

## Course Description

# Virtual Intelligent Environments

### Contents:

Subject of the course is the creation of virtual intelligent computer-based models for parts of the really existing world. For this purpose several information technologies are used, especially virtual reality, 3D computer graphics, computer animation, multimedia, and artificial intelligence.

The lectures give an overview of virtual reality, artificial intelligence, and other necessary technologies. They permit an exhaustive explanation of the ISO standardised languages VRML/X3D and LISP. Furthermore, they demonstrate comprehensive self-developed application systems in the domain.

In the practice, the students collect own experiences in VRML and LISP programming by testing several features of the languages. In the framework of a project-oriented complex task they prove their skills and work at the comprehensive modelling of a virtual intelligent environment in a selected application domain.

The course is closed with an oral project defence on the basis of a written project documentation.

**Target audience:** Information technology, Business information technology

**Extent:** semester hours 0/0/4

**Premise:** basic knowledge in computer science and mathematics

**Certificate:** project defence

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**Course:**

<b>Week:</b>	<b>Lecture:</b>	<b>Practice:</b>
1	Introduction to Virtual Intelligent Environments	VRML/X3D: Introduction
2	VRML: Concept and Working Environment	VRML: Working Environment
3	VRML: Syntax and Semantics	VRML: Static Objects
4	VRML: Geometric Objects and Transformations	VRML: Dynamic Objects
5	VRML: Material, Illumination, and Observer	VRML: Prototypes
6	VRML: Animation and Interaction	VRML: Intelligent Models
7	VRML: Programming and Networking	LISP: Programming
8	VRML: Involvement of Multimedia	LISP: Knowledge Representation
9	VRML: Intelligent Behaviour	LISP: Problem Solving
10	Artificial Intelligence	VRML / LISP: Complex Task
11	Advanced AI Approaches	VRML / LISP: Complex Task
12	Programming Language Lisp	VRML / LISP: Complex Task
13	Common Lisp	VRML / LISP: Complex Task
14	AI Programming Examples	VRML /LISP: Complex Task
15	System Demonstrations	VRML / LISP: Complex Task

## Literature:

- VRML97: *The Virtual Reality Modelling Language*, VRML97. International Standard ISO/IEC 14772-1:1997 and ISO/IEC 14772-2:2004
- *Extensible 3D (X3D) encodings* ISO/IEC FDIS 19776-2. Web3D Consortium, Inc., 2004
- Walsh, A.; Bourges-Sevenier, M.: *Core Web3D*. Prentice Hall, Upper Saddle River, NJ, 2001
- Daly, L.; Brutzman, D.: *X3D - Extensible 3D Graphics for Web Authors*. Elsevier, London, 2007
- Quigley, E.: *JavaScript*. Pearson Education, Upper Saddle River, 2004
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- Hase, H.: *Dynamische virtuelle Welten mit VRML 2.0: Einführung, Programme und Referenz*. dpunkt, Heidelberg, 1997
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- Foley, J.; van Dam, A.; Feiner, S.; Hughes, J.: *Computer Graphics*. Addison-Wesley, Bonn, 1990
- Russell, S.; Norvig, P.: *Artificial Intelligence*. Pearson Education, München, 2004
- Web3D-Consortium: [www.web3d.org](http://www.web3d.org)
- WebReference: [www.webreference.com](http://www.webreference.com)

