Course Programme MSG800/MVE170 Basic Stochastic Processes, 7.5 credits, 2nd quarter Fall 2013

Responsible teacher. Patrik Albin, room L3072 Mathematical Sciences, telephone 031 772 3512, email palbin@chalmers.se

Course web-page. http://www.math.chalmers.se/Stat/Grundutb/GU/MSG800/A13/

Responsible university unit. Department of Mathematical Statistics, Mathematica Sciences, Chalmers Tvärgata 3. Expedition: Monday - Friday 9 am - 1 pm.

Literature. *Hwei Hsu: Probability, Random Variables, and Random Processes, 2nd Edition. Schaum's Outlines, McGraw-Hill 2010* and *Geoffrey Grimmett and David Stirzaker: Probability and Random Processes, 3rd Edition. Oxford University Press 2001.* These books are available from Cremona Chalmer's bookshop. Additional computer exercises are available from the course web-page.

The book *Geoffrey Grimmett and David Stirzaker: One Thousand Exercises in Probability. Oxford University Press 2001* (also available from Cremona) contains solutions to the exercises in *Probability and Random Processes* and can thus be used for suplementary reading.

Contents of course. Sections 5.1-5.4, Sections 5.6-5.8, Sections 6.1-6.5 and Chapter 9 in Hsu's book. Sections 6.1-6.5, 6.8-6.9 and 6.11 in the book by Grimmett and Stirzaker.

Prerequisites for the course, besides basic university level math, is basic probability theory from a first university level course in mathematical statistics.

Examination. Written exam 4 hours pm Monday 16 Dec 2013 in V, with reexams pm Tuesday 22 April 2014 and am Monday 25 August 2014. Permitted aids on the written exam are either two A4-sheets (4 pages) of hand-written notes (xerox-copies and computer print-outs are not allowed) or Beta – but not both these aids. The written exams have 6 tasks - you need a 40% score for grade 3/G, a 60% score for grade 4, a 70% score for grade VG and an 80% score for grade 5, respectively.

Lectures. The course has 15 lectures according to the schedule below. The x-tra Lecture X on Thursday 31 October 8 - 9.45 am covers useful facts from probability theory and mathematics such as multidimensional probability theory and conditional distributions, Fourier transforms and characteristic functions, convolutions, Dirac's δ-function (-distribution), etc.

Lectures	**Day**	**Time and place**	**Programme**
Lecture 1	Wednesday 30 October	8 - 9.45 am in Euler	Ch. 5 in Hsu's book
Lecture X	Thursday 31 October	8 - 9.45 am in Euler	X-tra lecture (see above)
Lecture 2	Thursday 31 October	10 - 11.45 am in Euler	Ch. 5 in Hsu's book (cont.)
Lecture 3	Wednesday 6 November	8 - 9.45 am in Euler	Ch. 5 in Hsu's book (cont.)
Lecture 4	Thursday 7 November	10 - 11.45 am in Euler	Ch. 5 in Hsu's book (cont.)
Lecture 5	Wednesday 13 November	8 - 9.45 am in Euler	Ch. 6 in G-S's book
Lecture 6	Thursday 14 November	10 - 11.45 am in Euler	Ch. 6 in G-S's book (cont.)
Lecture 7	Wednesday 20 November	8 - 9.45 am in Euler	Ch. 6 in G-S's book (cont.)
Lecture 8	Thursday 21 November	10 - 11.45 am in Euler	Ch. 6 in G-S's book (cont.)
Lecture 9	Wednesday 27 November	8 - 9.45 am in Euler	Ch. 6 in G-S's book (cont.)
Lecture 10	Thursday 28 November	10 - 11.45 am in Euler	Ch. 6 in Hsu's book
Lecture 11	Wednesday 4 December	8 - 9.45 am in Euler	Ch. 6 in Hsu's book (cont.)
Lecture 12	Thursday 5 December	10 - 11.45 am in Euler	Ch. 6 in Hsu's book (cont.)
Lecture 13	Wednesday 11 December	8 - 9.45 am in Euler	Ch. 9 in Hsu's book
Lecture 14	Thursday 12 December	10 - 11.45 am in Euler	Ch. 9 in Hsu's book (cont.)

Exercises. Help with the exercises are offered by Patrik Albin Thursdays 8 - 9.45 am in room Euler beginning second course week Thursday 7 November. See the web-page for exercises

http://www.math.chalmers.se/Stat/Grundutb/GU/MSG800/A13/Exercises/Exercises.html

Note that the course have changed Fall 2013 as compared with how it has been given the previous three years in that Chapters 2-4 in Hsu's book concerning probability theory are no longer lectured on and have been replaced by a considerably more extensive coverage of Markov chains. For the latter coverage the additional course book written by Grimmett and Stirzaker has been introduced.

The book by Grimmett and Stirzaker is also used for the advanced level courses MVE140/ MSA150 Foundations of Probability Theory and MVE330/MSF200 Stochastic Processes at Mathematical Sciences. While the book by Hsu is intended as a "learning book" the book by Grimmett and Stirzaker is more suitable as a reference book. It is therefore not only useful for learning Markov chains (as we use it to), but also for suplementary reading and reference purposes.

The exercise book by book Grimmett and Stirzaker contains solutions to all exercises from their book that are used in our course. Note that these solutions occupy just 26 pages (13 sheets) in the exercise book of its total 438 pages.