Faculty of Health, Science and Technology
Computer Science

Syllabus

Internet Architectures and Protocols

Course Code:	DVAD21
Course Title:	Internet Architectures and Protocols *Internetarkitektur och protokoll*
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 2022-02-24, 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
Upon completion of the course, students should be able to:
1. explain the relation between latency and data rate and the impact on quality of these parameters for different internet applications,
2. explain the concepts Quality of Service and Quality of Experience, and describe various given architectures aimed at providing Quality of Service,
3. explain how a selection of active queue management algorithms work and how they interact with congestion control,
4. give an account of the different protocols used to access the web and the advantages and disadvantages of the various protocols,
5. describe protocols used to transmit streamed media and real-time media and explain the

design based on the requirements of various applications,
6. explain how the architecture of the Internet has been developed over time,
7. give an account of the concept "Internet ossification" and its underlying causes, and describe possible solutions for handling and preventing it,
8. describe the advantages and disadvantages of multi-access communication, and explain different solutions for key components in multi-access communication, and
9. explain what the concept of net neutrality means, the responsibility of different actors, and how economy as a driving force influences the development of the Internet.

Content
The course covers how the architecture and protocols of the Internet have been developed over time and how this development is related to the various applications used on the Internet and related requirements. The main areas covered in the course are the following:
- the requirements of different Internet applications and factors that influence the experienced quality of those applications,
- key resource management techniques such as congestion control and active queue management,
- different architectures for providing "Quality of Service", such as IntServ and Diffserv,
- the architectural solutions and protocols used by significant Internet applications such as various web and media services,
- how new services can be introduced on the Internet, limitations that exist and how they can be overcome, and
- the ecosystem of the Internet and how the responsibilities and driving forces of different Internet actors affect how services are provided on the Internet.

Reading List
See separate document.

Examination
Assessment is based on an individual written exam and individual presentations of tests and exercises.

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 Pass with Distinction (5), Pass with Some 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.

The courses DVAD02, DVAD60, DVAD61, DVAD62, DVAD63, and DVAD64 cannot be included in the same degree programme as DVAD21.