Course Programme MSG800/MVE170 Basic Stochastic Processes, 7.5 credits, 2nd quarter Fall 2015

Responsible teacher. Patrik Albin, email `palbin@chalmers.se`

Teaching assistant/exercise teacher. Claes Andersson, email `andclae@chalmers.se`

Course web-page. `http://www.math.chalmers.se/Stat/Grundutb/GU/MSG800/A15/`

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

Prerequisites for the course (besides basic university level math and some computer programming) is basic probability theory from a first university level course in mathematical statistics.

Lectures. The course has 28 lectures according to the schedule below. (The indicated content of lectures is approximative/preliminary.)

Lectures	**Day**	**Time and place**	**Programme**
Lecture 1	Wednesday 4 November	8 - 9.45 am in HC3	Crasch Course
Lecture 2	Wednesday 4 November	3.15 - 5 pm in HC3	Crasch Course
Lecture 3	Thursday 5 November	8 - 9.45 am in HC3	Ch. 5 in Hsu's book (cont.)
Lecture 4	Thursday 5 November	10 -11.45 am in KC	Ch. 5 in Hsu's book (cont.)
Lecture 5	Wednesday 11 November	8 - 9.45 am in HC3	Ch. 5 in Hsu's book (cont.)
Lecture 6	Wednesday 11 November	3.15 - 5 pm in HC3	Ch. 5 in Hsu's book (cont.)
Lecture 7	Thursday 12 November	8 - 9.45 am in HC3	Ch. 5 in Hsu's book (cont.)
Lecture 8	Thursday 12 November	10 -11.45 am in KC	Ch. 5 in Hsu's book (cont.)
Lecture 9	Wednesday 18 November	8 - 9.45 am in HC3	Ch. 5 in Hsu's book (cont.)
Lecture 10	Wednesday 18 November	3.15 - 5 pm in HC3	Ch. 5 in Hsu's book (cont.)
Lecture 11	Thursday 19 November	8 - 9.45 am in HC3	Ch. 6 in Hsu's book
Lecture 12	Thursday 19 November	10 -11.45 am in KC	Ch. 6 in Hsu's book (cont.)
Lecture 13	Wednesday 25 November	8 - 9.45 am in HC3	Ch. 6 in Hsu's book (cont.)
Lecture 14	Wednesday 25 November	3.15 - 5 pm in HC3	Ch. 6 in Hsu's book (cont.)
Lecture 15	Thursday 26 November	8 - 9.45 am in HC3	Ch. 6 in G-S's book
Lecture 16	Thursday 26 November	10 -11.45 am in KC	Ch. 6 in G-S's book (cont.)
Lecture 17	Wednesday 2 December	8 - 9.45 am in HC3	Ch. 6 in G-S's book (cont.)
Lecture 18	Wednesday 2 December	3.15 - 5 pm in HC3	Ch. 9 in Hsu's book
Lecture 19	Thursday 3 December	8 - 9.45 am in HC3	Ch. 9 in Hsu's book (cont.)
Lecture 20	Thursday 3 December	10 -11.45 am in KC	Ch. 9 in Hsu's book (cont.)
Lecture 21	Wednesday 9 December	8 - 9.45 am in HC3	Ch. 6 in G-S's book (cont.)
Lecture 22	Wednesday 9 December	3.15 - 5 pm in HC3	Ch. 6 in G-S's book (cont.)
Lecture 23	Thursday 10 December	8 - 9.45 am in HC3	Ch. 6 in G-S's book (cont.)
Lecture 24	Thursday 10 December	10 -11.45 am in KC	Ch. 6 in G-S's book (cont.)
Lecture 25	Wednesday 16 December	8 - 9.45 am in HC3	Ch. 6 in G-S's book (cont.)
Lecture 26	Wednesday 16 December	3.15 - 5 pm in HC3	Ch. 6 in G-S's book (cont.)
Lecture 27	Thursday 17 December	8 - 9.45 am in HC3	Ch. 6 in G-S's book (cont.)
Lecture 28	Thursday 17 December	10 -11.45 am in KC	Ch. 6 in G-S's book (cont.)

Literature. *Hwei Hsu: Probability, Random Variables, and Random Processes, 2nd Ed. 2010 or 3rd Ed. 2014. Schaum's Outlines, McGraw-Hill* and *Geoffrey Grimmett and David Stirzaker: Probability and Random Processes, 3rd Ed. 2001. Oxford University Press* are available from Cremona Chalmer's bookshop. List of Errata for Hsu's book available from the course web-page. Crasch course hand-out (stencil) on probability theory and math available from the course web-page. Information about exercise material available from the course web-page.

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 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. However, the solutions that concern us occupy just 26 pages (13 sheets) in this book of its total 438 pages.

Contents of course. Chapter 5, 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.

Exercises. The exercise material for the course is available from the course web-page

`http://www.math.chalmers.se/Stat/Grundutb/GU/MSG800/A15/Exercises/Exercises.html`

The problems in the book by Grimmett and Stirzaker are discussed by Patrik during lecture time. The problems for own work in Hsu's book and the corresponding computer problems are discussed by Claes Andersson during the exercise sessions, see below.

There are two weekly exercise session during course weeks 2-7 that will be run i parallell, which is to say that both of them have the same programme each week – students may thus want to go to just one of them each week. During these sessions students also can get help with solving other problems.

Exercise Session	**Day**	**Time and place**
Exercise Session 1	Thusday 12 November	1.15-3 pm in room VR
	Friday 13 November	3.15-5 pm in room MV:Pascal
Exercise Session 2	Thursday 19 November	1.15-3 pm in room VR
	Friday 20 November	3.15-5 pm in room MV:Pascal
Exercise Session 3	Thursday 26 November	1.15-3 pm in room VR
	Friday 27 November	3.15-5 pm in room MV:Pascal
Exercise Session 4	Thursday 3 November	1.15-3 pm in room VR
	Friday 4 November	3.15-5 pm in room MV:Pascal
Exercise Session 5	Thursday 10 December	1.15-3 pm in room VR
	Friday 11 December	3.15-5 pm in room MV:Pascal
Exercise Session 6	Thursday 17 December	1.15-3 pm in room VR
	Friday 18 December	3.15-5 pm in room MV:Pascal

At Exercise Sessions 1-5 the problems for own work in Hsu's book and the corespondning computer problems for own work are discussed and soloved. During Exercise Session 6 a set of archetypical type-problems of typical type-exam-type are solved. The students are supposed to study solved problems first. Thereafter, ideally, students shall try to work with the problems for own work themselves before going to the exercise sessions and seeing the solutions.

Consultation session. In addition to the lectures and exercise sessions there is arranged a consultation session to help students before the exam in Room Euler during the very last two hours of the semester on Friday 8 January 3.15 - 5 pm were both Claes and Patrik are present.

Examination. Written exam 4 hours pm Monday 11 January 2016 with reexams April 2016 and August 2016. 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.

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.