Course Programme MSG800/MVE170 Basic Stochastic Processes, 7.5 credits, 2nd quarter Fall 2016

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/A16/`

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 double lectures according to the schedule below. (The indicated content of lectures is approximative/preliminary.)

Lectures	Day	Time and place	Programme
Lecture 1	Wednesday 2 November	8 - 9.45 am in KE	Crasch Course
Lecture 2	Wednesday 2 November	3.15 - 5 pm in KE	Crasch Course
Lecture 3	Thursday 3 November	8 - 9.45 am in KA	Ch. 5 in Hsu's book (cont.)
Lecture 4	Thursday 3 November	10 -11.45 am in KC	Ch. 5 in Hsu's book (cont.)
Lecture 5	Wednesday 9 November	8 - 9.45 am in KE	Ch. 5 in Hsu's book (cont.)
Lecture 6	Wednesday 9 November	3.15 - 5 pm in KE	Ch. 5 in Hsu's book (cont.)
Lecture 7	Thursday 10 November	8 - 9.45 am in KA	Ch. 5 in Hsu's book (cont.)
Lecture 8	Thursday 10 November	10 -11.45 am in KC	Ch. 5 in Hsu's book (cont.)
Lecture 9	Wednesday 16 November	8 - 9.45 am in KE	Ch. 5 in Hsu's book (cont.)
Lecture 10	Wednesday 16 November	3.15 - 5 pm in KE	Ch. 5 in Hsu's book (cont.)
Lecture 11	Thursday 17 November	8 - 9.45 am in KA	Ch. 6 in Hsu's book
Lecture 12	Thursday 17 November	10 -11.45 am in KC	Ch. 6 in Hsu's book (cont.)
Lecture 13	Wednesday 23 November	8 - 9.45 am in KE	Ch. 6 in Hsu's book (cont.)
Lecture 14	Wednesday 23 November	3.15 - 5 pm in KE	Ch. 6 in Hsu's book (cont.)
Lecture 15	Thursday 24 November	8 - 9.45 am in KA	Ch. 6 in G-S's book
Lecture 16	Thursday 24 November	10 -11.45 am in KC	Ch. 6 in G-S's book (cont.)
Lecture 17	Wednesday 30 November	8 - 9.45 am in KE	Ch. 6 in G-S's book (cont.)
Lecture 18	Wednesday 30 November	3.15 - 5 pm in KE	Ch. 9 in Hsu's book
Lecture 19	Thursday 1 December	8 - 9.45 am in KA	Ch. 9 in Hsu's book (cont.)
Lecture 20	Thursday 1 December	10 -11.45 am in KC	Ch. 9 in Hsu's book (cont.)
Lecture 21	Wednesday 7 December	8 - 9.45 am in KE	Ch. 6 in G-S's book (cont.)
Lecture 22	Wednesday 7 December	3.15 - 5 pm in KE	Ch. 6 in G-S's book (cont.)
Lecture 23	Thursday 8 December	8 - 9.45 am in KA	Ch. 6 in G-S's book (cont.)
Lecture 24	Thursday 8 December	10 -11.45 am in KC	Ch. 6 in G-S's book (cont.)
Lecture 25	Wednesday 14 December	8 - 9.45 am in KE	Ch. 6 in G-S's book (cont.)
Lecture 26	Wednesday 14 December	3.15 - 5 pm in KE	Ch. 6 in G-S's book (cont.)
Lecture 27	Thursday 15 December	8 - 9.45 am in KA	Ch. 6 in G-S's book (cont.)
Lecture 28	Thursday 15 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/A16/Exercises/Exercises.html`

The problems in the book by Grimmett and Stirzaker are discussed by Patrik during lecture time as are the computer problems for own work. The problems for own work in Hsu's book 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 10 November	1.15-3 pm in room Euler
	Friday 11 November	3.15-5 pm in room Euler
Exercise Session 2	Thursday 17 November	1.15-3 pm in room Euler
	Friday 18 November	3.15-5 pm in room Euler
Exercise Session 3	Thursday 24 November	1.15-3 pm in room Euler
	Friday 25 November	3.15-5 pm in room KA
Exercise Session 4	Thursday 1 December	1.15-3 pm in room Euler
	Friday 2 December	3.15-5 pm in room Euler
Exercise Session 5	Thursday 8 December	1.15-3 pm in room Euler
	Friday 9 December	3.15-5 pm in room Euler
Exercise Session 6	Thursday 15 December	1.15-3 pm in room HA3
	Friday 16 December	3.15-5 pm in room KE

At Exercise Sessions 1-5 the problems for own work in Hsu's book are discussed and solved. 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.

Extra exercise sessions. In addition to the lectures and exercise sessions mentioned above there will be arranged two extra exercise sessions to help students before the exam on Wednesday 4 January 3.15-5 PM in room Euler and on Thursday 5 January 3.15-5 PM in room Euler where both Claes and Patrik will be present to help students.

Examination. Written exam 4 hours pm Monday 9 January 2017 with reexams April 2017 and August 2017. 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 with a total 30 possible points - you need 12 points for grade G (GU) and grade 3 (CTH), 18 points for grade 4 (CTH), 21 points for grade VG (GU) and 24 points for grade 5 (CTH), 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.