



Faculty of Health, Science and Technology
Computer Science

Syllabus

Introduction to Privacy and Privacy Enhancing Technologies

Course code: 7DAV023
Course Title: Introduction to Privacy and Privacy Enhancing Technologies
Introduktion till integritet och integritetsskyddande teknologier
Subject: Computer Science
Credits: 3 ECTS
Degree Level: Doctoral

Course approval

The syllabus was approved by the Faculty of Health, Science and Technology, 25 September 2024 and is valid from the autumn semester 2024 Karlstad University.

Language of instruction

Teaching language is English.

Prerequisites and selection

Admitted to research education in Computer Science, Computer Engineering or in a related subject. Basic knowledge of cryptography is required.

The course is for both doctoral students admitted at Karlstad University and for doctoral students admitted at other universities.

Learning outcomes

After completed course the doctoral student should know and be able to reason about:

- Basic legal privacy concepts and requirements (GDPR)
- Data protection goals
- Fundamentals of privacy enhancing technologies (PETs)

Moreover, the doctoral student should be able to reason about privacy challenges and/or technical solutions related to their research fields.

Course content

The course first introduces privacy as a concept and basic legal privacy principles with a focus on the GDPR.

It introduces PETs and shows how they can be used for implementing data protection goals of data minimization, transparency and intervenability derived from the GDPR.

A focus will be on data minimization technologies, including:

- Anonymous communication protocols (VPN, Mixes, Tor)
- Cryptographic schemes for anonymous systems: Zero-knowledge proofs, Anonymous credential
- Data privacy and data anonymisation: k-anonymity, differential privacy
- Secret sharing and Secure Multi-Party Computation.

The course also comprises presentations by the participating doctoral students on how PETs can be used to solve practical and theoretical privacy problems related to the student's research fields, along with discussions of their advantages, disadvantages and open challenges.

Reading list

See separate Reading List.

Examination

For a Pass grade, doctoral students are required to actively participate in the lectures and presentations. They should each elaborate, present and discuss privacy problems related to their research field and how these problems could be addressed by available or future PETs and open challenges.

Grades

One of the grades Fail (U) or Pass (G) is awarded in the examination of the course.

Quality assurance

A written evaluation is carried out at the conclusion of the course. The result of the evaluation is collated in accordance with *The Higher Education Ordinance*, Chapter 1, § 14.

Course Certificate

Course certificate is issued on request.

Goal matrix

Goals that, after completing the course, are fulfilled for the doctoral or licentiate degree are marked with an X.

	Doctoral			Licentiate	
	Knowledge and understanding			Knowledge and understanding	
1a	- demonstrate broad knowledge and systematic understanding of the research field and	X		1a demonstrate knowledge and understanding in the field of research including	X
1b	advanced and up-to-date specialised knowledge in a limited area of this field, and			1b current specialist knowledge in a limited area of this field as well as	
1c	familiarity with research methodology in general and the methods of the specific field of research in particular.			1c specialised knowledge of research methodology in general and the methods of the specific field of research in particular	
	Competence and skills			Competence and skills	
2a	- demonstrate capacity for scholarly analysis and synthesis as well as	X		2a demonstrate the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively and to	X
2b	to review and assess new and complex phenomena, issues and situations autonomously and critically			2b plan and use appropriate methods to undertake a limited piece of research and other qualified tasks within predetermined time frames in order to contribute to the formation of knowledge	
3a	- demonstrate the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively, and to			2c as well as to evaluate this work	
3b	plan and use appropriate methods to undertake research and other qualified tasks within predetermined time frames and to review and evaluate such work			3a demonstrate the ability in both national and international contexts to present and discuss research and research findings in speech and writing and in dialogue with the academic community and	
4	- demonstrate through a dissertation the ability to make a significant contribution to the formation of knowledge through his or her own research			3b society in general	

5a	- demonstrate the ability in both national and international contexts to present and discuss research and research findings authoritatively in speech and writing and in dialogue with the academic community and		4	demonstrate the skills required to participate autonomously in research and development work and to work autonomously in some other qualified capacity.	
5b	society in general				
6	- demonstrate the ability to identify the need for further knowledge and				
7	- demonstrate the capacity to contribute to social development and support the learning of others both through research and education and in some other qualified professional capacity.				
	Judgement and approach			Judgement and approach	
8a	- demonstrate intellectual autonomy and disciplinary rectitude as well as		5	demonstrate the ability to make assessments of ethical aspects of his or her own research	
8b	the ability to make assessments of research ethics, and		6	demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used	X
9	- demonstrate specialised insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used.		7	demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.	