Faculty of Health, Science and Technology
Computer Science

Syllabus

Advanced Communication Networks

Course Code:	DVAD20
Course Title:	Advanced Communication Networks *Avancerade kommunikationsnät*
Credits:	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 2022-02-01, and is valid from the Autumn semester 2022 at Karlstad University.

Prerequisites
Computer Networking I, 7.5 ECTS credits, and upper secondary level English 6, or equivalent

Learning Outcomes
The aim of the course is for students to acquire an in-depth understanding of how modern communication networks are designed, managed, and operated. The course introduces and builds on Software Defined Networking (SDN), which makes it possible to introduce new protocols and functions quickly into operation, without making substantial changes in the hardware. In addition, SDN enables the implementation of complex functionality in SDN controllers, and reduces the cost of network components (that is, switches and routers).

Upon completion of the course students should be able to:
1. describe different network architectures and explain the difference between data and control plane

2. describe important advantages of SDN, especially those that result from the separation of data and control plane
3. give a detailed account of how SDN data and control planes work
4. describe what network virtualisation is and how it is related to SDN
5. describe how a data centre network is structured and how SDN can be used to control traffic in data centre networks
6. describe different techniques of SDN-based network monitoring
7. explain how data centre networks contribute to economically and ecologically sustainable development, and
8. independently search for, collect, compile, and present relevant information in an elective area of specialisation.

Content
The course includes a review of SDN and different networking architectures. The course mainly covers the following:
- Networking architectures
- Software Defined Networking (SDN)
- Traffic engineering (for instance through Multi Protocol Label Switching (MPLS))
- Data centre networks and aspects of energy efficiency
- Network management with SDN
Attention is also paid to ongoing technological developments in the field.

Instruction is in the form of lectures, individual reading supported by study guides and supplementary material, hand-in assignments, laboratory sessions, and a seminar. Students are required to search for, collect, compile, and present relevant information for a specialisation assignment.

Reading List
See separate document.

Examination
Assessment is based on three components:
1) individual hand-in assignments
2) a laboratory component (group work) presented in writing
3) an oral presentation of a research article and leading a seminar discussion around the paper

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 5 (Pass with Distinction), 4 (Pass with Some Distinction), 3 (Pass), U (Fail) 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.

The course DVAD20 cannot be included in the same degree programme as the course DVAD52.