



## Cognitive and Object-Oriented Modeling Under Uncertainties as Aspects of Artificial Intelligence in Practical Applications

Course number	7525
Hours per week:	4
ECTS:	5
Scheduled:	Winter and Summer Term
Format:	Lectures/ seminar presentations / lab practice
Examination:	60% Oral exam (20 min.) & 40% active cooperation during the seminar
Lecturer:	Prof. Dr. Galia Weidl
Objectives:	<p>Understanding the basics of cognitive and object-oriented modeling for applications under uncertainties with lab practice on computer</p> <p>Seminar-type lectures for all Students, including functionality demonstration of modelling and Hands-on exercises on own computer (or on available lab computer, in case of presence lectures/seminars/labs)</p> <p>Free software campus site license is available (as download link) for each participating student.</p>
Contents:	<ul style="list-style-type: none"><li>• Cognitive modeling under uncertainties as aspect of artificial intelligence in practical and technical applications</li><li>• How is a model build/generated/learned?</li><li>• Knowledge based modeling (encoding causal relations in the model structure) &amp; Learning (of model parameters from data) . The combination of knowledge and data leads to probabilistic modelling under uncertainties and decision making.</li><li>• Suitable sources of knowledge and data</li><li>• Features and hypotheses of the problem domain</li><li>• Why do we need to model uncertainties of sensors, data, computation, knowledge? How?</li><li>• Data used for Learning: Variables types (boolean, numbered, interval, labeled)</li><li>• What means "Data Labeling"? e.g. labeled states</li><li>• Classification of hypotheses under uncertainties</li><li>• Evidence as input to the Model (for Decision Making) and interpretation of classification (decision) results.</li><li>• When to use cognitive modeling under uncertainties and what methods are appropriate?</li></ul>
Pre-requisites	Logical thinking, high school mathematics, University Mathematics I/II are of advantage, but not a requirement
Recommended Reading:	<p><b>eBook</b> (available from the Library of the University of Applied Sciences Aschaffenburg):</p> <p>Bayesian Networks and Influence Diagrams: A Guide to Construction and Analysis, 2013</p> <p>Authors: Kjærulff, Uffe B., Madsen, Anders L.</p> <p>Tutorials and examples:</p> <p><a href="http://download.hugin.com/webdocs/manuals/8.9/">http://download.hugin.com/webdocs/manuals/8.9/</a> → <b>Browse Help</b></p>