



About the course

- Advanced course:
 - Main specialization: Networking and Services
 - Secondary specialization: Algorithms, Data Analytics and Machine Learning, Data Science
 - 6 credit units for passing the course
 - Lectures and weekly exercises
 - Home exam at the end of the course
 - Mandatory project work (approx 2 credit units)
 - Passing the course requires at least 50% of points from home exam and exercises + successful completion of project work



About the course

- Course webpage
 - <https://www.cs.helsinki.fi/courses/582760/2016/s/k/1>
 - Course material and exercises will be available in electronic form from the webpage
- Exercises
 - Have to be returned electronically to the instructors, minimum 15 minutes before the exercise session
 - The exercises will be available from the course webpage
 - Solutions published online after the exercise session



Prerequisites

- Mathematics:
 - Understanding of basic concepts in geometry, linear algebra and calculus
 - Knowledge about basic concepts in probability and statistics
- Programming:
 - Capability to implement algorithms for processing location measurements
 - Implementation language can be chosen freely, but preferred languages Matlab, python, Java, R



Objectives

- Understand how location information can be measured and represented
- Obtain basic knowledge about approaches to positioning and be able to apply this in practice
- Learn basics of spatial data analysis and be able to identify patterns from location measurements



Outline

- Location-Awareness
 - Coordinate systems and other basic concepts
 - Location-Based Services
- Positioning and Location Systems
 - Positioning Algorithms
 - Measuring Location
- Spatial Analysis
 - Clustering, Indexing, Preprocessing, Filtering
 - Place Detection, Trajectory Mining, Recommendations
- Focus on **techniques/algorithms** for analyzing and processing location data