COURSE SYLLABUS

Research Methods for Intelligent Systems, 7.5 credits

Research Methods for Intelligent Systems, 7,5 högskolepoäng

Course Code:	TRIS20	**Education Cycle:**	Second-cycle level
Confirmed by:	Dean Mar 1, 2020	**Disciplinary domain:**	Technology
Revised by:	Director of Education May 17, 2021	**Subject group:**	DT1
Valid From:	Aug 1, 2021	**Specialised in:**	A1F
Version:	2	**Main field of study:**	Informatics

Intended Learning Outcomes (ILO)

After a successful course, the student shall:

Knowledge and understanding
- display knowledge of the current state-of-the-art in AI, machine learning and data science
- demonstrate knowledge and comprehension of the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in certain areas of the field as well as insight into current research and development work
- display specialised methodological knowledge of the main field of study

Skills and abilities
- demonstrate the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information
- demonstrate the ability to identify and formulate issues critically, autonomously and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as well as the ability to evaluate this work

Judgement and approach
- demonstrate the ability to compare and evaluate different representations and algorithms for intelligent agents
- demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work
- demonstrate the ability to have insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used
- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning

Contents

The course comprises of lectures and seminars. The lectures broadly cover the theoretical

foundations of typical research approaches in artificial intelligence and related areas as well as common research methods and ways of reporting research findings. The seminars cover academic communication, state-of-the-art development in artificial intelligence from a scientific perspective, and open research questions and challenges.

The course includes the following elements:
- Information retrieval and literature surveys
- Qualitative and quantitative approaches to research
- Computer science as a scientific paradigm
- Research methods in computer science
- Basic and applied research in artificial intelligence
- Ethical considerations
- Assessment of scientific quality

Type of instruction

Lectures are conducted in the traditional format, which means that they are aimed at transmission of course content whereby the focus is on the delivery of the material by the lecturer. Each lecture is 90 minutes with 15 minutes break half-way. The seminars are planned and moderated by the students based on specifications from the course responsible and materials described in the course memo.

The teaching is conducted in English.

Prerequisites

Passed courses at least 90 credits within the major subject Informatics, and completed course Machine Learning, 7,5 credits or equivalent. Proof of English proficiency is required.

Examination and grades

The course is graded 5,4,3 or Fail.

Registration of examination:

Name of the Test	Value	Grading
Seminars	1.5 credits	U/G
Assignments	1.5 credits	U/G
Academic Report[I]	4.5 credits	5/4/3/U

[I] Determines the final grade of the course, which is issued only when all course units have been passed.

Course literature

The literature list for the course will be provided latest 8 weeks before the course starts.

Scientific articles will be handed out during the course.

Reference literature:

• Antony, J. (2014). Design of Experiments for Engineers and Scientists. Second edition. Elsevier.
• American Psychology Association (2020). Publication Manual of the American Psychological Association. Seventh Edition. APA.

• Dawson, C. W. (2009). Projects in Computing and Information Systems: A Student's Guide. Second Edition. Addison Wesley.
• Janert, P. K. (2016). GNUPlot in Action: Understanding Data with Graphs. Second edition. Manning.
• Krantz, S. G. (2017). A Primer of Mathematical Writing. Second edition. American Mathematical Society.
• Kuhn, T. S. (2012). The Structure of Scientific Revolutions. Fourth edition. The University of Chicago Press.
• Shadish, W. R., Cook, T. D., Campbell, D. T. (2002). Experimental and Quasi-experimental Designs for Generalized Causal Inference. Wadsworth.
• Wadpole, R. E., Myers, R. H., Myers, S. L., Ye, K. (2012). Probability & Statistics for Engineers and Scientists. Ninth Edition. Pearson.
• Williams, J. M., Colomb, G. G. (2007). The Craft of Argument. Third Edition. Pearson Longman.