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Faculty of Health, Science and Technology

Computer Science

**Syllabus**

**Computer Networking Seminar: 5G, edge and IoT**

## **Course Code:** 7DAV011**Course Title:** Computer Networking Seminar: 5G, edge and IoT

##  *Seminarieserie inom datakommunikation: 5G, edge och IoT*

## **Credits:** 7.5 ECTS

**Degree Level:** Doctoral

## **Course Approval**

The syllabus was approved by the Faculty of Health, Science, and Technology,
8 February 2023 valid from the fall semester of 2022.

## **Language of instruction**

Teaching is conducted in English.

## **Prerequisites**

## The course is primarily for doctoral students at Karlstad University, secondly for doctoral students admitted to other universities, and thirdly for others. To be eligible, an applicant should be enrolled in doctoral studies in Computer Science or hold a Master’s degree in Computer Science or equivalent.

## **Learning Outcomes**

After the course, students should be able to:

* identify literature of relevance for both the own learning and the learning of others;
* determine the demands of various vertical applications and 5G use cases and relate the demands to the design of 5G networks and key concepts such as network slicing and multi-connectivity;
* argue the role and importance of edge computing for 5G networks and justify its relationship to various IoT use cases;
* analyze the main strengths and limitations of current research works in 5G networks, edge computing and IoT, both with respect to the technical solutions presented and the evaluation methods used;
* authoritatively present and discuss current research results and methodological choices within 5G networks, edge computing, and IoT.

## **Course Content**

## This course aims to increase understanding of current development and research in 5G networks, edge computing, and the internet of things (IoT). Furthermore, the course offers practice in reading research papers and critically analyzing, presenting, and reflecting on the research of others.

The course comprises ten or more seminars during which students discuss research papers on current topics in 5G networks, edge computing, and IoT. Each participating student is responsible for selecting the detailed theme and articles for one of the seminars, preparing a set of discussion questions, and leading the seminar. Additional seminars are selected by the course responsible if needed. The selection of the seminar themes is discussed in a preparatory meeting to ensure good coverage of the course topics and to arrange the order of the seminars for the course in a good way.

## **Reading List**

Contemporary research works were selected for each course instance and made electronically available.

## **Examination**

Seminar participation and performance in discussions. Students are expected to come to the seminars prepared to discuss the reading in-depth, and the seminar leader ensures that all students actively participate in the discussions. Each student must also prepare the materials and lead one of the seminars in the course. A student who fails to attend a seminar must hand in written answers to all seminar discussion questions.

## **Grades**

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

## **Quality Assurance**

## The course convenor has a duty to encourage a continuous dialogue on learning processes and goal fulfillment. A written evaluation is carried out after the course, combined with a joint student-teacher discussion of all aspects commented on. The evaluation result is collated and made available by *The Higher Education* Ordinance, Chapter 1, § 14.

## **Course Certificate**

## A 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.

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| --- | --- | --- | --- | --- | --- | --- | --- |
|   | **Doctoral** |  |   |   |   | **Licentiate** |   |
|   | **Knowledge and understanding** |  |   |   |   | **Knowledge and understanding** |   |
| 1a |  - demonstrate broad knowledge and systematic understanding of the research field and |  |   |   | 1a | demonstrate knowledge and understanding in the field of research including |   |
| 1b | advanced and up-to-date specialised knowledge in a limited area of this field, and |  | X  |   | 1b | current specialist knowledge in a limited area of this field as well as |  X |
| 1c | familiarity with research methodology in general and the methods of the specific field of research in particular. |  |  X |   | 1c | specialised knowledge of research methodology in general and the methods of the specific field of research in particular |  X |
|   | **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 |  |  X |   | 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 |  |  X |   | 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 |  X |
| 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 |  |  X |   | 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 |  |  X |   |  |   |   |
| 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. |  |  X |   |  |   |   |
|   | **Judgement and approach** |  |   |   |  | **Judgement and approach** |   |
| 8a |  - demonstrate intellectual autonomy and disciplinary rectitude as well as |  |  X |   | 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 |   |
| 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. |  X |