Pervasive Computing 7.5 credits M7012E

Pervasive Computing

Course syllabus admitted: Spring 2024 Sp 3 - Present

DECISION DATE
2023-02-15

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Pervasive Computing

Second cycle, M7012E

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Mobila system	Computer Technology

Main field of study

Computer Science and Engineering

Entry requirements

Introduction to programming (D0009E), 7.5 credit, Object-oriented programming and design (D0010E), 7.5 credit, Algorithms and data structures (D0012E), 7.5 credit and Software engineering (D7032E), 7.5 credit.

Good knowledge in English, equivalent to English 6.

Selection

The selection is based on 30-285 credits

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Course Aim

The aim of the course is to study design and implementation of modern computing systems that are built on distributed states and where the general course goal is to study design and implementation of pervasive and mobile systems that builds on distributed states and where multiple devices communicates with eachother (for instance systems based on sensors and actuators).

Knowledge and understanding

- Demonstrate basic knowledge and understanding of software engineering both individually and in a group.
- Demonstrate knowledge of proven software engineering methods and theories for design and implementation of pervasive and mobile systems.
- Demonstrate insight in the scientific state of the art in pervasive and mobile computing.
- Demonstrate in-depth knowledge in pervasive and mobile computing.

Competence and skills

- Demonstrate abilities to critically and creatively identify, formulate, analyze and evaluate design and implementation of pervasive and mobile systems, using an entrepreurial methodology.
- Demonstrate abilities to critically and systematically design pervasive and mobile systems through modeling and evolutionary   integration of knowledge, from limited information.
- Demonstrate abilities to plan, lead and execute software engineering assignments related to pervasive and mobile computing.
- Demonstrate abilities to design pervasive and mobile systems in regards of human needs and abilities as well as the society's goals for economical, social and ecological factors for sustainable development.
- Demonstrate abilites for oral and written presentation in English of a pervasive and mobile system.

Judgement and approach

- Demonstrate abilities tu judge scientific, societal and ethical aspects of pervasive and mobile computing.
- Demonstrate insights into the potentials and limitations of pervasive and mobile computing, foremost regarding economical and social aspects.
- Demonstrate insights and capacities of working in a non-homogeneus group of 4-5 students (not freely composed groups).
- Demonstrate abilities to search for new knowledge and to continously develop skills using entrepreneurial methodologies (individually and through collaboration with other students).

Intended Learning Outcomes (ILO)

1. Be able to describe pervasive computing and reason about its core concepts.
2. Be able to participate in the design and implementation of a pervasive computing system, with distributed components including both sensors and actuators.
3. Be able to find and analyze knowledge presented in research articles and to present an overview in a seminar format as well as in reflective summaries.
4. Be able to jointly present and demonstrate a prototype system in a seminar format.
5. Be able to write a research paper based on project work in group.

Contents

The course builds on Software Engineering (D7008E/SMD136) and will be designed as a project course where the goal is to study the field through seminars and in a group design and implement a prototype system. The course includes a project in groups where the assignment is openly defined and is later presented both orally and written. The course also includes study assignments and seminars with mandatory presence.

Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.

The course is roughly divided into three intertwined parts: lectures, seminars and projects. These are designed to maintain activity throughout the course. Lectures and seminars provide a 'heartbeat' together with individual group tutoring meetings, such that every week has activities to participate in and goals to achieve.

Reflections (individual and in group) are one of the main pedagogical tools in the course, where knowledge and ideas gained in lectures and seminars are aimed towards helping with the written and oral presentation of the projects. Peer feedback is also used, both for the individual seminars and for the projects conducted in groups.

Lectures

The first part of the course is based on a serie of mandatory and optional lectures that requires active participation from the students. The purpose of the lectures are to provide insights into many facets of pervasive computing, from the point of view of many other related subjects and individual experiences. The lectures therefore mainly target ILO-1 and ILO-5, to be able to describe pervasive computing and reason about its core concepts, which also contributes to the introduction, related work and discussion sections of the project reports.

A number of lectures are mandatory since the written and oral examination of the course mainly cover the project work, through the paper and seminar at the end of the course. Presence is therefore necessary as a pass or fail category. The additional optional lectures are less close to the subject and more orienting of nature.

Lectures will typically differ from year to year, depending on available guest lecturers and external events.

Seminars

The second part of the course is a set of seminars, that complement the lectures to provide the overview of the subject, which are based on research publications from international conferences and journals which are either of individual interest and/or related to the projects. This contributes to ILO-3, to be able to find and analyze knowledge presented in research articles and to present an overview in a seminar format as well as in reflective summaries, but it also contributes to the other ILOs.

Note that this is an individual assignment, and is graded individually, while the content change from year to year.

Projects

The third part of the course is conducted in groups, normally of 3-5 students. The groups organize themselves, with a setup and with tools of their own liking. The work aims towards developing a prototype system, to be described in a project report (in paper format) and presented in a final seminar. The work is divided into certain phases, with specific deadlines and related tutor meetings in group (bi/weekly).

Finally, note that tools used will be individually selected depending on the projects and will change year from year.

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Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

Examination is done through both individual and group assignments, which leads to a U/3/4/5 grade. The course will use continual examination, meaning that (sub)parts of the course are graded throughout the course. The examination is organized by obtaining points, where 100p is the maximum. You will need 50p in order to pass the course, earning a '3'. 70p is needed in order to earn a '4', and 90p will translate into an '5'.

Examination will thus practically be done continuously, based on the following:

1. Review of project results
2. A final group presentation
3. A project report in paper format
4. Active participation in lectures
5. Active participation in seminars including presentation and opposition of papers
6. A short 1 minute video about your project

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Remarks

The course will not be given every year.

Course offered by

Department of Computer Science, Electrical and Space Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0004	Lectures	U G#	2	Mandatory	S22	
0005	Seminars with individual assignments	U G#	1.5	Mandatory	S22	
0006	Project work	G U 3 4 5	4	Mandatory	S22	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

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Last revised

by Robert Brännström 2023-02-15

Syllabus established

by Department of Computer Science and Electrical Engineering 2007-12-17

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