



Faculty of Health, Science and Technology  
Computer Science

# Syllabus

## Systems modeling and simulation

<b>Course Code:</b>	DVAD27
<b>Course Title:</b>	Systems modeling and simulation <i>Systemmodellering och simulering</i>
<b>Credits:</b>	5
<b>Degree Level:</b>	Master's level
<b>Progressive Specialisation:</b>	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 2022-02-24, and is valid from the Autumn semester 2022 at Karlstad University.

### Prerequisites

Computer Networking I (7.5 ECTS credits), Operating Systems (7.5 ECTS credits), and Mathematical Statistics (7.5 ECTS credits), plus upper secondary level English 6, or equivalent

### Learning Outcomes

Upon completion of the course, students should be able to:

1. give an account of the possibilities and limitations of modeling, especially as regards systems modeling, but also as regards implicit effects of economic models related to the environment, such as life cycle analyses,
2. use analytical modeling to evaluate computer systems and their performance, with a focus on network, security, and software development applications,
3. develop and evaluate various types of simulation models,
4. use emulation tools to evaluate performance,

5. use appropriate statistical methods to compare systems, interpret data, and present data, and
6. assess what factors are important when choosing between different techniques for evaluating performance.

### **Content**

- A review of statistical analysis, including ANOVA, and basic principles of queuing theory used for performance analysis
- Analytical modeling and evaluation of computer systems
- Simulation-based evaluation, with a focus on discrete event simulation
- Performance evaluation using emulation techniques

The course is oriented toward a practical application of theories and concepts, mainly focused on performance evaluation in the areas of network, security, and software development.

The course consists of lectures and laboratory sessions.

### **Reading List**

See separate document.

### **Examination**

Assessment is individual and based on two components:

- 1) A written exam
- 2) A laboratory component presented in writing

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 Great Distinction (5), Distinction (4), Pass (3) or Fail (U) is awarded in the examination of the course.

### **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.