Positioning Systems

Programme course

6 credits

Positioneringssystem

TNK106

Valid from: 2017 Spring semester

Determined by
Board of Studies for Industrial Engineering and Logistics

Date determined
2017-01-25

Main field of study
Electrical Engineering, Transportation Systems Engineering

Course level
Second cycle

Advancement level
A1X

Course offered for
- Intelligent Transport Systems and Logistics, Master's programme
- Communication and Transportation Engineering, M Sc in Engineering

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Mobile Communication and Networks

Intended learning outcomes
The general purpose is to give theoretical as well as practical knowledge in different positioning technologies. After completing the course, the student is expected to be able to:

- Identify the most common positioning systems and their main characteristics
- Assess the potential of using different positioning systems for a certain application
- Explain the implementation principles of selected positioning systems and methods
- Given a sequence of measurements, apply different positioning methods in order to estimate the position of a target
- Perform map matching given a road network and a sequence of position estimates
- Estimate and assess the accuracy of a general positioning system
- Identify and explain measurements relevant for positioning and how they are measured in different positioning systems

Course content

Positioning systems, e.g. GNSS, cellular and WLAN. Positioning methods, e.g. ToA, TDoA, AoA and pattern matching. Range and angle measurements. Accuracy metrics and estimation. Selected topics within vehicle positioning, GIS, databases, pattern recognition and tracking.

Teaching and working methods

The course contains lectures, tutorials and laboratory work.

Examination

UPG1	Group assignment with oral and written report. Seminar	4 credits U, 3, 4, 5
LAB1	Laboratory work	2 credits U, G

Grades

Four-grade scale, LiU, U, 3, 4, 5

Department

Institutionen för teknik och naturvetenskap

Director of Studies or equivalent

Erik Bergfeldt

Examiner

David Gundlegård

Education components

Preliminary scheduled hours: 48 h
Recommended self-study hours: 112 h

Course literature

Additional literature

Books

Küpper, Axel, (2005) *Location-based services : fundamentals and operation*
ISBN: 0470092319, 9780470092316
Chichester : John Wiley and Sons Ltd, 2005.

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.