Reg No: DVAD30/20252

Faculty of Health, Science and Technology
Computer Science

Syllabus

Privacy by Design

Course Code:	DVAD30
Course Title:	Privacy by Design *Inbyggd integritet*
Credits:	7.5
Degree Level:	Master's level
Progressive Specialisation:	Second cycle, has only first-cycle course/s as entry requirements (A1N)

Major Field of Study:
DVA (Computer Science)

Course Approval
The syllabus was approved by the Faculty of Health, Science and Technology 2025-03-05, and is valid from the Autumn semester 2025 at Karlstad University.

Prerequisites
Computer Science, 30 ECTS credits, or three years of work experience in the IT sector, and upper secondary level English 6 or B, or equivalent

Learning Outcomes
Upon completion of the course, students should be able to:
- explain basic legal privacy concepts, regulations and principles, and major court decisions at national and European level,
- analyse challenges and risks of ICT and applications in relation to privacy,
- relate legal privacy principles to technical concepts,
- explain basic technologies for security and privacy protection,
- relate security and privacy goals to suitable mechanisms and technologies,
- explain when and how to apply different privacy enhancing technologies,
- explain the concepts of privacy, data protection, privacy enhancing technologies, privacy

by design, and privacy impact assessment,
- relate privacy by design to personal privacy, data protection, privacy enhancing technologies, and basic human rights,
- explain how privacy by design and privacy impact assessment are used in regard to privacy enhancing technologies,
- demonstrate broad knowledge of various approaches to managing information privacy and data protection in organisations,
- demonstrate deep insight into one method for managing information privacy,
- develop analytical skills in risk and effect analysis of privacy protection,
- demonstrate broad knowledge of privacy control selection methods, and deep insight into the concept of privacy controls per se,
- explain the fundamental principles of architectural tactics for privacy protection and privacy patterns,
- list relevant patterns used to ensure privacy,
- analyse the usage and occurrence of privacy patterns in a given systems context,
- apply appropriate architectural tactics in a given systems context and for a given set of privacy requirements,
- identify threats and risks in relation to privacy in IT systems that use artificial intelligence (AI),
- give an account of basic legal principles for the use of AI when personal data are involved, and
- perform risk assessment processes for IT systems that use AI.

Content
The following components are included:
- Fundamental concepts of architectural tactics and patterns
- Privacy protection as quality attribute of software systems
- Introduction to privacy patterns, privacy anti-patterns, and privacy dark patterns
- Applying privacy patterns in agile development
- The relationship between artificial intelligence and data protection

The course comprises five modules.

Module 1 Introduction to privacy and the GDPR, 1.5 ECTS cr
The module includes the definitions, history and foundations of privacy with an emphasis on the challenges in information and communication technology. The focus is on the European and national (Swedish) laws regulating privacy, data protection and cyber safety, including agreements on transferring personal information beyond the EU. Some important decisions of the EU court in this area are discussed.

Module 2 Privacy enhancing technologies, 1.5 ECTS cr
The module introduces security and privacy mechanisms and technologies and proceeds to focus on how security and privacy mechanisms can be used to solve practical and theoretical problems, along with discussions of their advantages and disadvantages.

Module 3 Designing for privacy, 1.5 ECTS cr
The module introduces the foundations of privacy, data protection, and privacy enhancing technologies, and focuses on the concepts of privacy by design and privacy impact assessments by exploring the relevant background, their relationship to the foundation and fundamental human rights, and by introducing relevant methods.

Module 4 Privacy patterns for software design, 1.5 ECTS cr
The module deals with privacy aspects as part of software development. It particularly focuses on architectural tactics and patterns as reusable conceptual solutions to recurring problems in privacy protection. It also outlines how to use these concepts in agile

development settings in order to engineer privacy into software.

Module 5 Artificial intelligence and data protection, 1.5 ECTS cr
This module focuses on the relationship between artificial intelligence and data protection, provides insight into the basics of artificial intelligence, and treats how to protect personal data when using various types of machine learning models. New legal obligations in European regulations concerning applications of AI and data protection are also discussed.

Reading List
See separate document.

Examination
Assessment is based on five individual written hand-in assignments and five individual oral presentations, one of each per module.

If students have a decision from Karlstad University entitling them to Targeted Study Support due to a documented disability, the examiner has the right to give such students an adapted examination or to examine them in a different manner.

Grades
One of the grades Distinction (VG), Pass (G), or Fail (U) is awarded in the examination of the course. Engineering students are awarded one of the grades Pass with Distinction (5), Pass with Some Distinction (4), Pass (3) or Fail (U).

Quality Assurance
Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate
A course certificate will be provided upon request.

Additional information
The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.

The courses DVAD31, DVAD32, DVAD33, DVAD34 and DVAD35 cannot be included in the same degree programme as DVAD30.