# UNIVERSITY OF PANNONIA

## COURSE DATASHEET

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|---|---|
| **Semester:** | 2015/16/2 |
| **Course:** | Control Theory |
| **Code:** | VEMKFOM144I |
| **Responsible department:** | Department of Process Engineering |
| **Department code:** | MKFO |
| **Responsible instructor:** | Dr. János Abonyi |

**Course objectives:**

The aim of the course is to familiarize students with basic concepts of the advanced control design. We study continuous-time an discrete-time systems as well. We study ideal, noiseless models as well as control tasks in the presence of noise and disturbances. We simulate the control methods, state estimation solutions and identification techniques with examples of systems that are relevant for mechatronic engineers, especially examples form the vehicle industry.

**Course content:**

Overview of basic concepts of control theory
Pole placement (zero and non-zero reference signal)
LQR control (zero and non-zero reference signal)
PID tuning and design
Parameter estimation with least squares method (non-recursive; recursive; recursive with exponential forgetting)
Linear Kalman filter
LQG control
Extended Kalman filter

**Requirements, evaluation and grading:**

There will be homework every week (except for the case of holidays and midterm exams). Sulotion of the homework has to be uploaded in Moodle within a week.

Assessment of the solutions will be carried out with 0, 1, ..., 10 points. 0 points: 0 pont: if the solution is not uploaded on schedule. If somebody gets points less than 10 (but more than 0) then the mistakes will be indicated in the uploaded homework documentation and there is a possibility of correction within a week. The subtracted points can be retrieved in the case of right correction.

There are going to be 2 midterm exams. Every exams consists of theoretical and practical parts. The midterm exams give the 25-25 % of the whole course completion (remaining 50 %: from the homeworks).
There is an optional corrective exam in the first week of the examination period (if somebody wants to get higher grade at the end of the course). In this case the mark of this exam is going to be the final grade (the previous midterm exam and homeworks are not considered in this case).

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**Requirements, evaluation and grading:**

Assesment of the whole semester performance:
[ 85 %; 100 %]   5;
[70 % ; 85 %[    4;
[55 % ;70%[    3;
[40 % ; 55 %[   2;
[0 % ; 40 %[    1.

**Required and recommended readings:**

References can be found on the Moodle learning system.