

Systems and Control: intensive master course 2009

General setting:

The aim of the intensive course SYSTEMS AND CONTROL is to get familiar with the basic concepts and more advanced notions from the mathematical theory of systems and control. The text for the course is the book *Introduction to Mathematical Systems theory: a Behavioral Approach*, by J.W. Polderman and J.C. Willems (Springer, New York, 1998). The book is temporarily out of print but is downloadable via www.mastermath.nl.

The book will be treated in several sessions, see below for a schedule. The students are expected to participate as follows:

- During the periods between the lecture days students are expected to study parts of the book independently and to work on exercises from the book.
- During the course a TAKE HOME EXAM consisting of two parts will be handed out. Part I is to be handed in two weeks after publication and Part II should be handed in during the intensive course week in Twente.
- During this course week, students get a reading assignment. On this material they have to give a PRESENTATION on the final day of the course (on Monday, November 23).

Students earn their course grade by the combination of the take home exam and the quality of the presentation. During the periods between the lecture days students can get individual help from the lecturers J.W. Polderman, A. Stoorvogel and J.W. van der Woude.

Contact:

All information on the course can be found on the web sites

www.mastermath.nl
and www.math.utwente.nl/~poldermanjw/onderwijs/DutchMaster09

On the latter web site there are download able pdf files, containing information on PROGRAM & GUIDELINES regarding the course (including a list of useful exercises) as well as the TAKE HOME EXAM. The information on the web site will be regularly updated. The lecturers J.W. Polderman, A. Stoorvogel and J.W. van der Woude can be contacted by email.

Lecturers

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Time and location:

- Monday, September 14, 2009, Uithof, Buys ballot Lab. Room 273, Utrecht, 10:15-12:00

- Monday, September 28, 2009, Uithof, Buys ballot Lab. Room 273, Utrecht, 10:15-12:00
- Monday, October 12, 2009, Uithof, Buys ballot Lab. Room 273, Utrecht, 10:15-12:00
- October 26 – October 30, 2009, Twente University.
- Monday, November 23 (subject to discussion), 2009, Uithof, Buys ballot Lab. Room 273, Utrecht, 10:15-14:45.

Literature:

J.W. Polderman and J.C. Willems, *Introduction to Mathematical Systems theory: a Behavioral Approach*, Springer, New York, 1998.

Schedule:

- September 14. The first part is used to get acquainted with each other. An inventory is made of the background knowledge of the students. During the second part we will describe in general terms what the first part of the book is about.
 - a Inventory of background knowledge.
 - b Sketch of Chapters 1,2.
- September 28. We start by discussing the problems with the book and the exercises. After that we will outline in general terms the second part of the book.
 - a Inventory of problems, exercises.
 - b Sketch of chapters 3 and 4.
- October 12. We start by discussing the problems with the book and the exercises. After that we will outline in general terms the third part of the book.
 - a Inventory of problems, exercises.
 - b Sketch of chapters 5 and 6.

Week October 26 – October 30. During this week five HALF DAY SESSIONS will be spend on the following:

- Monday afternoon. Inventory of problems, exercises, discussion of remaining chapters of the book.
- Tuesday morning. Students work independently on the problems of the TAKE HOME EXAM. The lecturers are available for questions
- Wednesday morning. Hand in the TAKE HOME EXAM. Reading material (parts of chapters 7,9, and 10, relevant journal articles) is handed out. The group is divided into pairs (or triples) of students. To each sub group a subject for the final presentations is assigned. Students study their reading material independently. The lecturers are available for questions.
- Thursday morning. Students study their reading material independently. The lecturers are available for questions.
- Friday morning. Students study their reading material independently. The lecturers are available for questions.

Monday, November 23 (subject to discussion): final meeting: Presentations.

- 10:15-14:30 Presentations by students.
- 14:30-14:45 Conclusive discussion.