

Datateknik – Kursbeskrivningar (Course descriptions)

Introduction to data science, 5 ects

This course is designed to provide an overview to the field of data science. Throughout the course the students get familiar with the different branches of data science and they also get to know of the standard steps when dealing with the data. They also get to try their hand on some of the programming packages of the field. At the end of the course the students are able to use the data and interpret the result to some basic extent. They are also prepared to continue with studying to deal with more complex problems. The course is self-paced and you can go through it faster or slower depending on your own time table.

Time: Autumn 2017

Prerequisites for the course

Basic knowledge of python is required for this course.

Target group

The course is targeted for professionals with an IT-background, currently wanting to upgrade their skills and is suitable for both unemployed as well as those in the working force. Anyone interested in this topic and with basic skills in python can register for the course.

Registration and fees

Adult students or students outside Finland register via the [Open University](#), students från Åbo Akademi through [MinPlan](#) and students from other Universities in Finland register through the JOO-agreement. This course is part of a pilot project and if you only want to attend the course you can do it for free. However, if you wish to do all the exercises and get credit points and a certificate you need to pay the Open university term fee of 50 euros.

Examination

The evaluation is based on the grades of assignments (40%) and the final project (60%).

The course content is organized as follows:

Lecture 1: What is data science?

Lecture 2: Data collection, data types and preparation, python preliminary

Lecture 3: Data cleaning and integration

Lecture 4: Exploratory data analysis

Lecture 5: Scaling up analytics, map-reduce

Lecture 6: Graph analytics, link analysis

Lecture 7: Classification, regression

Lecture 8: Clustering

Lecture 9: Knowledge bases and their applications

Data analysis with visual basic, 5 ects - no specific prerequisites, open for anyone!

Data analysis is one of the crucial steps in dealing with the data. In this course the students learn how to use the Visual Basic programming skills to deal with the data worksheets. At the end of this course the students are not only able to use the predefined functions to interpret the

data, but also are able to write their own functions to do the specific task they are given. Visual basic skills, although less complex than some other programming languages, is highly on demand in the market according to information gathered from the Public Employment Services. This makes the course an ideal choice for the professionals who are seeking new careers in the market and are willing to obtain new skills in order to increase their chances. The course is self-paced and you can go through it faster or slower depending on your own time table.

Time: Autumn 2017

Prerequisites for the course

No specific prerequisite.

Target group

As well as being targeted for professionals dealing with different kind of data, the course is also suitable for any Open University students interested in honing their skills in this area.

Examination

The evaluation is based on the grades of assignments (40%) and the final project (60%).

Registration

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The course content is organized as follows:

Lecture 1: Introduction

Lecture 2: Advanced text query

Lecture 3: Visualizations

Lecture 4: Introduction to the VBA Environment

Lecture 5: Data Types & Built-in Functions in VBA

Lecture 6: Modular Programming using Sub Procedures

Lecture 7: Selective Execution using If Structures and Select Case Structures

Lecture 8: Repetitive execution using loops

Lecture 9: Arrays

Machine learning, 5 ects

Machine learning skills are fast becoming necessary for data scientists as companies navigate the data and try to build automated decision systems that hinge on predictive accuracy. At the end of this course students get familiar with the foundation of machine learning. They would be able to analyse the data with standard machine learning skills and would be able to write the relevant code in MATLAB/Octave to facilitate these analyses.

Time: starting in week 44 (31.10.2016)

The course content is organized as follows:

Lecture 1: Introduction

Lecture 2: Linear methods for regression
Lecture 3: Logistic methods for regression
Lecture 4: Linear methods for classification
Lecture 5: Tree-based methods for regression and classification
Lecture 6: Methods for high-dimensional problems
Lecture 7: Support vector machines
Lecture 8: Unsupervised methods
Lecture 9: Bayesian learning

Prerequisites for the course

The basic knowledge of MATLAB/Octave is advised.

Target group

This course is targeted for Åbo Akademi University and University of Turku students, as well as to a general audience through the Open Universities of ÅÅ. The course is well suited for professionals with an IT-background, currently wanting to upgrade their skills and thus suitable for both unemployed as well as those in the working force.

Registration and fees

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Examination

Project-based, project peer-review, project report.

Facilitators and teachers:[PhD Sepinoud Azimi](#), and [professor Ion Petre](#), Åbo Akademi University.

Data Analytics Software, 5 ects

This Spring we are offering the final course in ÅÅ/CS Data Science package: “Data Analytics Software (5 ECTS)”. In this course, we provide an overview to some of the data analysis software. The focus of this course is on software that require minimal coding and can be efficiently used by students from all branches of studies, ranging from computer science to biology, to economy, and engineering. We are introducing software by two major leading companies in Data Science research, Microsoft and IBM. Throughout the course the students get familiar with various functionalities of these software and the data analysis tool they are providing. They also get to apply these tools in several mini-projects. At the end of the course the students can use the data, build models and interpret the output of the model with proposed tools.

Time: starting 3rd of April

Examination and prerequisites: The course evaluation is based on taking quizzes, delivering mini projects and peer reviewing other students’ projects. As a prerequisite basic machine learning / modelling skills are advised.

Target group

This course is targeted for Åbo Akademi University and University of Turku students, as well as to a general audience through the Open Universities of ÅA. The course is well suited for professionals with an IT-background, currently wanting to upgrade their skills and thus suitable for both unemployed as well as those in the working force.

Registration and fees

Adult students (non degree students) or students outside Finland register via the [Open University](#), students från Åbo Akademi through [MinPlan](#) and students from other Universities in Finland register through the JOO-agreement. This course is part of a pilot project and if you only want to attend the course you can do it for free. However, if you wish to do all the exercises and get credit points and a certificate you need to pay the Open university term fee of 50 euro

Facilitators and teachers: [PhD Sepinoud Azimi](#), and [professor Ion Petre](#), Åbo Akademi University.

Computational Modelling: Methods and Applications", 5 ECTS

The course aims to provide an introduction to the entire computational modeling process, from the formulation of a qualitative model, to its quantitative formulation, to model fitting and validation, model analysis, and model predictions.

We focus on the various computational methods that can be employed for modeling and especially on the advantages (and disadvantages) of each approach. We discuss in the course modeling with difference equations, differential equations, and with stochastic processes.

The examples we follow throughout the course are from biology and ecology, but the applicability of the methods covered in the course is very broad and it includes dependability issues in complex systems, resource availability, but also applications in economy, chemistry, and social sciences.

Course book: F.R. Giordano, M.D.Weir, W.P. Fox: A first course in mathematical modeling, Thomson, 2003.