Artificial Intelligence Engineering Systems – Signals, probability and data bases

Artificial Intelligence Engineering Systems (This flyer will be updated soon)	
Offered by	Department of Electrical Engineering
Language	English
Primarily interesting for	Coherent package for students with a background in Biomedical Engineering or Build Environment who aim to enter the MSc program Artificial Intelligence Engineering Systems.
Prerequisites	5ESE0: assumed pre-knowledge 2WBB0 & 5EIA0. 5ESB0: assumed pre-knowledge 2DE20, 5ESE0 & 4DA00. 2ID50: assumed pre-knowledge 2IT60.
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Content and composition

This coherent package is focusing on signals, signal processing techniques, models of dynamical systems and provides a number of elementary techniques data modelling and the use of data bases. The package offers tools for the representation of signals in the time and frequency domain, for the different representations and for the analysis of linear time-invariant dynamical systems and presents a number of techniques data management including data modeling and the extraction of information from data bases.

The package connects to the entrance level on signal processing, systems and data management and databases of the MSc program *Artificial Intelligence Engineering Systems* (AIES) and is recommended for bachelors students that consider doing a masters in AIES and lack relevant background on signals, systems and data science. There are three (3) coherent packages preparing for the MSc program AIES. Only one of these packages can be selected as coherent package in your Bachelor's degree program.

Course code	Course name	Level classification
5ESE0	Signal processing basics (Signals I)	1. introductory
5ESB0	Systems	1. introductory
2ID50	Data modelling and databases	2. deepening

Courses that are part of the major program for which you are registered cannot be taken as allowed courses in this coherent package. If such a course is mandatory in this coherent package, this means that the package cannot be chosen. There is a preference to take the introductory courses before the deepening course.

Course descriptions

5ESE0 Signal processing basics (Signals I)
Nowadays processing analog, or continuous-time, signals in the digital, discrete-time, domain is pervasive. This because of the fact that digital signal processing techniques are used in everything from digital photo cameras, digital television, mobile phones to automobiles and advanced medical imaging equipment. The course is organized in different modules around the topics: complex numbers and phasors, spectrum and fourier series, sampling and aliasing, finite impulse response filters, and frequency response.

5ESB0 Systems
Almost all engineering systems exhibit dynamic behaviour. In this course general tools for analysing and synthesizing dynamic systems described by differential equations are introduced. The basic principles of feedforward and feedback control are studied to show how the stability and performance of dynamic systems can be effectively influenced.

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2ID50 Data modelling and databases

Our lives are awash in data (e.g., social, business, web) which only continues to grow in both quantity and variety. Database management systems are key technologies which facilitate our practical use of these massive data sets. In this course, we study fundamental concepts, such as data model design and formulation of queries against databases, which underpin the effective practical use of industrial strength data management systems.