uni-hannover.de:3000/kpsmanager/). The courses listed here will be available via these platforms.

1.3. Questionnaire

KnowledgeWeb learning material information was collected via a questionnaire sent to all partners. The questionnaire consists of a general part and scenario-related questions. We asked for the following information:

- Title
- Abstract
- Contents
- Keywords
- Status (Planned/Available, Availability date, etc.)
- URL
- Course Elements (Slides, Exercises, etc.)
- Language
- Intended Audience
- Intended Scenario
- Comments

For learning units intended for the Shared M.Sc. Programme following information was requested:

- Number of teaching hours
- Number of credit points
- Availability as F2F course for visiting students (rsp. willingness to provide it as such)
- Availability as distance course (rsp. willingness to provide it as such)

If a learning unit was intended for Community of Practice, we asked for the following:

- Number of teaching hours
- Suitability for self-study
- Willingness to provide unit as part of a summer school
- Willingness to provide unit as distance course

For material intended for professional education we requested the following information:

- Suitability for self-study
- Willingness to provide unit as professional training

All responses can be found in the next section.

2. Detailed Learning Unit Descriptions

The content of the collected material differs significantly with respect to the topic which is covered by each learning unit. As most of the courses describe available courses which are taken from the context of a local university curriculum, it is not straightforward how to group them into different categories.
In this document, the following preliminary classification is made:

1. Foundations: This class of units covers basic topics required for the advanced courses about Semantic Web issues. Examples include courses on logics or Internet technologies.
2. Semantic Web Core: These units cover topics about basic Semantic Web characteristics, on which the special topic courses built upon. Examples are courses on knowledge representation, reasoning, or ontologies.
3. Semantic Web Special Topics: These courses deal with highly special fields in the area of Semantic Web like Semantic Web services or applications of Semantic Web technologies.

The classification will be improved further when courses are adapted to the KnowledgeWeb context

2.1. Foundations

1	**Computational Logics**
General Information	
Abstract	Introduction to Computational Logic
Participant	FUB
Contact Person	Enrico Franconi (franconi@inf.unibz.it)
Intended scenarios	Shared M.Sc. Programme, Repository Usage
Intended audience	M.Sc. Students, Ph.D. Students, Researchers
Language	English
Status	Available, must be adapted to Knowledge Web context
URL	http://www.unibz.it/inf/acs/courses02_03_y2/logic/
Consists of	Slides, Exercises, Background papers
Shared M.Sc. Programme information	
Teaching hours	24
Credit points	4
	Partner is willing to provide it as distance course within a university cooperation

2	**Description Logics**
General Information	
Abstract	Introduction to DLs
Participant	FUB
Contact Person	Enrico Franconi (franconi@inf.unibz.it)
Intended scenarios	Shared M.Sc. Programme, Repository Usage
Intended audience	M.Sc. Students, Ph.D. Students, Researchers
Language	English
Status	Available, must be adapted to Knowledge Web context
URL	http://www.inf.unibz.it/%7Efranconi/dl/course/
Consists of	Slides, Exercises, Background papers
Shared M.Sc. Programme information	
Teaching hours	24
Credit points	4
	Partner is willing to provide it as distance course within a university cooperation

3	**DLs for Conceptual Design, Information Access, and Ontology Integration**
General Information	
Abstract	Introduction to DLs for Semantic Web
Participant	FUB
Contact Person	Enrico Franconi (franconi@inf.unibz.it)
Intended scenarios	Shared M.Sc. Programme, Repository Usage
Intended audience	M.Sc. Students, Ph.D. Students, Researchers
Language	English
Status	Available, must be adapted to Knowledge Web context
URL	http://www.inf.unibz.it/~franconi/dl/course/phd-course/
Consists of	Slides, Exercises, Background papers
Shared M.Sc. Programme information	
Teaching hours	24
Credit points	4
	Partner is willing to provide it as distance course within a university cooperation

4	**Logics for knowledge representation and reasoning**
General Information	
Abstract	The main objective of this course is to provide a technical overview of the most "famous" logic families and automatic reasoning techniques applied in AI and CS. The level of the course is introductory, for each logic family we will provide, intuitions and applications, the basic syntax and semantics, and its main automatic reasoning techniques. The course does not have any prerequisite, but at each lecture students are supposed to be familiar with the subjects treated in the previous one.
Participant	UniTn
Contact Person	Luciano Serafini (luciano.serafini@itc.it)
Intended scenarios	Community of Practice, Shared M.Sc. Programme
Intended audience	M.Sc. Students, Ph.D. Students
Language	English
Status	Available, no changes necessary
URL	ttp://sra.itc.it/people/serafini/teaching/dottorato-dit/2003.html
Consists of	F2F lectures
Shared M.Sc. Programme information	
Teaching hours	20
Credit points	3
	available as F2F course for visiting students
	partner is willing to provide it as F2F course within a university cooperation
	partner is willing to provide it as distance course within a university cooperation
	partner is willing to provide it as: video of the lectures (visible on a regular browser, see comments)
	It would be possible to make a video of the course available to remote students. In case, it has to be arranged (next academic year)

5	**Internet Technologies**
General Information	
Abstract	This course starts with an introduction to basic Internet protocols, data formats and languages. Then it gives an overview of Information Retrieval Methods for the Web, covering basic Web search engine approaches. The third part consists of an introduction into P2P networks within the Internet.
Content	• Protocols for the WWW • Data Formats for the WWW • Search Technologies & Engines • Peer-to-Peer Technologies & Algorithms
Participant	L3S
Contact Person	Wolf Siberski (siberski@l3s.de)
Intended scenarios	Shared M.Sc. Programme
Intended audience	M.Sc. Students
Language	English
Status	Available, no changes necessary
URL	
Consists of	Slides, Background papers
Shared M.Sc. Programme information	
Teaching hours	24
Credit points	4
	available as F2F course for visiting students
	partner is willing to provide it as F2F course within a university cooperation

6	**A three hour introduction to XML**
General Information	
Abstract	Slides of a lecture on XML.
Participant	UniTn
Contact Person	Marco Ronchetti (marco.ronchetti@unitn.it)
Intended scenarios	Community of Practice, Shared M.Sc. Programme
Intended audience	M.Sc. Students
Language	English
Status	Available, no changes necessary
URL	http://latemar.science.unitn.it/Didattica/aa_2003_2004/Web_Programming/Settimana1/0pre01-XML.pdf
Consists of	Slides, F2F Lectures
Shared M.Sc. Programme information	
Teaching hours	3
Credit points	0
	available as F2F course for visiting students
	partner is willing to provide it as F2F course within a university cooperation
	is willing to provide it as distance course within a university cooperation
	partner is willing to provide it as: video of the lectures (visible on a regular browser, see comments)
Comments	It would be possible to make a video of the course available to remote students. In case, it has to be arranged (next academic year)

7	**Information Retrieval, Hypermedia and the Web**
General Information	
Abstract	Databases are not the only means for the storage, and subsequent retrieval of information, -- in fact databases only hold the subset of information known as "structured data". Although this constitutes the majority of data that drives the operational processes of an enterprise, it is actually the minority of information that is found in an enterprise. Documents and hypermedia are also information repositories, often referred to as semi-structured data, and forming the backbone of Digital Libraries and the Web. Work has gone on for at least a decade on how to manage and find electronic documents, and how to structure and navigate hypertexts. Work has been going on for centuries on how to manage and catalogue libraries. The Web, as a global document repository and a distributed hypermedia, makes this area of information management more important than ever. A customer or another business finding my businesses web pages is a matter of my business's survival in e-Commerce land. This course unit aims to give students an understanding of the issues and some solutions in hypermedia development, design document management and retrieval and metadata management. The case study is the Web and the “Semantic Web”.
Content	The objective of the course is that students will understand the fundamental techniques for hypermedia architectures, design and usability; document management and retrieval and metadata management. By the end of the course the student should: 1. be familiar with the fundamentals of hypermedia systems, and hypermedia design and usability methodologies, sufficient to know how to develop a good web hypermedia and why a web site is good or bad; 2. understand the difficulty of representing and retrieving documents. 3. be familiar with the classical techniques of Information Retrieval, and the additional techniques employed by Web search engines sufficient to understand how web search engines work and how they could be improved; 4. be familiar with techniques for conveying the meaning of documents or hypermedia content - for example, metadata, ontologies, thesauri, and classification taxonomies - sufficient to understand their application to the "Semantic Web"; 5. understand the latest W3C technologies for linking, describing and searching the Web; 6. understand the relationship between IR, hypermedia and semantic models.

Participant	VUM
Contact Person	Carole Goble (carole@cs.man.ac.uk)
Intended scenarios	Shared M.Sc. Programme
Intended audience	Undergraduates
Language	English
Status	Available, no changes necessary
URL	http://www.cs.man.ac.uk/ugrad/syllabus2003latest/CS3352.htm
Consists of	Slides, Lecture Notes, Background papers

2.2. Semantic Web Core

8	**Models of knowledge representation**
General Information	
Abstract	I teach how Semantic Web languages can be used to represent different types of knowledge and used to perform different kinds of reasoning. As teaching material, I use the newly published book "A Semantic Web Primer" by G. Antoniou and F. van Harmelen (published by the MIT Press).
Participant	UniTn
Contact Person	Paolo Bouquet (bouquet@dit.unitn.it)
Intended scenarios	Shared M.Sc. Programme
Intended audience	M.Sc. Students, Ph.D. Students
Language	English
Status	Available, no changes necessary
URL	
Consists of	F2F lectures
Shared M.Sc. Programme information	
Teaching hours	35
Credit points	5
	available as F2F course for visiting students
	partner is willing to provide it as F2F course within a university cooperation

9	**Knowledge Representation and Reasoning**
General Information	
Abstract	For many applications, specific domain knowledge is required. Instead of coding such knowledge into a system in a way that it can never be changed (hidden in the overall implementation), more flexible ways of representing knowledge and reasoning about it have been developed in the last 10 years. These approaches are based on various extensions of classical logic: modal logic, agents logics, or description logics. They can be used to reason about the terminology of a domain or the behaviour of systems. Computer-based tools can then use this kind of reasoning to support the user. In particular description logics have recently been used as foundational tools for the semantic web.
Content	A student completing this course unit should: – have knowledge and understanding of the syntax and semantics of modal, description, and temporalised description logics, defaults, and formal concept analysis – be able to formalise and represent knowledge in these logics and relate questions concerning this knowledge to logical reasoning problems – have knowledge and understanding of a selection of logic-based applications – be able to use standard proof systems, in particular Hilbert-style deduction and a translation-based approach for modal logics, subsumption algorithms for description logics, and the attribute exploration algorithm – be able to use various systems (SPASS, ICOM) and apply them to solve problems
Participant	VUM
Contact Person	Ulrike Sattler (sattler@cs.man.ac.uk)
Intended scenarios	Shared M.Sc. Programme
Intended audience	M.Sc. Students
Language	English
Status	Available, no changes necessary
URL	http://www.cs.man.ac.uk/Study_subweb/Postgrad/ACS-CS/webpages/syllabus/acs/CS616.html
Consists of	Slides, Lecture Notes, Exercises, Background papers
Shared M.Sc. Programme information	
Teaching hours	40
Credit points	5
	partner is willing to provide it as F2F course within a university cooperation

10	**Web-based Knowledge Representation**
General Information	
Abstract	The WWW offers a great opportunity for using well-established and new knowledge representation techniques.The aim in using these is to make web pages intended for human users accessible for machines as well. Such a web would enable a set of intelligent services such as: search-engines, information filters, adaptive web-sites a.s.o. This course presents the technology that enables the new generation of the web. It presents knowledge modeling concepts (ontologies) and knowledge representation languages developed for the web (XML, RDF, OWL). We investigate the increasing expressiveness of these languages and point out issues for future research in this field.
Content	1. The Semantic Web: an introduction + Ontologies I 2. Ontologies II 3. XML and related techniques 4. RDF and RDF Schema 5. Querying RDF 6. OWL (beyond RDF Schema) 7. Graphical applications; Stylesheets, XSL 8. Further applications
Participant	VUA
Contact Person	Frank van Harmelen (Frank.van.Harmelen@cs.vu.nl)
Intended scenarios	Shared M.Sc. Programme
Intended audience	M.Sc. Students
Language	English
Status	Available, no changes necessary
URL	http://bb.vu.nl/webapps/portal/frameset.jsp?tab=courses&url=%2Fbin%2Fcommon%2Fcourse.pl%3Fcourse_id%3D_5753_1 http://www.semanticwebprimer.org
Consists of	Slides, Exercises, Background papers, Book: "A Semantic Web Primer", G. Antoniou, F. van Harmelen,MIT Press, ISBN 0-262-01210-3
Shared M.Sc. Programme information	
Teaching hours	82
Credit points	6
	available as F2F course for visiting students
	partner is willing to provide it as F2F course within a university cooperation
	learning unit for self-study
	partner is willing to provide it as part of summer school
Comment	stable course material, in use for 3 years

11	**Ontology in a Nutshell**
General Information	
Abstract	Short introduction to ontologies in knowledge management and semantic web
Participant	INRIA
Contact Person	Fabien Gandon (Fabien.Gandon@sophia.inria.fr)
Intended scenarios	Repository only
Intended audience	M.Sc. Students, Ph.D. Students, Professionals
Language	English
Status	Available, no changes necessary
URL	http://www-sop.inria.fr/acacia/personnel/Fabien.Gandon/ research/kmss2002/
Consists of	Slides
	available as reusable material for lecturers

12	**Course on Ontologies**
General Information	
Abstract	Introduction to: problems solved by ontologies in information retrieval, ontoogies, knowledge modelling, ontology life-cycle, knowledge representation formalisms, examples of ontologies, special case of SW, ontologies and multiagent systems
Participant	INRIA
Contact Person	Fabien Gandon (Fabien.Gandon@sophia.inria.fr)
Intended scenarios	Repository only
Intended audience	M.Sc. Students, Ph.D. Students
Language	French
Status	Available, no changes necessary
URL	ttp://www-sop.inria.fr/acacia/personnel/Fabien.Gandon/lecture/emse_ontologie2002/
Consists of	Slides, Exercises
	available as: reusable material for lecturers

13	**The Semantic Web: Ontologies and OWL**
General Information	
Abstract	Knowledge representation and "ontologies" are becoming critical to the development of the next generation Web ("The Semantic Web" and "meta data"). The course will present the knowledge representation paradigms used in a variety of applications including current research in the department in "E-Science" and theWeb. Describing web resources with metadata expressed using ontologies is a key step towards achieving effective 'agent based' applications to automate web operations.
Content	A student successfully completing this course unit should: 1) Be able to discuss/explain the general principals of semantic networks, frames, rules (A), 2) Be able to discuss/explain KR/ontology languages designed for the world wide web, in particular the new Web Ontology Language (OWL) (A, B), 3) Understand the syntax, semantics and decision procedures for the family of description logics which underpin OWL (A), 4) Know the common ontological structures and principles of ontology development , have an appreciation of ``why it's hard", and to be able to write critically about current work on the ``Semantic Web" (A, B), 5) Be able to design and build ontologies in OWL using the de facto standard editor, OilEd, justify and evaluate their design (B, C), and explain their behaviour.
Participant	VUM
Contact Person	Ian Horrocks (horrocks@cs.man.ac.uk)
Intended scenarios	Shared M.Sc. Programme
Intended audience	M.Sc. Students
Language	English
Status	Available, no changes necessary
URL	http://www.cs.man.ac.uk/~horrocks/Teaching/cs646/
Consists of	Slides, Lecture Notes, Exercises, Background papers
Shared M.Sc. Programme information	
Teaching hours	40
Credit points	15
	partner is willing to provide it as F2F course within a university cooperation

14	**Ontological Engineering and the Semantic Web**
General Information	
Abstract	Ontologies provide a common vocabulary of an area and define, with different levels of formality, the meaning of the terms and the relationships between them. Ontological Engineering refers to the set of activities that concern the ontology development process, the ontology life cycle, the methods and methodologies for building ontologies, and the tool suites and languages that support them. During the last decade, increasing attention has been focused on ontologies. Ontologies are now widely used in Knowledge Engineering, Artificial Intelligence and Computer Science; in applications related to areas such as Knowledge Management, Natural Language Processing, e-Commerce, Intelligent Information Integration, Bio-Informatics, Education; and in new emerging fields like the Semantic Web. This learning unit presents the major issues of Ontological Engineering and describes the most outstanding ontologies that are currently available. It covers the practical aspects of selecting and applying methodologies, languages, and tools for building ontologies.
Content	Theoretical foundations of ontologies The most outstanding ontologies Methods and methodologies to build ontologies Ontology languages Ontology development tools Ontology-based applications
Participant	UPM
Contact Person	Asunción Gómez-Pérez (asun@fi.upm.es)
Intended scenarios	Community of Practice, Shared M.Sc. Programme, Education for Professionals
Intended audience	M.Sc. Students, Ph.D. Students, Researchers, Professionals
Language	English, Spanish
Status	Available, no changes necessary
URL	http://webode.dia.fi.upm.es/ontologicalengineering/
Consists of	Slides, Exercises, Book "Ontological Engineering" (Springer-Verlag)
Shared M.Sc. Programme information	
Teaching hours	40
Credit points	4
	available as F2F course for visiting students
	partner is willing to provide it as distance course within a university cooperation
Community of Practice information	
Teaching hours	30

	learning unit for self-study
	partner is willing to provide it as part of summer school
	partner is willing to provide it as distance course/lecture
Education for Professionals information	
	learning unit for self-study
	partner is willing to provide it as professional training
Comments	During the whole learning unit, the same case study is used to present all the contents: methods and methodologies, tools, and languages.

15	**Semantic Web Information Day**
General Information	
Abstract	The Information Day gives an overview of the fundamental concepts and technologies of the Semantic Web. It enables you to incorporate the buzzword "Semantic Web" into your lexicon. Furthermore it gives you an opportunity to evaluate the meaning of the Semantic Web for your existing and future projects.
Content	Overview of the Semantic Web; Standards around the Resource Description Framework; Ontologies; Applications, Current Research and Future Vision.
Participant	FUBerlin
Contact Person	Prof. Dr. Robert Tolksdorf (tolk@inf.fu-berlin.de)
Intended scenarios	Education for Professionals
Intended audience	Professionals
Language	German
Status	Available, no changes necessary
URL	http://swit.xml-clearinghouse.de/1/
Consists of	Slides
Education for Professionals information	
	learning unit for self-study
	partner is willing to provide it as professional training

16	**RDF for the Semantic Web**
General Information	
Abstract	Presentation of RDF and RDF Schema
Participant	INRIA
Contact Person	Olivier Corby (Olivier.Corby@sophia.inria.fr)
Intended scenarios	Repository usage only
Intended audience	M.Sc. Students, Ph.D. Students
Language	English, French
Status	Available, must be adapted to Knowledge Web context
URL	
Consists of	Slides

17	**Intelligente Systeme im WWW**
General Information	
Abstract	Im Web der Zukunft spielt Wissen im E-Commerce und in Internetportalen die zentrale tragende Rolle. Wissen kann nur mit Hilfe von Semantik vermittelt werden. Das "Semantic Web", ein Begriff geprägt von Tim Berners-Lee, dem Erfinder des World Wide Web, bezeichnet die intelligente Anwendung des WWW für die Übermittlung und den Austausch von Inhalten, die für Maschinen und Menschen gleichermaßen verständlich sind. Grundlage für das Semantische Web sind Methoden der Modellierung, der Datenbankprogrammierung, und der Künstlichen Intelligenz aus denen innovative Technologien und Dienstleistungen entstehen, die leichteres Teilen von Wissen ermöglichen. Die Vorlesung "Intelligente Systeme im WWW" behandelt Methoden aus den angesprochenen Bereichen und zeigt wie Software-Agenten das Semantic Web der Zukunft für Wissensportale, B2B und B2C nutzen können.
Content	1. Intro (ca. 1 Doppelstunde) 2. Sprachen im Semantic Web (ca. 5 Doppelstunden) 3. Ontology Engineering (ca. 1 Doppelstunde) 4. Metadata (ca. 1 Doppelstunde) 5. Peer-to-Peer (1 Doppelstunde) 6. Web Services (1 Doppelstunde)
Participant	UKARL
Contact Person	Max Völkel (mvo@aifb.uni-karlsruhe.de)
Intended scenarios	Community of Practice
Intended audience	Ph.D. Students
Language	German
Status	Available, no changes necessary
URL	http://www.aifb.uni-karlsruhe.de/Lehre/Sommer2004/ISWWW/
Consists of	Slides, Exercises, Background papers
Community of Practice information	
	learning unit for self-study

18	**Einführung in das Semantic Web**
General Information	
Abstract	The amount of information available over the Internet is increasing from day to day. Still, smart technologies for selecting, accessing, and processing information are lacking: Currently, mainly search robots are used that search for available information in the Internet. Access patterns, link information etc. are used to determine the relevance of retrieved information. One of the major issues for improving the way how people interact with the semantic web will be to enable machines to get some understanding of the semantics of the information they process - to create a "semantic web".
Content	Semantic Web, Metadata, XML Technologies, Taxonomies, Ontologies, RDF,RDF Schema, Web Ontology Languages, Logic and Inference in the Semantic Web, Web Personalization, Recommender- and Filtering Systems, Adaptive Hypermedia.
Participant	L3S
Contact Person	Nicola Henze (henze@kbs.uni-hannover.de)
Intended scenarios	Shared M.Sc. Programme
Intended audience	M.Sc. Students
Language	English/German
Status	Available, no changes necessary
URL	http://www.kbs.uni-hannover.de/-henze/semweb04/
Consists of	Slides, Exercises, Book: Grigoris Antoniou, Frank Van Harmelen: A Semantic Web Primer
Shared M.Sc. Programme information	
Teaching hours	24
Credit points	
	available as F2F course for visiting students
	partner is willing to provide it as F2F course within a university cooperation
	learning unit for self-study
Comments	Materials are partly in German, mainly in English

2.3. Semantic Web Special Topics

19	**Upgrade legacy content to the Semantic Web**
General Information	
Abstract	One of the biggest problems we nowadays face in the information society is information overload. The Semantic Web aims to overcome this problem by adding meaning to the Web, which can be exploited by software agents to whom people can delegate tasks. The aim of learning unit is to show how to bridge the gap between the actual World Wide Web and the Semantic Web by using ontology-based services available to "upgrade" existing content to Semantic Web content.
Content	How to develop ontologies: methods, tools and languages How to annotate content: methods and tools How to build applications on top of annotated content Success stories
Participant	UPM, iSOCO
Contact Person	Asunción Gómez-Pérez (asun@fi.upm.es)
Intended scenarios	Education for Professionals
Intended audience	Professionals
Language	English, Spanish
Status	Available, must be adapted to Knowledge Web context
URL	
Consists of	Slides, Lecture notes, Exercises
Education for Professionals information	
	partner is willing to provide it as professional training
Comments	The contents of this learning unit are based on the success stories of migrating legacy content to the Semantic Web in the context of the EU Esperonto project (IST-2001-34373)

20	**Semantic Web Services**
General Information	
Abstract	Content based on John Domingue's contribution to the Ontoweb Summer School on Semantic Web Services. probably powerpoint slides + exercises for practical work, PhD students mostly, available in 6 months
Participant	OU
Contact Person	John Domingue (j.b.domingue@open.ac.uk)
Intended scenarios	Community of Practice, Education for Professionals
Intended audience	Ph.D. Students, Professionals
Language	English
Status	Planned
URL	
Consists of	Slides, Exercises
Community of Practice information	
	learning unit for self-study
	partner is willing to provide it as part of summer school
Education for Professionals information	
	learning unit for self-study

21	**Introduction to Human Language Technology for the Semantic Web**
General Information	
Abstract	The Semantic Web (SW) is adding a machine-tractable layer to the natural language web of HTML. The Grid initiative is constructing infrastructure for distributed collaborative science, or e-science. Web Services are driving the decomposition of monolithic software into flexible component sets that can be reconfigured to keep ahead in rapidly changing markets. The three areas are closely linked: web technology is essential to the Grid; the Semantic Web and the Grid are co-penetrating to form the Semantic Grid; Web Services underpin the next generation of the Grid in the Open Grid Services Architecture; Semantic Web Services (SWSs) allow dynamic construction of applications from component services, and better service description and discovery. Together these developments represent the next stage of evolution for the web, distributed computing and collaborative science. Key to the success of the enterprise is the production and maintenance of formal data. The SW and SWSs rely on formal semantics in the shape of ontologies and related instance sets, or knowledge bases. Whereas the simplicity of HTML and the ubiquity of natural language led to the organic growth of the hypertext web, semantic data is harder to create and maintain. HLT provides the missing link between language and formal data, the glue to fix web services to their user constituency and enable easier enterprise integration.
Content	This tutorial will cover the use of HLT for the Semantic Web and Web Services.
Participant	USFD
Contact Person	Hamish Cunningham (hamish@dcs.shef.ac.uk)
Intended scenarios	Community of Practice
Intended audience	Ph.D. Students, Researchers, Professionals
Language	English
Status	Available, must be adapted to Knowledge Web context
URL	http://gate.ac.uk/sale/talks/sekt-tutorial.ppt (previous version)
Consists of	Slides, Web-based materials
Community of Practice information	
Teaching hours	4
	partner is willing to provide it as part of summer school
	partner is willing to provide it as distance course/lecture
Comments	The material will be adapted from the tutorial given by USFD at ESWS 2004.

22	**Knowledge Assisted Multimedia Content Analysis Using Semantic Web Technologies**
General Information	
Abstract	Analysis of audiovisual content is assisted with the use of knowledge based on a multimedia ontology infrastructure. The knowledge represenation enables the detection of audiovisual objects, which correspond to the semantic concepts defined in the ontology. Semantic Web technologies and inference rules can also be used for the definition of semantically important events. This multimedia analysis approach provides a framework for ontology-based annotation, search and retrieval of multimedia content. The presentation also includes an overview of existing multimedia analysis, annotation and search and retrieval applications.
Participant	CERTH
Contact Person	Yiannis Kompatsiaris (ikom@iti.gr)
Intended scenarios	Community of Practice, Shared M.Sc. Programme
Intended audience	M.Sc. Students, Ph.D. Students
Language	English, Greek
Status	Available, must be adapted to Knowledge Web context
URL	
Consists of	Slides, Background papers
Shared M.Sc. Programme information	
Teaching hours	32
Credit points	
	available as F2F course for visiting students
	partner is willing to provide it as F2F course within a university cooperation
	available as distance course
	partner is willing to provide it as distance course within a university cooperation
Community of Practice information	
Teaching hours	35
	partner is willing to provide it as part of summer school
	partner is willing to provide it as distance course/lecture

23	**Semantic portal technology**
General Information	
Abstract	This learning unit shows an overview of the technology available for building semantic portals. It focuses on their architectural design and their content management and user customisation capabilities. Specifically, in this learning unit the ODESeW platform is described in detail. With this learning unit professionals will be able to create at a minimum effort scalable, reliable and customised semantic portals for their organisations.
Content	Overview of semantic portal technology Architectural design of semantic portal technology: tools available and their integration Content management User customisation Semantic portal 101: how to create a semantic portal with ODESeW
Participant	UPM, iSOCO
Contact Person	Asunción Gómez-Pérez (asun@fi.upm.es)
Intended scenarios	Education for Professionals
Intended audience	Researchers, Professionals
Language	English, Spanish
Status	Planned
URL	
Consists of	Slides, Lecture notes, Exercises, Background papers
Education for Professionals information	
	partner is willing to provide it as professional training

24	**Wissensmanagement**
General Information	
Abstract	In einem modernen Unternehmen spielt Wissen bei der Erfüllung von zentralen Unternehmensaufgaben (der Verbesserung von Geschäftsprozessen, der Produktinnovation, der Erhöhung der Kundenzufriedenheit, der strategischen Planung, usw.) eine immer wichtigere Rolle. Damit wird Wissensmanagement zu einem eminent wichtigen Erfolgsfaktor. Die Vorlesung befaßt sich mit den verschiedenen Arten von Wissen, die beim Wissensmanagement eine Rolle spielen, den zugehörigen Wissensprozessen (Wissensgenerierung, -erfassung, -zugriff und -nutzung) sowie Methodologien zur Einführung von Wissensmanagementlösungen. Schwerpunkmäßig werden Informatikmethoden zur Unterstützung des Wissensmanagement in Intranet-Umgebungen vorgestellt, insbesondere für die gemeinsame Nutzung und Abfrage von Wissen sowie die Navigation in Wissensstrukturen. Hierzu gehören Ontologien zur Wissensmodellierung und -strukturierung, Wissensportale und Fallbasierte Schließen. Ferner werden grundlegende Konzepte eines Data Warehouse eingeführt. Typische Wissensmanagement-Anwendungen werden diskutiert. In Rechenübungen werden die gelehrten Methoden angewendet.
Content	1. Einführung - Was ist Wissensmanagement? 2. Ontologiebasiertes Wissensmanagement 3. Topic Maps 4. Community of Practice 5. Praxis-Vortrag 6. Case-based Reasoning (CBR) 7. Data Warehouse (DWh)
Participant	UKARL
Contact Person	Max Völkel (mvo@aifb.uni-karlsruhe.de)
Intended scenarios	Community of Practice
Intended audience	Ph.D. Students
Language	German
Status	Available, no changes necessary
URL	http://www.aifb.uni-karlsruhe.de/Lehre/Sommer2004/wm/
Consists of	Slides, Exercises
Community of Practice information	
	learning unit for self-study

3. Conclusions

This document contains the description of 24 learning units which have been collected for the learning material repository to be used within the Virtual Institute for Semantic Web Education (VISWE). From these 24 units, 15 are ready for usage within the KnowledgeWeb context, seven have to adapted to this context, and two are currently planned so they do not exist yet.
As the collected units which are already available describe courses, which are already existent as local lecture, the associated materials are mainly intended for local usage also. However, for 22 units slides, lecture notes, and information about background literature are already available, which could be used as a starting point for distant lectures. For eight courses, especial interest in providing distant lectures was expressed. Four courses were suggested for usages within a summer school, nine courses could be offered as face-to-face lectures, and seven courses are also suited for self-studying.
In summary, there is already quite some material available covering a significant amount of Semantic Web related topics. However, some of the courses are to be instantiated yet, or adapted to the KnowledgeWeb context. Further courses are under preparation such as the courses for the summer school 2004 and the subsequent summer schools, which will be a significant addition to the learning unit repository. More courses may become necessary when the curricula offered in the VISWE context will be defined. Thus, this collection will be enhanced in the future. The learning material classification is very preliminary. We need to develop this classification further version in cooperation with REWERSE and the other projects of the SDK cluster.

Appendix A. REWERSE Learning Unit Collection

This appendix contains the questionnaire description and results of the REWERSE 'sibling deliverable E-D1. A.1 describes the REWERSE questionnaire, A.2 gives an overview of the collected courses, and A.3 contains the details for each course. KnowledgeWeb courses are not repeated. However, we left them in the overview list and did not re-number the courses to stay in synch with the original REWERSE deliverable. Instead we have added the KnowledgeWeb learning unit number to the course list in A.2.

A.1. Questionnaire

Implementing the work plan of REWERSE an Education and Training the coordinators of the ET work package requested from the REWERSE participants the information about offered and planned courses relevant, in their opinion, for the Semantic Web Education. The intention was to investigate the possibility of integration of some of them, or their modified variants into the planned Semantic Web curriculum. The information is also to be used by the REWERSE Technology Transfer and Awareness package for planning of industrial courses and possibly also for adaptation of existing university courses for industrial needs.

The request was to fill a web questionnaire including the following items:

- Contact person
- REWERSE participant (selected from the list of NoE participants)
- Title
- Status: already offered (last run) / planned
- Type: traditional face-to-face/other (which?) and number of hours
- Intended audience (master students/ Ph.D. students /other (which?))
- Homepage: URL if any
- Abstract
- Contents
- Literature
- Other available learning materials
- Language: English/other
- Comments (optional)

The deadline for the response was in April 2004. The topics of the questionnaire were used as a basis for design of the tabular course descriptions in the Appendix. For Bach response to the web questionnaire, describing a single course a table structured according to the topics above has been automatically created. Each table was inspected and if necessary edited to make the presentation as uniform as possible for further comparison. In case of missing/incomplete items an attempt was made to augment them by using the information provided at the course homepage and/or by the contact person. In some of these cases, being unable to obtain the missing information we decided to keep an incomplete course description in the list rather than removing it.
A.2 contains a list of the courses with their reference numbers and titles. As the Appendix integrates course information from different sources, each position of the list, and Bach respective table, also indicates the origin: REWERSE, knowledgeweb, Heraklion collection, or Budapest. Note that we left KnowledgeWeb courses here to keep the numbering from REWERSE. A.3 provides full descriptions of the respective courses. Knowledgeweb courses are omitted here, as they are already listed in 2.

A.2. Learning Units List

To facilitate comparisons this overview contains two lists which contain the learning units depending on the number of teaching hours. The first category of long courses includes those with more than 10 teaching hours. Most of them are actually full-term master courses. Short courses, which usually have very different objectives from the long ones, belong to the second category. For example some of them are single introductory lectures.
Courses in each section are sorted in the alphabetic order of their titles. In this way courses obtain numbers, used as references to the Appendix in the rest of this report. The references to short courses are suffixed with "s". For example [1] is the reference of the first course of the long course category, while [ls] is the reference of the first course of the short course category.

Full Courses

Index	Title	Origin

1	Agent-Based Internet Computing	H
2	Artificial Intelligence and Machine Learning	R
3	Computational Logics	K **1**
4	Constraint Programming	R
5	Constraint Reasoning and Programming	R
6	Course on Ontologies	K **12**
7	Database Technology	R
8	Description Logics	K **2**
9	DLs for Conceptual Design, Information Access, and Ontology Integration	K **3**
10	Foundations of the Semantic Web	H
11	Foundations of the Semantic Web and Ontology Management	H
12	Global Information Systems	H
13	Information Retrieval, Hypermedia and the Web	K **7**
14	Integrated Logic Programming	R
15	Intelligent Agents: modeling and reasoning techniques	R
16	Intelligent Systems in WWW (Intelligente Systeme im WWW)	K **17**
17	Introduction to Human Language Technology for the Semantic Web	K **21**
18	Issues an Knowledge Representation an the Web	R
19	Knowledge Assisted Multimedia Content Analysis Using Semantic Web	K **22**
20	Knowledge Base Programming with Frames and Logic	R
21	Knowledge Management an the Web	R
22	Knowledge Representation and Reasoning	K **9**
23	Knowledge management	K **24**
24	Laboratory of Web Applications	R
25	Logic for Computer Scientists	R
26	Logic Programming	R
27	Logics for Computer Science	R
28	Logics for knowledge representation and reasoning	K **4**
29	Logics for the Web	R
30	Models of knowledge representation	K **8**
31	Nonmonotonic reasoning and security	R
32	Ontology in a Nutshell	K **11**
33	RDF for the Semantic Web	K **16**
34	Security and privacy	R
35	Semantic Web	R
36	Semantic Web	R
37	Semantic Web	H
38	Semantic Web	H
39	Semantic Web	H
40	Semantic Web and Intelligent Agents	H
41	Semantic Web Services	K **20**
42	Semantic Web: Models and Query Languages	H
43	Semistructured Data	R
44	Semistructured Data and XML	R
45	Software Agents	R
46	Technologies of the Web based Information Systems	R
47	The Semantic Web	H
48	The Semantic Web: Ontologies and OWL	R
49	Web Data Management	R
50	Web-based Knowledge Representation	K **10**
51	XML and Databases	R

Short Courses

Index	Title	Origin
1s	A three hour introduction to XML	K **6**
2s	Brief introduction to ANT	K -
3s	Brief introduction to JNDI	K -
4s	Introduction to business rules	R
5s	Semantic Web Information Day	K **15**

A.3. Detailed Descriptions

Index	1
Origin	Heraklion's collection
Partner	n/a
Contact person	Manolis Koubarakis manolis@intelligence.tuc.gr
Title	Agent-Based Internet Computing
Status	Already offered, last run: 2004
Course type	Traditional, 20 teaching hour(s)
Intended audience	Master students
Course page	http://www.intelligence.tuc.gr/-agents/
Abstract	The Course gives an introduction to techniques and methods related to application of logics in Semantic Web with focus an knowledge representation and reasoning techniques.
Contents	Knowledge representation and reasoning. Propositional logic and first-order logic (FOL). Using FOL to represent knowledge. Model theory, proof theory and inference for FOL. Unification, forward and backward chaining, resolution. Knowledge engineering, ontologies, example applications. Logic programming, Prolog, Datalog and database querying, theorem provers, constraint logic programming. Advanced knowledge representation languages: semantic data models, frame sys tems, terminological logics and higher-order logics. Example languages: Telos, CLASSIC and F-logic. Ontologies and knowledge representation in the age of the Web. The Semantic Web. Knowledge representation with Semantic Web Languages RDF(S) and OWL. The New Frontier: Agents, Semantic Web, P2P Computing and Grid Computing.
Literature	Stuart Russel and Peteer Norvig. Artificial Intelligence: A modern Approach, Prentice Hall, lst edition or 2nd edition(2002). Ivan Bratko. Prolog Programming for Artificial Intelligence, 2nd edition. Grigoris Antoniou and Frank Van Harmelen. A Semantic Web Primer, MIT Press. 2004.
Materials	slides
Language	Other
Comments	

Index	2
Origin	REWERSE
Partner	Turin
Contact person	Alberto Martelli mrt@di.unito.it
Title	Artificial Intelligence and Machine Learning
Status	Already offered, last run: 2002-2003
Course type	Traditional, 54 teaching hour(s)
Intended audience	Master students
Course page	http://www.di.unito.it/-botta/didattica/iaml.html
Abstract	This course introduces the Student to the artificial intelligence areas of reasoning, planning, and learning. The students are supposed to have basic notions about AI and logics.
Contents	Reasoning mechanisms: - logical resolution - non-monotonic reasoning - truth maintanance systems - approximate reasoning - qualitative reasoning Planning: - non-linear, hierarchical, conditional planning - planning and acting Learning: - learning from examples - genetic algorithms - learning in knowledge bases Specialistic seminars
Literature	- N.J. Nilsson: Principles of artificial intelligence, Springer-Verlag, 1982 - S. Russell, P. Norvig: Artificial Intelligence: A Modern Approach, Prentice Hall, 1997 - S. Russell, P. Norvig: Intelligenza Artificiale: Un Approccio Moderno, UTET, 1998 - M. Ginsberg: Essentials of Artificial Intelligence, Morgan Kaufmann, 1993 - T. Mitchell: Machine Learning, McGraw-Hill, 1997
Materials	slides
Language	Other
Comments	

	4
Origin	REWERSE
Partner	Paris
Contact person	Francois Fages Francois.Fages@inria.fr
Title	Constraint Programming
Status	Already offered, last run: 2nd semester 2004
Course type	Traditional, 20 teaching hour(s)
Intended audience	Master students
Course page	http://contraintes.inria.fr/-vages/Teaching
Abstract	This course provides an introduction to constraint programming with a strong focus an logics and semantics. It introduces some advanced topics an concurrent constraint programming and linear logic. The course can be adapted however to various audience by focusing either an the logical properties of constraint systems and languages, an the constraint solving methods or an the applications of constraint programming.
Contents	1. Introduction 2. Logical background, complete theories and decidability of constraint languages 3. Constraint Logic Programming I: programs, examples CLP (H,B,FD,R), constraint propagation algorithms 4. Constraint Logic Program ming II: operational and fixpoint semantics, abstract interpretation, constraint based model checking 5. Constraint Logic Programming III: logical semantics, automated deduction, higher-order 6. Concurrent Constraint Programming I: operational semantics and examples 7. Concurrent Constraint Programming II: denotational semantics and constraint propagation B. Concurrent Constraint Pro gramming III: linear logic semantics
Literature	K.R. Apt. Principles of Constraint Programming. Cambridge University Press. 2003. F. Fages. Programmation Logique avec Contraintes. Ellipses, Paris, 1996.
Materials	slides, lecture notes
Language	English
Comments	

Index	5
Origin	REWERSE
Partner	Cairo
Contact person	Slim Abdennadher slim.abdennadher@guc.edu.eg
Title	Constraint Reasoning and Programming
Status	Already offered, last run: 2002
Course type	Traditional, 36 teaching hour(s)
Intended audience	Master students, PhD students, summer school, industrial
Course page	http://www.pms.informatik.uni-muenchen.de/lehre/constraints/
Abstract	The use of constraints had its scientific and commercial breakthrough in the 1990s. Programming with constraints makes it possible to model and specify problems with uncertain, incomplete information and to solve combinatorial problems, as they are abundant in industry and commerce, such as scheduling, planning, trans portation, resource allocation, layout, design, and analysis. Constraint-based Pro gramming languages enjoy elegant theoretical properties, conceptual simplicity, and practical success. The idea of constraint-based programming is to solve problems by simply stating constraints (conditions, properties) which must be satisfied by a solution of the problem. Constraints can be considered as pieces of partial information. Con straints describe properties of unknown objects and relationships between them. Constraints are formalized as distinguished, predefined predicates in first-order predicate logic. The unknown objects are modeled as variables. For example, consider a bicycle number lock. We forgot the first digit, but re member some constraints about it: The digit was an odd number, greater than 1, and not a prime number. Combining the pieces of partial information expressed by these constraints (digit, greater than 1, odd, not prime) we are able to derive that the digit we are looking for is "9". As it run., a constraint program successively generates constraints. As a special program, the constraint solver stores, combines, and simplifies the constraints until a solution is found. The partial solutions can be used to influence the run of the program.
Contents	The theoretically well-founded presentation includes application examples from real life. It introduces the common classes of constraint programming languages and constraint systems in a uniform way. We first introduce the basic ideas behind the family of (concurrent) constraint logic programming languages in a calculus based framework. Constraint solving algorithms are specified and implemented in the constraint handling rules language (CHR). in a uniform high-level executable notation. We will present some of the most common constraint domains, their solvers and applications such as Boolean constraints for circuit design, linear polynomial equa tions for financial and engineering applications and finite domains for scheduling. This course was last held at the University of Pisa in 1999 and 2002. It can be combined with a practical lab course using the free Yap Prolog or the commercial Sicstus Prolog constraint logic programming language. The family of (concurrent) constraint logic programming languages Preliminaries of Syntax and Semantics Constraint logic programming (incl. Prolog) Concurrent committed-choice constraint logic programming Constraint handling rules (CHR) Constraint systems and their solvers Rational Trees Feature Terms Description Logic Boolean Constraints Finite Domains Linear polynomial equations Non Linear polynomial equations Applications Commercial applications, market and companies Case study Munich

	rent advisor an the internet Case study Planning wireless telecommunication Case study Timetabling and Roomplanning
Literature	T. Frühwirth and S. Abdennadher, Essentials of Constraint Programming, Text book, Springer Verlag, March 2003. Kim Marriott and Peter J. Stuckey, Programming with Constraints, MIT Press, USA.
Materials	slides, exercises
Language	English 21
Comments	

Index	7
Origin	REWERSE
Partner	Skövde
Contact person	Mikael Berndtsson spiff@ida.his.se
Title	Database Technology
Status	Already offered, last run: Sep-Dec 2003
Course type	Traditional, 24 teaching hour(s)
Intended audience	Master students
Course page	http://www.ida.his.se/ida/kurser/database-systems/
Abstract	This course aims to introduce students to the new generation of database systems, giving them a critical introduction to developments in database modelling and changes in supporting theory, technology, standards and tools. The course covers 5 study points (7.5 ECTS). Students completing this course should be able to demonstrate good knowledge of the state of the art in advanced database systems, and be able to critically appraise developments in this demanding and rapidly expanding field. They should be able to demonstrate that they can appropriately select and use database systems, techniques and tools in a broader information systems environment.
Contents	The course will have three main themes: database modelling and Support; database support for enterprise computing; and cooperative information systems. Each is described briefly below. The trend towards broader applicability of database systems is unrelenting. Such broadening has significant implications for the data models used and the tools to support the use of these richer models. Efforts by the standardisation commit tees to reflect these pressures has also been immense. Major topics will include: developments in SQL and related standards, design transparency, interchange of model information between tools and the evaluation of CASE tools. Enterprise requirements for information access are continually growing, with in creasing demands for effective support for wider access to all enterprise data. This may be in the form of data warehousing to support data mining, or database Sup port within the context of enterprise intranets and the WWW. These issues will be explored under the heading of database support for enterprise computing. There will be an introduction to active database functionality, both as a support ing technology for database functionality and as a means for capturing business rules at the database level. At the level of database funtionality, the course will highlight the use of active capabilities in supporting cooperative behaviour be tween autonomous information systems. Such cooperative information systems offer significant promise for future large-scale information systems integration.
Literature	http://www.ida.his.se/ida/kurser/database-systems/kursmaterial/references/references.html
Materials	slides
Language	English
Comments	The link is to the old web page. During summer 2004 we will revise the web pages, including the change of the course name to "database technology". Within the "active database" module, we have started to introduce papers that targets active rules for the web. For next semester, we will have one active database lecture and (probably) two lectures an active rules technology for the semantic web.

Index	10
Origin	Heraklion's collection
Partner	n/a
Contact person	Volker Haarslev haarslev@cs.concordia.ca
Title	Foundations of the Semantic Web
Status	Already offered, last run: Winter 2004
Course type	Traditional, 14 teaching hour(s)
Intended audience	Master students, PhD students
Course page	http://www.cs.concordia.ca/
Abstract	Web markup languages, World Wide Web Consortium (W3C) standards, extend able markup language (XML), resource description framework (RDF), Schema for markup languages, Semantic Web, ontology development, markup languages for ontologies, ontology inference layer (OIL), DARPA agents markup language (DAML), DAML+OIL, ontology web language (OWL), logical foundations of on tologies, frame languages, description logics.
Contents	The lectures will cover the following topics: Description Logics Basics of XML RDF Ontology Web Language (OWL) Ontology Design
Literature	Spinning the Semantic Web: Bringing the World Wide Web to Its Full Potential by Dieter Fensel (Editor), et al; Hardcover - 392 pages 1 edition (February 1, 2003) M.I.T. Press/Triliteral ; ISBN: 0262062321. The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management by Michael C. Daconta (Author), et al; Paperback - 312 pages 1 edition (May 16, 2003) John Wiley & Sons Canada, Ltd. ; ISBN: 0471432571.
Materials	slides, exercises
Language	English
Comments	

Index	11
Origin	Budapest University of Technology and Economics
Partner	Other
Contact person	Gergely Lukacsy lukacsy@cs.bme.hu
Title	Foundations of the Semantic Web and Ontology Management
Status	Already offered, last run: 2003/2004 spring semester
Course type	Traditional, 4 hours/week teaching hour(s)
Intended audience	Master students, PhD students
Course page	http://www.cs.bme.hu/ stilgar/vima9000/index.html
Abstract	The course provides two approaches for the semantic web. We talk about the creation of intelligent search engines, how RDF could help in this, what are RDF schemas, RDF query languages and so on. However we also introduce the concept of Description Logic, the inference algorithms an DL Tboxes/Aboxes and its ap plication in conventional information and knowledge management systems. The two approaches meet in the language OWL. Basically we prefer a well established and precise discussion an Semantic Web. For example, at the time we introduce the language OWL, we have already talked about all the DL constructs available in OWL (including nominals and datatypes also).
Contents	We Start with the theory of search engines, Show how google page ranking algo rithm works, what are the bottlenecks of efficient and intelligent internet search. Then we introduce the concept of the semantic web, XML, RDF and RDF schemas. We talk about RDF query languages, how to put RDF information to the web. In the middle of the course we Start to talk about base logic concept, first-order logic, then description logic. We introduce the concept of TBox/ABox, the Semantic of DL, the possible inferences. Then, we talk about concrete algo rithms, such as Tableau, etc. From ALC tableau, step by step we reach SHIQ and RIQ based Tableau. At the end of the course we introduce OWL (it seems very easy to talk about it after DL concepts) and the model theory of RDF and its problems.
Literature	The coursebook is currently being written. Parts of it are available as lecture notes at the course home page (for now, only in hungarian).
Materials	slides, exercises, lecture notes
Language	Other
Comments	This is a Hungarian course at the Budapest University of Technology and Eco nomics, intended for computer science students. The course takes 13 weeks to complete with small homework and big homework assignments, mid-term and fi nal exam. Small homeworks included creation of RDF data and RDF schemas, using interactive editors. Big homework could be selected as either: write a pro gram which could visualize an RDF graph, write a program which impements ALCN Tableau algorithm.

Index	12
Origin	Heraklion's collection
Partner	n/a
Contact person	Amit Sheth amit@cs.uga.edu
Title	Global Information Systems
Status	Already offered, last run: 2003
Course type	Traditional, teaching hour(s)
Intended audience	Master students, PhD students
Course page	http://lsdis.cs.uga.edu/GlobalInfoSys/
Abstract	This course deals with architecture, infrastructure, enabling technologies and ap plications of Web-based Information Systems. We are particularly interested in information systems and e-services that support large enterprises (e.g., Enterprise Content Management), that span multiple enterprises (e.g., CRM), and are pan Web (e.g., Internet Search Engines). This is an advanced course involving topics in Internet/WWW, Database Man agement, Information Systems, Information Retrieval and and other related fields.
Contents	Examples of Global Information Systems: -Within enterprises: Enterprise Con tent Management, Inta-Enterprise Portals -Across Enterprises: B2B and e-service applications -Pan-Web: Search Engines Conceptual bases of dealing with data/information: Syntax, Structure and Se mantics; Data, Metadata, Information, Knowledge Understanding types of data and their management an the Web: -Unstructured data -Semi-structured data -Structured data Semi-structured data management and its importance to Global Information Sys tems; XML for data exchange, XML Schema, XML Query, native and non-native XML data management Metadata, metadata standards, RDF and metadata processing, RDFS, RDF Query, RDF storage and management Techniques for Content/data management: -Classification and categorization - metadata extraction Tools and possibly one commercial product Core technologies and product categories: Application Servers, EAI, etc. Research/Emerging Issues, Commercial Landscape: -Semantics : Ontology, OWL -Component architecture based an Web Services, Web Service Standards and Technologies, SOAP, WSDL, UDDI
Literature	
Materials	literature
Language	English
Comments	

Index	14
Origin	REWERSE
Partner	Dresden
Contact person	Michael Schroeder ms@mpi-cbg.de
Title	Integrated Logic Programming
Status	Planned, start date: Oct 2004
Course type	Traditional, 14 teaching hour(s)
Intended audience	Master students
Course page	
Abstract	The module is just planned and not all details are laid out. The basic idea is to take information integration applications (in bioinformatics) and apply web and logic programming to solve the problems. Thus the module will build upon things done in REWERSE. Sample applications are - LP and Java - LP and DB access - LP and XML - LP and distributed computing - Rules to specify and execute distributed workflows - Rules and constraints for fold prediction - Rules to reason over ontologies
Contents	Details are not yet clear
Literature	
Materials	slides
Language	English
Comments	

Index	15
Origin	REWERSE
Partner	Turin
Contact person	Alberto Martelli mrt@di.unito.it
Title	Intelligent Agents: modeling and reasoning techniques
Status	Already offered, last run: March 2004
Course type	Traditional, 15 teaching hour(s)
Intended audience	PhD students
Course page	http://www.di.unito.it/-mrt/BISSO4/
Abstract	The purpose of the course is to present modeling and reasoning techniques for intelligent agents, based an formal methods. Intelligent agents are presented from two viewpoints. First of all it is shown how to model the behavior of a single agent, in particular referring to the belief-desire-intention (BDI) model. Then the problem of modeling and reasoning in multi-agent systems is tackled, by describ ing communication and cooperation among agents. Finally it is shown how the above models can be implemented by using computational fragments of the logic formalisms, and how they can be used to prove properties of agent systems. Outline of the course: * Introduction to intelligent agents * The belief-desire-intention model * Formal techniques for modeling agents - modal and temporal logics - reasoning about ac tions * Communication - speech acts - Agent Communication Languages: KQML and FIPA * tation of intelligent agents * Verification of multi-agent systems: model checking
Contents	* Introduction to intelligent agents * Formal techniques for modeling agents - logical foundations (modal and temporal logics) * rational agents * agent systems * agent systems: model checking
Literature	* Michael Wooldridge. An Introduction to MultiAgent Systems. John Wiley & Sons, 2002. * Michael Wooldridge. Reasoning about Rational Agents. The MIT Press: Cambridge, MA, USA, 2000.
Materials	slides
Language	English
Comments	

Index	18
Origin	REWERSE
Partner	Lisbon
Contact person	Carlos Damasio cd@di.fct.unl.pt
Title	Issues an Knowledge Representation an the Web
Status	Already offered, last run: 2nd semester 03/04
Course type	Traditional, 30 teaching hour(s)
Intended audience	Master students
Course page	http://www.di.fct.unl.pt/mei0304/docdisciplinas/trcw/
Abstract	The course starts by explaining and motivating the origins of the Semantic Web and its logical layered structure. Some basic concepts are overviewed, namely UNICODE, URIS and IRIS, XML Base, XML Namespaces, XSL, and XML Canon icalization. The Resource Description Framework (RDF) and RDF Schema lan guages are introduced for describing resources and basic vocabularies in the Se mantic Web. RDF(S) model theory and inference mechanisms are also addressed, as well as practical applications and its limitations. Description Logics are then introduced as a better knowledge representation formalism. Its constructs and semantics are introduced, as well the basic reasoning tasks and corresponding al gorithms. The OWL language is presented and applications are provided. The course finishes, by studying the existing proposals for the integration of ontologies with rules in the Semantic Web, in particular the RuleML language proposal is discussed.
Contents	The course has just started beginning of March 04. More information will be available soon at a specific course instance web page. Check http://www.di.fct.unl.pt/mei0304/docdisciplinas/semestre2.html for the link there.
Literature	
Materials	
Language	English
Comments	This course is being offered in English in the new MSc in Computational Logic, starting September 04. Cf. http://centria.di.fct.unl.pt/-lmp/mestrado

Index	20
Origin	REWERSE
Partner	New York
Contact person	Michael Kifer
Title	Knowledge Base Programming with Frames and Logic
Status	Already offered, last run: January 2004
Course type	Traditional, 12 teaching hour(s)
Intended audience	Master students, PhD students, summer school
Course page	http://flora.sourceforge.net/tutorial.php
Abstract	FLORA-2 is a knowledge base development platform, which is based an F-Logic, HiLog, and Transaction Logic. It is both a high-level programming language and a specification language. This tutorial covers the Foundations of FLORA-2, F-Logic, HiLog, and Transaction Logic, as well as the programming aspects of the system. The tutorial includes lab assignments.
Contents	Part 1: Foundations 1. Introduction z. Background 2.1 F-logic 2.2 HiLog 2.3 Transaction Logic 2.4 Top-down Execution and Tabling Part 2: Programming 3. Getting Around FLORA-2 3.1 Getting Started 3.2 Mod ules 3.3 Multifile modules 3.4 Debugging 4. Some Low-level Details 4.1 HiLog vs. Prolog Representation of Terms 4.2 To Table or Not To Table? 5. Advanced Features 5.1 Path Expressions 5.2 Aggregates 5.3 Anonymous OIDs 5.4 Equality 5.5 Control Constructs 5.6 Metaprogramming 6. Updating the Knowledge Base 6.1 Non-logical updates 6.2 Logical Updates 6.3 Limitations 6.4 Inserting and Deleting Rules 7. Future Plans
Literature	Prolog: Bratko, Prolog Programming for Artificial Intelligence, Prentice Hall http://cwx.prenhall.com/bookbind/pubbooks/bratko3-ema/ D.S. Warren, Memoing for logic programs, CACM 1992 http: / /portal.acm. org/citation.cfm?id=131299& jmp=cit&dl=portal&dl=ACM) Deductive databases: Principles of Database and Knowledge-base Systems, Vol. I (chapter 3) (J.D. Ullman, 1988; 1989) Principles of Database and Knowledge-base Systems, Vol. I (chapters 12, 13) (J.D. Ullman, 1988; 1989) F-Logic: M. Kifer, G. Lausen, and J. Wu: Logical Foundations of Object-Oriented and Frame-Based Languages, Journal of the ACM, 42:741-843, 1995. G. Yang and M. Kifer. Reasoning about Anonymous Resources and Meta State ments an the Semantic Web. Journal an Data Semantics, Volume 1, Pages 69-97, 2003. HiLog: W. Chen, M. Kifer, D.S. Warren, HiLog: A Foundation for Higher-Order Logic Programming, Journal of Logic Programming 15:3, 187-230, 1993. Transaction Logic: A. Bonner and M. Kifer, An Overview of Transaction Logic, in Theoretical Com puter Science, 1995. A. Bonner and M. Kifer, A Logic for Programming Database Transactions, in Logics for Databases and Information Systems, Chomicki+Saake (eds), Kluwer, 1998. A. Bonner and M. Kifer, Results an Reasoning about Action in Transaction Logic, in Transactions and Change in Logic Databases, LNCS 1472, 1998.

Materials	slides
Language	English
Comments	

Index	21
Origin	REWERSE
Partner	Heraklion
Contact person	Grigoris Antoniou antoniou@ics.forth.gr
Title	Knowledge Management an the Web
Status	Already offered, last run: 2003/04
Course type	Traditional, 4 teaching hour(s)
Intended audience	Master students
Course page	http://www.csd.uch.gr/-hy566/
Abstract	The course describes the basic Semantic Web technology and some basic applica tions. The students do two modelling assignments (ontology development in RDFS and OWL) and a term project: development of a useful tool using some kind of SW technology (possibly integrating existing tools).
Contents	Semantic Web vision XML technology: XML, DTD, schemas, XSLT, namespaces, XPath RDF, RDF Schema, Query languages OWL, ontologies, ontology develop ment basics Rules an the Semantic Web, RuleML Applications of SW and ontolo gies: e-commerce, knowledge management etc.
Literature	Antoniou & van Harmelen. A Semantic Web Primer. MIT Press 2004
Materials	Project descriptions, course outline
Language	Other
Comments	

Index	24
Origin	REWERSE
Partner	Turin
Contact person	Alberto Martelli mrt@di.unito.it
Title	Laboratory of Web Applications
Status	Already offered, last run: 2002-2003
Course type	Traditional, 56 teaching hour(s)
Intended audience	Master students
Course page	http://www.di.unito.it/-liliana/DIDATTICA/aa04/SERVIZI-WEB/i
Abstract	The course introduces the design and the development of internet services from both a theoretical and pratical point of view. It introduces the technologies for Server-side programming and the methodologies for design and development of applications based an modular architectures to access to heterogeneous data sources (relational DB, XML files, etc.). XML has became a standard language for representing and sharing information over the internet and, in particular, for web services. The course introduces mark-up languages and XML as well as programming lan guages such as ASP and JSP. The laboratory exercise is developed in Java.
Contents	- Markup languages and HTML - Introduction to architecture for web applications * Web browser and Web server; N-Tier applications * HTML forms * Server side programming: CGI, ASP, JSP * Access to database: driver ODBC (Open Database Connection) and JDBC * XML: DTD and XML Schema * Parser SAX, JAXB * XSLT Laboratory: * Servlets (error handling, session tracking) * JSP * development of a simple application that makes use of JSP, a relational DB
Literature	- Professional Java Server Programming, WROX eds. - Java servlet programming 2 ed. di Hunter Jason. Editore: O' Reilly - Core Servlets and JavaServer Pages. Volume 1: Core technologies. Di Marty Hall e Larry Brown. Edito da Sun Microsystems.
Materials	slides
Language	Other
Comments	

Index	25
Origin	REWERSE
Partner	Munich
Contact person	Francois Bry Francois.Bry@ifi.lmu.de
Title	Logic for Computer Scientists
Status	Already offered, last run: Winter 2003/04
Course type	Traditional, 22 to 30 (of 60 min teaching hour(s)
Intended audience	Master students, PhD students
Course page	http://www.pms.ifi.Imu.de/lehre/logik/03ws04/
Abstract	An application-oriented though formal and demanding introduction to mathemat ical logic for Computer scientists with a strong bias towards knowledge represen tation, databases, and automated deduction. The course consists of core chapters covering traditional topics of mathematical logic and excursus chapters covering connections to computer science and other advanced topics. Each time the course was given, different parts have been selected or omitted.
Contents	1. Introduction 2. Syntax 2.1 Propositional Logic 2.2 Excursus: Prefix and Postfix Notation and Precedences 2.3 First-order Predicate Logic 2.4 Excursus: Term Representa tions in Programming Languages and Modelling Languages 2.5 Excursus: Entity Relation-Model and Tuple Calculus 2.6 Restricted Quantification 2.7 Excursus: Rule Based Formalisms 2.8 First-order Predicate Logic and Natural Language 2.9 Excursus: Many-sorted First-order Predicate Logic 2.10 Excursus: Second-order Predicate Logic 2.11 Excursus: Syntax of Modal and Temporal Logics 3. Semantics 3.1 Booleean Functions 3.2 Excursus: Circuits and Boolean Al gebras 3.3 Interpretations and Models of Propositional Formulae 3.4 Excursus: Natural Language Interpretations of Connectives 3.5 Interpretations and Models of First-order Formulae 3.6 Equality 3.7 Excursus: Natural Language Interpreta tions of Quantifiers 3.8 Herbrand-Interpretations and Skolemization 3.9 Excursus: Relational Datenbases 3.10 The Natural Numbers and the Induction Axiom 3.11 Excursus: Semantics of Modal and Temporal Logics 4. Proof Theory 4.1 What is a Proof Method? What is a Proof? 4.2 Decid ability Results for Propositional Logic 4.3 Excursus: Logical Calculi 4.4 Normal Forms 4.5 Excursus: The Davis-Putnam Proof Method 4.6 Decidability Results for First-order Predicate Logic 4.7 Excursus: The PUHR-Tableau Proof Method 4.8 Excursus: Declarative Semantics of Definite Logic Programs 4.9 The Finite ness Theorem (Compactness Theorem) 4.10 Excursus: Finite Entailment 4.11 Non-Expressibility of the Induction Axiom in First-order Predicate Logic
Literature	
Materials	lecture notes
Language	Other
Comments	Well developed lecture notes as PostScript and PDF http: / /www.pms. ifi.lmu.de/publikationen/lecture-notes/logik/ Skriptum. ps In its current version, the course is in German. A translation into English would make sense and could be considered

Index	26
Origin	REWERSE
Partner	Linköping
Contact person	Ulf Nilsson ulfni@ida.liu.se
Title	Logic Programming
Status	Already offered, last run: Fall 2003
Course type	Traditional, 46 teaching hour(s)
Intended audience	Master students
Course page	http://www.ida.liu.se/-TDDA41/
Abstract	The aim of the course is to provide foundations for logic and constraint program ming and relations to other areas of computer science. The course focuses an both theoretical aspects of logic and constraint programming as well as practical programming in existing systems. One of the main ob jectives is to convey a declar ative view an programming and to practise this knowledge in the programming languages Prolog and CLP(fd). The course also covers relations to grammars, in particular through Definite Clause Grammars, and deductive databases; covering the use of magic transformations for efficient processing of deductive database quesries. The course consists of 12 lectures, 4 problem solving sessions, and 7 labs (each occasion comprising 2 hours of teaching).
Contents	Survey of first order predicate logic, definite programs, Herbrand models, fixed point semantics, unification and SLD-resolution, soundness and completeness of SLD-resolution, negation as failure, SLDNF-resolution, Prolog, cut, Definite Clause Grammars, constraints, CLP(X), finite domain constraints, CLP(fd), de ductive databases and query optimization.
Literature	U. Nilsson and J. Maluszynski Logic, Programming and Prolog (2ed) Wiley & Sons, 1995
Materials	slides, exercises, Electronic book (available free of charge)
Language	English
Comments	

Index	27
Origin	REWERSE
Partner	Turin
Contact person	Alberto Martelli mrt@di.unito.it
Title	Logics for Computer Science
Status	Already offered, last run: 2003-2004
Course type	Traditional, 56 teaching hour(s)
Intended audience	Master students
Course page	http://www.di.unito.it/-olivetti/CORSO-LOGICA/ProgrammaLogic
Abstract	
Contents	0) Classical propositional logic (LPC) - Axiomatization, soundness and completeness - Metodo di prova a Tableaux per LPC 1) Modal logics: * and completeness * Tableaux 2) Modal logics for representing knowledge 3) Temporal logics for distributed and concurrent systems - Linear temporal logics (LTL) - Model checking - CTL 4) Intuitionistic logic 5) Description Logics
Literature	Basic logic: - G. Lolli. Introduzione alla logica formale. Il Mulino, 1991. (D) Modal logics: - M. Fitting. Proof methods for modal and intuitionistic logics, D. Reidel, 1983. (D) - M.G. E. Hughes, M. J. Crewell. A new introduction to modal logic. Routledge, 1996, (D) Logic for knowledge representation: - M. Huth, M. Ryan. Logic in Computer Sci ence: Modeling and reasoning about systems. Cambridge University Press, 2000. - J. Halpern and Y. Moses. Knowledge and common knowledge in a distributed environment. Journal of the ACM, 37(3):549-587, 1990. (D) - J Meyer and W. van der Hoek, Epistemic Logic for AI and Computer Science, Cambridge Tracts in Theoretical Computer Science, vol. 41, Cambridge University Press, 1995. (D) Temporal logics: - Jost-Pieter Katoen: "Concepts algorithms and tools for model checking", lecture notes disponibili al sito - http://www.diku.dk/topps/activities/model/ (D) D. Peled - Software Re liability Methods, Springer-Verlag, 2001. (D) M. Huth, M. Ryan. Logic in Computer Science: Modeling and reasoning about systems. Cambridge University Press, 2000. Intuitionistic logic: - Dirk van Dalen, Intuitionistic Logic, in:Gabbay, D. M.(ed.) Handbooks of Philosophical Logic, Vol.III, P. Reidel, pp. 225-339, 1986. (D) Description Logics: - F. Baader, D. Calvanese, D. McGuiness, D. Nardi, and P. Patel-Schneider, editors. The Description Logic Handbook -Theory, Implementa tion and Applications. Cambridge University Press, 2003.
Materials	lecture notes
Language	Other
Comments	

Index	29
Origin	REWERSE
Partner	Linköping
Contact person	Patrick Lambrix patla@ida.liu.se
Title	Logics for the Web
Status	Already offered, last run: 2003
Course type	Traditional, 24 teaching hour(s)
Intended audience	Master students, PhD students, summer school
Course page	http://www.ida.liu.se/labs/iislab/courses/LW/
Abstract	In the emerging Semantic Web (See http://www.semanticweb.org/introduction.html) logic plays an important role. Different logics are proposed for different purposes. The goal of the course is to survey this vision, to give an introduction to the relevant logical formalisms: Description Logics, Horn Clauses and F-Logics and to discuss their proposed uses in the context of the Semantic Web. A major part of the course is devoted to Description Logics as the underlying formalism for ontology description. The course gives the main concepts, surveys some well-known Description Logics and Sketches some basic reasoning techniques. The web ontology languages DAML+OIL and OWL are briefly presented and their relation to DL is discussed. The course provides also a brief introduction to Horn logic as a starting point for defining the rule level of the Semantic Web. The proposed approches to integration of rule level with the ontology level are briefly discussed. Frame logic is briefly discussed as an alternative foundation of the Semantic Web. The course consists of 14 hours of lectures and 10 hours of Seminars.
Contents	Lectures A vision of the Semantic Web and the role of logics therein (2h) De scription Logics: (6h) - Representing knowledge in DL - Reasoning services and algorithms; - Completeness, correctness and complexity; - Description logics and ontologies (DAML+OIL, OWL) - Relations between DL and other KR formalisms. Horn Logic and beyond (6h) - Representing knowledge in Horn clauses, - Reason ing techniques - Rules an the web: is Horn logic sufficient? - Frame-logic Seminars Survey of existing tools and projects, proposed extensions, relations between the formalisms, etc. See the course home page for details.
Literature	Collection of papers, available from the course home page.
Materials	slides
Language	English
Comments	

Index	31
Origin	REWERSE
Partner	Naples
Contact person	Piero Bonatti bonatti@na.infn.it
Title	Nonmonotonic reasoning and security
Status	Already offered, last run: summer 2001
Course type	Traditional, 12 teaching hour(s)
Intended audience	PhD students
Course page	
Abstract	An introductory course an nonmonotonic logics, and their application to the spec ification and enforcement of security policies. Most of the course was devoted to introducing semantics, proof theory and com putational complexity of the three main nonmonotonic logics: - Circumscription - Default logic - Autoepistemic logic The properties of three logics have been related to the needs of security policy specification. The course was intended for students with no knowledge of nonmonotonic reason ing, and with a specific background in security and database, including theoretical aspects.
Contents	Semantcs, proof theory, main reasoning tasks and computational complexity of - Circumscription, - Default logic, - Autoepistemic logic. Applications to modeling open/closed policies, Bell-La Padula, need-to-know prin ciple etc. Policy composition: desiderata, modularization issues, technical solutions based an an embedding of an algebra of policies into logic programming. Implementation issues: partial materialization based an partial evaluation techniques.
Literature	Slides and foundational papers.
Materials	slides, relevant articles
Language	English
Comments	The course was given in Dortmund in 2001

Index	34
Origin	REWERSE
Partner	Naples
Contact person	Piero Bonatti bonatti@na.infn.it
Title	Security and privacy
Status	Already offered, last run: in progress
Course type	Traditional, 48 teaching hour(s)
Intended audience	Master students
Course page	http://people.na.infn.it/-bonatti/didattica/index.html#SP
Abstract	A broad spectrum introductory course an security and privacy, touching models, policies, languages, exploits based an operating system bugs and network proto cols. The course introduces the basic notions and terminology related to policies and models, and touches examples of both static and dynamic policies enforcing non trivial constraints, such as Chinese Walls. Complex administration policies and recursive revocation are described. Of course, traditional mandatory frameworks (Bell-La Padula) and their realiza tions (multilevel databases, polyinstantiation techniques) are discussed in depth. Declarative logic-based languages are introduced, and their application as policy description and composition languages is The second part, instead, is of a more technological nature. It describes typical attacks based an operating system bugs and network protocol vulnerabilities.
Contents	The part relevant to REWERSE comprises a 6 hours introduction an logic pro gramming under the stable model semantics and about 4 hours an the applications of (variants of) this language to the formulation and composition of security poli cies, with classical examples such as Chinese Walls, Bell-La Padula etc. Of course, the first 10-15 hours of the course are essential for providing the notions and the reference policy models needed to understand what needs to be modelled with logic based-languages.
Literature	The basic notions an LPNMR are in the lecture notes (italian). The applications to security policies are illustrated in the slides (italian) and the reference papers.
Materials	slides, lecture notes, relevant articles
Language	Other
Comments	All the material is in Italian, with the exception of the reference articles

Index	35
Origin	REWERSE
Partner	Hannover
Contact person	Nicola Henze henze@kbs.uni-hannover.de
Title	Semantic Web
Status	Planned, start date: Summer 2004
Course type	Traditional, 24 teaching hour(s)
Intended audience	Master students, summer school
Course page	http://www.kbs.uni-hannover.de/-henze/semweb04/
Abstract	The amount of information available over the Internet is increasing from day to day. Still, smart technologies for selecting, accessing, and processing information are lacking: Currently, mainly search robots are used that search for available information in the Internet. Access patterns, link information etc. are used to determine the relevance of retrieved information. One of the major issues for improving the way how people interact with the semantic web will be to enable machines to get some understanding of the semantics of the information they process - to create a "semantic web".
Contents	Semantic Web, Metadata, XML Technologies, Taxonomies, Ontologies, RDF,RDF Schema, Web Ontology Languages, Logic and Inference in the Semantic Web, Web Personalization, Recommender- and Filtering Systems,Adaptive Hypermedia.
Literature	Grigoris Antoniou, Frank Van Harmelen: A Semantic Web Primer many online resources available via Course-website
Materials	slides
Language	Other
Comments	Materials are partly in German, mainly in English

Index	36
Origin	REWERSE
Partner	Eindhoven
Contact person	Gerd Wagner G. Wagner@tm.tue. nl
Title	Semantic Web
Status	Planned, start date: 15 April 2004
Course type	Traditional, 26 teaching hour(s)
Intended audience	Master students
Course page	
Abstract	The Semantic Web is an initiative of the W3C for advancing the Web. Its main ob jective is the "semantic" annotation of Web documents for making them accessible to automated interpretation and processing (e.g., by semantic search machines). Semantic annotations represent propositional information, which is expressed by means of XML-based knowledge representation languages (such as RDF, OWL and RuleML/SWRL). In the Seminar, we will primarily discuss these languages and the corresponding Software tools.
Contents	
Literature	A Semantic Web Primer, by Grigoris Antoniou and Frank van Harmelen, The MIT Press, 2004
Materials	slides, exercises
Language	English
Comments	The course is mainly based an the new book by Grigoris Antoniou and Frank van Harmelen, and an the materials they provide an their Web site.

Index	37
Origin	Heraklion's collection
Partner	n/a
Contact person	Amit Sheth amit@cs.uga.edu
Title	Semantic Web
Status	Already offered, last run: 2003
Course type	Traditional, teaching hour(s)
Intended audience	Master students, PhD students
Course page	http://lsdis.cs.uga.edu/SemWebCourse/index.htm
Abstract	Some say Semantic Web will be bigger than WWW. Some consider it to be the next generation of the Web. So what is all the excitement about? What is Se mantic Web? Will semantics change the Web forever? Why and how? What are the underpinnings of Semantic Technology? How can Semantic Technology revo lutionize how we use web to find and organize information, or conduct business? How can semantics enable next generation data and application interoperability and integration? Will it? What can you get by empowering Web services with Se mantics? What are Semantic Web Processes? What are research challenges? Are businesses taking notice of it? Will semantics bring new generation of Content Management, will it revolutionize text analytics or content analytics? Semantic Web is turning out to be a multidisciplinary field. Consequently, this is an advanced course involving topics in Internet/WWW, Database Management, Information Systems, Information Retrieval and Artificial Intelligence.
Contents	What is Semantics? Syntax, Structure and Semantics Understanding content: Metadata, metadata standards, XML+metadata specifi cation, RDF and metadata processing Semantic underpinning: Ontology, Domain Modeling, Logic, Inferencing, Context Classification and Semantic metadata extraction techniques: statistical, statistical learning/AI, lexical and natural language, knowledge based Specifications: why is XML(S) not adequate? why is RDF(S) not adequate? what is OWL and why is the chosen ontology description language? Semantic Applications - demonstrating power of Semantic technology for search, personalization, contextual directory and custom/enterprise applications; next generation semantic content management Research Landscape: review of Some of the active projects (e.g., IBM's Web foun tain, LSDIS's InfoQuilt and METEOR-S, DAMS-S) and initiatives Commercial Landscape: For example, technologies and products from Semagix/Taalee, Ontoprise, Cyccorp, Applied Semantics, business models today and in future - next generation content management - text analytics, content analytics Technologies, tools and commercial products (e.g., Protege-2000, Semagix Free dom) Research Questions: Contributions of IR, AI, Logic, NLP, DB and IS to Semantic Web, Ontology integration versus interoperation, Broadening the current vision of Semantic Web (beyond machine understandable data) to include modeling of human information and decision making needs
Literature	
Materials	Readings
Language	English
Comments	

Index	38
Origin	Heraklion's collection
Partner	n/a
Contact person	Bob Wielinga wielinga@swi.psy.uva.nl
Title	Semantic Web
Status	Already of£ered, last run: 2003
Course type	Traditional, teaching hour(s)
Intended audience	Master students
Course page	http://www.swi.psy.uva.n1/semanticweb/
Abstract	An introduction to Semantic Web technology
Contents	XML RDF OWL Ontologies Logic
Literature	
Materials	links to papers
Language	Other
Comments	

Index	39
Origin	Heraklion's collection
Partner	n/a
Contact person	Grigoris Antoniou (input, not course delivery) antoniou@ics.forth.gr
Title	Semantic Web
Status	Already offered
Course type	Traditional, teaching hour(s)
Intended audience	Master students
Course page	http://cms.brookes.ac.uk/computing/courses.php?id=86
Abstract	
Contents	Introduction to Knowledge Representation and Information theory The use of metadata in HTML, negotiation and searching Existing metadata representations (e.g. PICS, P3P, XML Signature) The RDF graph model and RDF Schemas The role of XML in metadata representation The role and creation of ontologies Topic maps Reification and reasoning over metadata Searching and reasoning over distributed and disparate resources
Literature	
Materials	
Language	English
Comments	

Index	40
Origin	Heraklion's collection
Partner	n/a
Contact person	Nick Bassiliades nbassili@csd.auth.gr
Title	Semantic Web and Intelligent Agents
Status	Already of£ered, last run: 2004
Course type	Traditional, 3 teaching hour(s)
Intended audience	Master students
Course page	http://lpis.csd.auth.gr/mtpx/sw/index.htm
Abstract	
Contents	XML RDF OWL Rules Web services
Literature	
Materials	slides
Language	Other
Comments	

Index	42
Origin	Heraklion's collection
Partner	n/a
Contact person	Isabel Cruz ifc@cs.uic.edu
Title	Semantic Web: Models and Query Languages
Status	Already offered, last run: 2002
Course type	Traditional, 4 teaching hour(s)
Intended audience	Master students, PhD students
Course page	http://http://www.cs.uic.edu/-ifc/594-SW.html
Abstract	The course aims to prepare students to undertake research in the important sub jects that comprise the new Semantic Web research area. Subjects will be intro duced by the instructor and by the students in their presentations to the class. The project will be representative of current research and development in the Se mantic Web area. Because of the research nature of the course, it is best suited for advanced graduate students.
Contents	Data models XML RDF Logic-based query languages, Datalog Ontologies F-Logic Visualization for the Semantic Web
Literature	[Hjelm 2001] Creating the Semantic Web with RDF by Johan Hjelm, 2001, Wi ley. [Abiteboul 1999] Data an the Web: From Relations to Semistructured Data and XML. Abiteboul, Serge / Buneman, Peter / Suciu, Dan Morgan Kaufmann Publishers, 1999, ISBN: 155860622X. [Delobel 1995] Databases: From Relational to Object-oriented Systems. Delobel, Lcluse, Richard. International Thomson Computer Press, 1995. ISBN 1-85032-124-8. [Lochovsky 1982] Data Models. Tsichritzis D C, Lochovsky F H, Prentice-Hall, 1982. [Sowa 2000] Knowledge Representation by John F. Sowa, Brooks/Cole 2000. [Fensel 2001] Ontologies: A Silver Bullet for Knowledge Management and Electronic Commerce by Dieter Fensel, 2001, Springer.
Materials	Group project outcomes
Language	English
Comments	

Index	43
Origin	REWERSE
Partner	Vienna
Contact person	Robert Baumgartner baumgart@dbai.tuwien.ac.at
Title	Semistructured Data
Status	Already of£ered, last run: Winter 2003
Course type	Traditional, 2 per week teaching hour(s)
Intended audience	Master students
Course page	http://www.dbai.tuwien.ac.at/staf£/baumgart/semi/
Abstract	Semistructured data models Object Exchange Model OEM XML Family DTD XSD XLink XPointer XSLT XML-based standards Query Languages Lorel XQuery XQL XML APIs, web data extraction wrapper generation mediation sys tems web data integration web services basics semantic web basics
Contents	Semistructured data models, Object Exchange Model OEM, XML Family (XML, DTD, XSD, XLink....), XSLT, Query Languages(Lorel, XQuery, XQL, ...), XML APIs, web data extraction, wrapper and mediation systems
Literature	
Materials	slides
Language	Other
Comments	

Index	44
Origin	REWERSE
Partner	Göttingen
Contact person	Wolfgang May may@informatik.uni-goettingen.de
Title	Semistructured Data and XML
Status	Already offered, last run: Summer 2003
Course type	Traditional, 50 teaching hour(s)
Intended audience	Master students, summer school
Course page	http://www.dbis.informatik.uni-goettingen.de/Teaching/SSD
Abstract	One of the most important facts that lead to the overall success of XML is that the "XML world" combines a lot of already known concepts in an optimal way for coping with a broad spectrum of requirements. The course will first review some of these preceding (partially even historic) concepts (network database model, re lational databases, object-orientierted databases) and the integration of data and metadata (SchemaSQL). Then, the idea of "semistructured data" is introduced by showing early representatives that helped to shape the XML world (F-Logic, OEM). In the main part, XML is presented as a data model and a markup-meta-language, and the current languages of the concepts of the XML world are systematically investigated and applied: XPath, XQuery, XSLT, XLink, XML Schema etc.
Contents	Concepts of the XML world (theory and practice).
Literature	Optional: Sall: XML Family of Specifications (Addison Wesley) Katz: XQuery from the Experts (Addison Wesley)
Materials	slides, exercises
Language	English
Comments	The course has been given in german in SS03 and will be given in englisch in SS04 (4 hrs lecture + 2 hrs theoretical/practical exercises). Planned for 2005: 3+1 hrs lecture + separate lab 2+4

Index	45
Origin	REWERSE
Partner	Dresden
Contact person	Michael Schroeder ms@mpi-cbg.de
Title	Software Agents
Status	Already offered, last run: 2002
Course type	Traditional, 10 teaching hour(s)
Intended audience	Master students
Course page	
Abstract	The module introduces Software agents and covers their architecture, components such as planning, learning, and negotiation, as well as applications such as infor mation agents
Contents	Agent Infrastructure: Agent Architectures based an chapter 1 of Weiss. Multi agent system. Mobile Agents Back up material: James White. Mobile Agents. Chapter 19 in J.Bradshaw (ed.), Sofware Agents, MIT Press, 1997 Components of Agents Planning based an Chapter IV of Russell and Norvig. AI - A modern approach Learning based an Chapter VI of Russell and Norvig. AI - A modern approach Coordination of Agents Agent Communication based an chapter 2 of Weiss. Multi-agent system. Market-based Computing based an chapter 5 of Weiss. Multi-agent system and an Michael Schroder. http://www.soi.city.ac.uk/-msch/abstracts/schmaamaw99.html An efficient argumentation framework for negotiating autonomous agents. In Proceedings of the workshop an Modelling Autonomous Agents in a Multi-Agent World MAA MAW99. Valencia, Spain, Springer-Verlag, July 1999. You may also wish to have a look at S. Kraus and K. Sycara and A. Evenchik. Reaching agreements through argumentation: a logical model and implementation. Artificial Intelligence. 1998. To appear. Applications: Information agents
Literature	Weiss. Multi-agent system. Russell & Norvig, AI papers
Materials	slides
Language	English
Comments	

Index	46
Origin	REWERSE
Partner	Lisbon
Contact person	Joaquim Aparicio jna@di.fct.unl.pt
Title	Technologies of the Web based Information Systems
Status	Already offered, last run: lst semester 03/04
Course type	Traditional, 30 teaching hour(s)
Intended audience	Master students
Course page	http://www.di.fct.unl.pt/mei0304/docdisciplinas/tsibw/
Abstract	This course describes XML based technology for representing hierarchical and semi-structured data, and related W3C recommendations: XML Schemas, XML Namespaces, and XML Base. The text-centered and data-centered documents views are discussed and compared. XML data model integrity supporting mecha nisms are analysed, namely XLink, XPointer and XML Inclusions. Querying and transformation languages for XML documents are described and deeply studied, in particular XSL based-languages (XPath and XSLT) and the more recent XQuery. The course continues by relating the database relational model (DBMSs) with the hierarchical model (XML), and studying the mappings between them. The course continues by presenting client-server architectures integrating XML and relational databases, as well as XML support in the major DBMSs. The course concludes with DOM and SAX programming techniques, and construction of Web Services using SOAP.
Contents	The course web page is not for the moment available due to a disk problem. Check with the Contact person for more information please.
Literature	
Materials	
Language	English
Comments	This course is being offered in English in the new MSc in Computational Logic, starting September 04. Cf. http://centria.di.fct.unl.pt/-lmp/mestrado

Index	47
Origin	Heraklion's collection
Partner	n/a
Contact person	Jeff Heflin heflin@cse.lehigh.edu
Title	The Semantic Web
Status	Already offered, last run: 2003
Course type	Traditional, 4 teaching hour(s)
Intended audience	Master students
Course page	http://www.cse.lehigh.edu/-heflin/courses/semweb/
Abstract	The Internet is an the verge of another revolution. The development of the World Wide Web made the Internet accessible to millions by making it easy for any one to publish and access documents an the Internet. However, the explosive growth of the Web has led to the problem of information overload. Researchers from industry and academia are now exploring the possibility of creating a "Se mantic Web," in which meaning is made explicit, allowing machines to process and integrate Web resources intelligently. Beyond enabling quick and accurate web search, this technology may also allow the development of intelligent internet agents and facilitate communication between a multitude of heterogeneous web accessible devices. In this class, we will examine this exciting area by reading and discussing both existing web specifications and cutting-edge research papers. Top ics will include the design of various Semantic Web languages (such as XML, RDF, SHOE, DAML+OIL and OWL), the role of ontologies, and issues in developing semantic-aware applications.
Contents	
Literature	Fensel, Hendler, Liebermann, Wahlster: Spinning the Semantic Web. MIT Press 2003
Materials	slides, exercises
Language	English
Comments	

Index	48
Origin	REWERSE
Partner	Manchester
Contact person	Ian Horrocks horrocks@cs.man.ac.uk
Title	The Semantic Web: Ontologies and OWL
Status	Already offered, last run: 2003
Course type	Traditional, 30 teaching hour(s)
Intended audience	Master students, PhD students
Course page	http://www.cs.man.ac.uk/-horrocks/Teaching/cs646/
Abstract	Knowledge representation and "ontologies" are becoming critical to the devel opment of the next generation Web ("The Semantic Web" and "meta data"). The course will present the knowledge representation paradigms used in a variety of applications including current research in the department in "E-Science" and theWeb. Describing web resources with metadata expressed using ontologies is a key step towards achieving effective 'agent based' applications to automate web operations.
Contents	* Introduction to the Semantic Web (PPT) * mantic Web (PPT) * An Introduction to Description Logics (PPT) * with OWL * did that happen? (PDF) * Advanced Reasoning Techniques (PDF) * Building o Introduction (PPT) o Existentials and Universals (PPT) o Classes, In stances, Concepts & Individuals (PPT) o Definitions, Descriptions, Restrictions & Axioms (PPT) o Ontology Patterns & Top Ontologies (PPT) o Ontology Patterns Parts and Wholes (PPT) o Representing Time & Space (PPT)
Literature	* Tim Berners-Lee, James Hendler and Ora Lassila. The Semantic Web. Sci entific American, May, 2001. (PS) * Deborah McGuinness. Ontologies Come of Age. The Semantic Web: Why, What and How, MIT Press, 2001. (PS, MS Word) * Mike Uschold and Robert Jasper. A Framework for Understanding and Classifying Ontology Applications. KRR5-99, Stockholm, Sweden, 1999. (PDF) * Franz Baader, Ian Horrocks and Ulrike Sattler. Description logics as ontology languages for the semantic web. Lecture Notes in Artificial Intelligence. Springer, 2003. (PDF) * Ian Horrocks, Peter F. Patel-Schneider and Frank van Harmelen. From SHIQ and RDF to OWL: The making of a web ontology language. (PDF) Alan L. Rector, Chris Wroe, Jeremy Rogers and Angus Roberts. Untangling Tax onomies and Relationships: Personal and Practical Problems in Loosely Coupled Development of Large Ontologies. (PDF)
Materials	slides, exercises
Language	English
Comments	

Index	49
Origin	REWERSE
Partner	Heraklion
Contact person	Vassilis Christophides christop@ics.forth.gr
Title	Web Data Management
Status	Already offered, last run: Spring 2003
Course type	Traditional, 6h per week teaching hour(s)
Intended audience	Master students, PhD students
Course page	http://www.csd.uch.gr/-hy561/
Abstract	The goal of this course is to expose students to advanced database topics that Show how post-modern database systems have been extended from the Standard relational model to deal with more complex kinds of data an the Web. In par ticular, CS561 will present the state of the art of current research directions in semistructured and XML databases representing the convergence of three distinct until nowdays cultures in information management: (a) everything is a document (i.e., the Web), (b) everything is a table (i.e., the Relational databases) and (c) everything is an object (i.e., Object Programming Languages). In summary, the goals of CS561 are as follows: What the database community has done: Semistructured data model: SSD-exps, labeled graphs Schema/Typing, Storage, Query Optimization What the Web community has done: Data formats and APIs: XML 1.0, DOM Transformation and Stylesheet languages (XSLT/XSL) Where they meet and where they differ Comparison to relational and object-oriented data models Present emerging XML technology as a data management issue XML Data models XML Data Definition (Schema) Languages XML Data Manip ulation (Query) Languages Students completing this course are expected to acquire the required skills in XML Information Management both from a research and a system development perspective
Contents	Lectures Date Lecture Web Data Management:An Introduction to Semistructured and XML Databases Semistructured Data XML XML Schema Schema Formalisms and Type Systems for Semistructured Data Intro to XQuery XQuery Typing Semistructured & XML Data Manipulation Languages
Literature	Data an the Web: From Relations to Semistructured Data and XML S. Abiteboul, P. Buneman, D. Suciu, Morgan Kaufmann, 1999 ISBN 1-55860-622-X. XQuery from the Experts: A guide to the W3C XML Query Language Don Chamberlin, Denise Draper, Mary Fernandez, Michael Kay, Jonathan Robie, Michael Rys, Jerome Simeon, Jim Tivy, Philip Wadler, Addison- Wesley, 2003 ISBN 0-321 18060-7. XML Data Management: Native XML and XML-Enabled Database Systems Akmal B. Chaudhri, Awais Rashid, Roberto Zicari, Addison Wesley, 2003 ISBN 0201844524.
Materials	slides, exercises

Language	English
Comments	

Index	51
Origin	REWERSE
Partner	Munich
Contact person	Francois Bry Francois.Bry@ifi.lmu.de
Title	XML and Databases
Status	Already offered, last run: Summer 2003, Summer 2004
Course type	Traditional, 25 (of 60 min each) teaching hour(s)
Intended audience	Master students, PhD students, industrial
Course page	http:///www.pms.ifi.lmu.de/lehre/markupsemistrukt/04ss/
Abstract	This course aims at introducing into techniques and methods related to XML and databases that have been developed during the last years, some of which are still the subject of active research. The course will give an introduction to XML basics, to formalisms for specifying XML data schemas, to query and transformation languages for XML, and to indexing methods for XML data. The course will also present research results an some of these issues recently obtained at the University of Munich. No specific knowledge in document management and/or in database systems is assumed.
Contents	A. XML Basics (slide) 1. Markup Languages: Origins and Typology 1. "Mark up" vs. "Markup" 2. Purposes of Markup Languages 3. Kinds of Markup Languages 2. Structure of an XML Document 1. Document Prolog 2. Elements 3. Document Tree 4. Attributes 5. Resources, Entities, and Notations 6. Character Set 3. XML vs. SGML 4. XML vs. HTML 5. References B. Data Type Specification (slide) 1. Features of Standard Data Models: indis pensable, exceptions excluded, and not self-explanatory 2. Advantages of Dispens able Data Schemas and Self-Explanatory Data 3. Semistructured Data 4. DTD 1. Introduction 2. Markup Declarations 3. Composition of a DTD 4. Namespaces 5. Well-Formed vs. Valid XML Documents 6. Expressive Power of DTD 5. XML Schema 1. Introduction z. Built-in Simple Types of XML Schema 3. Simple Type Definitions 4. Complex Types Definitions 5. Further Features 6. References C. Query and Transformation Languages for XML (slide) 1. Need for Transfor mations 2. Data Selection with XPath 1. Regular Path Expressions 2. XPath 3. XPointer 3. The Transformation Language XSLT 1. XSLT Basics 2. The Recursive Computation Model of XSLT 3. The Imperative Computation Model of XSLT 4. Further Constructs 4. The Query Language XQuery 1. Origin of XQuery 2. XQuery Principles 5. Xcerpt: Querying XML Data Reconsidered 6. References D. Indexing XML Data
Literature	
Materials	lecture notes
Language	English
Comments	Lecture notes as XHTML pages: http: / /www.pms.ifi.lmu.de/publikationen/lecture-notes/xml-databases/contents.html Three chapters are completed, the last chapter needs more work, the completion of which is expected for mid 2004.

Short Courses

Index	4s
Origin	REWERSE
Partner	LibRT
Contact person	Silvie Spreeuwenberg silvie@librt.com
Title	Introduction to business rules
Status	Planned, start date: april
Course type	Traditional, 4 teaching hour(s)
Intended audience	industrial
Course page	n/a
Abstract	This tutorial gives an introduction an what business rules are and an the tech niques that stand behind the Business Rules Approach. In the presentation the relationship between the Business Rules Approach and other OMG initiatives such as UML 2.0 and MDA as well as the current state of the two RFP's is discussed. The presentation will be complemented with real world examples of business rules applications.
Contents	At the end of the tutorial, attendees will be able to assess in what respect the business rules approach increases the agility of an organization. Organisations that already automate business rules in traditional procedural code, database environments or web-based applications will learn how the cost of maintenance and support an the rules in your organizations can be decreased in the long run. The tutorial will discuss how business rules can be implemented in your organisation to meet this objective in an optimal way.
Literature	
Materials	slides
Language	English
Comments	

Appendix B. WP 3.2 Learning Unit Questionnaire

Title:

Abstract:

Contents:

Keywords:

Participant:

Contact Person:
Name:
e-mail:

Status:
☐ Planned
☐ Available, must be adapted to Knowledge Web context
☐ Available, no changes necessary

URL (if available):
Planned availability date (if not available yet):

Consists of
☐ Slides
☐ Lecture notes
☐ Exercises
☐ Background papers
☐ Other:

Language:
☒ English
☐ Other:

Intended scenario(s):
☐ Community of Practice
☐ Shared M.Sc. Programme
☐ Education for Professionals
☒ Repository Usage

Intended audience:
☐ M.Sc. Students
☐ Ph.D. Students
☐ Researchers
☐ Professionals
☐ Other:

If learning unit is intended for M.Sc. Programme:

Number of teaching hours:
Number of credit points:

☐ available as F2F course for visiting students
☐ partner is willing to provide it as F2F course within a university cooperation

☐ available as distance course
☐ partner is willing to provide it as distance course within a university cooperation

☐ available as:
☐ partner is willing to provide it as:

If learning unit is intended for Community of Practice:

Number of teaching hours (if applicable):

☐ learning unit for self-study

☐ partner is willing to provide it as part of summer school
☐ partner is willing to provide it as distance course/lecture

☐ available as:
☐ partner is willing to provide it as:

If learning unit is intended for Education of professionals:

☐ learning unit for self-study
☐ partner is willing to provide it as professional training

☐ available as:
☐ partner is willing to provide it as:

Comments: