Course Programme MVE136 Random Signals Analysis, 7.5 credits, 1st quarter Fall 2017

Teachers: Patrik Albin (Lectures 1-10, written exam), email `palbin@chalmers.se`.
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Course web-page: `http://www.math.chalmers.se/Stat/Grundutb/CTH/mve136/1718/`

Responsible university unit: Department of Mathematical Statistics, Mathematica Sciences, Chalmers Tvärgata 3. Expedition: Monday-Friday 11 am-1 pm.

Literature. *S.L. Miller and D.G. Childers: Probability and Random Processes With Application to Signal Processing and Communications, 2004*, available from Cremona Chalmer's bookshop as well as electronically from Chalmers Library. A new second edition of the book has been published Spring 2012 which can equally well be used by students: Besides the addition of more exercises to the 2012 edition, the differences between the two editions are essentially of a typographical nature. In all course material references will be given to the 2004 edition first and then to the 2012 edition afterwards within parenthesises (whenever there is a difference to the 2004 edition). Included material from the book by Miller and Childers: Sections 2.1-2.7 (2.1-2.8 in the second edition), 3.1-3.5, 4.1-4.8, 5.1-5.9, 8.1-8.6, 9.1-9.3, 10.1-10.4 and 11.1-11.6.

Lecture notes "Complement on Digital Spectral Analysis and Optimal Filtering: Theory and Exercises" authored by Mats Viberg, available through the course web-page. Two laborations available through the course web-page. Test exam available through the course web-page.

Examination. Written exam (6 credits) 27 October 2017 am with reexams 19 December 2017 pm and 20 August 2018 pm. Two mandatory laborations (1.5 credits), see the course web-page.

Permitted aids on the written exam are either two A4-sheets (4 pages) of hand-written notes (xerox-copies and/or computer print-outs are not allowed) or Beta (but not both these aids). The written exam will have 6 tasks that are worth 5 points each. Of the maximal total 30 points you need 12 points for grade 3, 18 points for grade 4 and 24 points for grade 5, respectively.

After an exam has been graded you recive an official result mail from Ladok with your result. After that you can goto the expedition (see above) and look at your exam and the grading. If you want you can make complaints about the grading on a form that is available at the expedition.

Lectures take place in room EA according to the following schedule

Lectures	**Day**	**Time**	**Programme**
Lecture 1	Tuesday 29 August	10-11.45 am	Ch. 3 in Miller and Childers' book
Lecture 2	Wednesday 30 August	8-9.45 am	Ch. 4 in Miller and Childers' book
Lecture 3	Tuesday 5 September	10-11.45 am	Ch. 5 in Miller and Childers' book
Lecture 4	Wednesday 6 September	8-9.45 am	Ch. 8 in Miller and Childers' book
Lecture 5	Tuesday 12 September	10-11.45 am	Ch. 8 in Miller and Childers' book
Lecture 6	Wednesday 13 September	8-9.45 am	Ch. 9 in Miller and Childers' book
Lecture 7	Tuesday 19 September	10-11.45 am	Ch. 9 in Miller and Childers' book
Lecture 8	Wednesday 20 September	8-9.45 am	Ch. 10 in Miller and Childers' book
Lecture 9	Tuesday 26 September	10-11.45 am	Ch. 11 in Miller and Childers' book
Lecture 10	Wednesday 27 September	8-9.45 am	Ch. 11 in Miller and Childers' book
Lecture 11	Tuesday 3 October	8-9.45 am	Lecture notes
Lecture 12	Tuesday 3 October	10-11.45 pm	Lecture notes
Lecture 13	Wednesday 4 October	8-9.45 am	Lecture notes
Lecture 14	Friday 13 October	8-9.45 am	Lecture notes

Consultations that offer help to students take place in room EA Tuesday 8-9.45 am weeks 3-5 and 7 and Wednesday 8-9.45 week 7.

Solved exercises. Detailed solutions are available from the course homepage for the problems listed below. Students are advised to study these solutions before working with the home exercises for own work. References are given to the 2004 edition of Miller and Childers's book first and to the 2012 edition afterwards within parenthesises. The non-stared exercises are most important.

Course segment	**Exercises**
Chapter 3 in book	Exercises 3.3⋆ (3.12⋆), 3.4 (3.13), 3.7⋆ (3.16⋆), 3.10 (3.21), 3.16 (3.36), 3.17⋆ (3.37⋆)
Chapter 4 in book	Exercises 4.13 (4.29), 4.15 (4.25), 4.20⋆ (4.38⋆), 4.22 (4.40), 4.31 (4.53)
Chapter 5 in book	Exercises 5.22 (5.51), 5.28⋆ (5.56⋆)
Chapter 8 in book	Exercises 8.5 (8.9), 8.7 (8.11), 8.11 (8.15), 8.14⋆ (8.18⋆), 8.22⋆ (8.33⋆), 8.23 (8.34), 8.27 (8.37)
Chapter 9 in book	Exercises 9.5 (9.22), 9.9 (9.12), 9.11 (9.14)
Chapter 10 in book	Exercises 10.8 (10.11), 10.12⋆ (10.15⋆), 10.14⋆ (10.19⋆), 10.19 (10.23)
Chapter 11 in book	Exercises 11.10 (11.5), 11.11 (11.6), 11.14 (11.9), 11.26 (11.34)
Lecture notes	Exercises 1, 3⋆, 4, 5⋆, 6, 8⋆

Home exercises. The following exercises are recommended to students as home exercises for own work. References are given to the 2004 edition of Miller and Childers's book first and then to the 2012 edition afterwards within parenthesises. The non-stared exercises are most important.

Course segment	**Exercises**
Chapter 3 in book	Exercises 3.5 (3.14), 3.9 (3.20), 3.14 (3.35), 3.19⋆ (3.46⋆)
Chapter 4 in book	Exercises 4.3 (4.90), 4.4⋆ (4.91⋆), 4.17 (4.35), 4.23 (4.41), 4.28 (4.50), 4.36⋆ (4.62⋆)
Chapter 5 in book	Exercises 5.5 (5.10), 5.29 (5.30), 5.32⋆ (5.60⋆), Test exam 1
Chapter 8 in book	Exercises 8.8 (8.12), 8.9 (8.13), 8.12 (8.16), 8.19 (8.20), 8.25⋆ (8.35⋆), 8.28 (8.41), Test exam 2
Chapter 9 in book	Exercises 9.2 (9.9), 9.8 (9.23), 9.17 (9.25), 9.26⋆ (9.19⋆), Test exam 3
Chapter 10 in book	Exercises 10.5 (10.8), 10.7⋆ (10.10⋆), 10.10 (10.13), 10.17 (10.21 a), 10.20⋆ (10.24⋆), Test exam 4
Chapter 11 in book	Exercises 11.1 (11.1), 11.5⋆ (11.14⋆), 11.12 (11.7), 11.17 (11.12), 11.20⋆ (11.22⋆), Test exam 5
Lecture notes	Exercises 2, 7 and 9, Test exam 6

Tutorials mainly intended to offer help with the exercises take place in room EA Tuesday 8-9.45 am week 2, Friday 10-11.45 am weeks 2-4, Friday 9-10.45 am week 5, Tuesday 10-11.45 am week 7 and Friday 10-11.45 am week 7 according to the following schedule.

Tutorial	**Day**	**Programme**
Tutorial 1	Tuesday 5 September	Chapters 3 and 4 in book
Tutorial 2	Friday 8 September	Chapters 5 and 8 in book
Tutorial 3	Friday 15 September	Chapter 8 and 9 in book
Tutorial 4	Friday 22 September	Chapter 9 and 10 in book
Tutorial 5	Friday 29 September	Chapter 11 in book
Tutorials 6	Tuesday 10 October	Lecture Notes
Tutorials 6-7	Friday 13 October	Lecture notes