Course Programme MVE171 Basic Stochastic Processes and Financial Applications, 7.5 credits, 2nd quarter Fall 2019

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

Financial teacher. Simone Calogero, email calogero@chalmers.se

Teaching assistant/exercise teacher. Oskar Allerbo, email allerbo@chalmers.se

Course web-page. http://www.math.chalmers.se/Stat/Grundutb/CTH/mve171/1920/

Responsible university unit. Department of Mathematical Statistics, Mathematical 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.) Possibly not all Thursday lecture times weeks 1–3 will be fully utilized but some will be canceled – if that happens students will be notified in advance orally on lecture time as well as with Canavas email.

Lectures	Day	Time and place	Programme
Lecture 1	Wednesday 6 November	8 - 9.45 am in KA	Crasch Course
Lecture 2	Wednesday 6 November	3.15 - 5 pm in KA	Crasch Course
Lecture 3	Thursday 7 November	8 - 9.45 am in KA	Ch. 5 in Hsu's book
Lecture 4	Thursday 7 November	10 - 11.45 am in KA	Ch. 5 in Hsu's book
Lecture 5	Wednesday 13 November	8 - 9.45 am in KA	Ch. 5 in Hsu's book
Lecture 6	Wednesday 13 November	3.15 - 5 pm in KA	Ch. 5 in Hsu's book
Lecture 7	Thursday 14 November	8 - 9.45 am in KA	Ch. 5 in Hsu's book
Lecture 8	Thursday 14 November	10 - 11.45 am in KA	Ch. 5 in Hsu's book
Lecture 9	Wednesday 20 November	8 - 9.45 am in KA	Ch. 5 in Hsu's book
Lecture 10	Wednesday 20 November	3.15 - 5 pm in KA	Ch. 5 in Hsu's book
Lecture 11	Thursday 21 November	8 - 9.45 am in KA	Ch. 6 in Hsu's book
Lecture 12	Thursday 21 November	10 - 11.45 am in KA	Ch. 9 in Hsu's book
Lecture 13	Wednesday 27 November	8 - 9.45 am in KA	Ch. 9 in Hsu's book
Lecture 14	Wednesday 27 November	3.15 - 5 pm in KA	Ch. 9 in Hsu's book
Lecture 15	Thursday 28 November	8 - 9.45 am in MVF33	Financial applications
Lecture 16	Thursday 28 November	10 - 11.45 am in MVF33	Financial applications
Lecture 17	Wednesday 4 December	8 - 9.45 am in MVF33	Financial applications
Lecture 18	Wednesday 4 December	3.15 - 5 pm in MVF33	Financial applications
Lecture 19	Thursday 5 December	8 - 9.45 am in MVF33	Financial applications
Lecture 20	Thursday 5 December	10 - 11.45 am in MVF33	Financial applications
Lecture 21	Wednesday 11 December	8 - 9.45 am in MVF33	Financial applications
Lecture 22	Wednesday 11 December	3.15 - 5 pm in MVF33	Financial applications
Lecture 23	Thursday 12 December	8 - 9.45 am in MVF33	Financial applications
Lecture 24	Thursday 12 December	10 - 11.45 am in MVF33	Financial applications
Lecture 25	Wednesday 18 December	8 - 9.45 am in MVF33	Financial applications
Lecture 26	Wednesday 18 December	3.15 - 5 pm in MVF33	Financial applications
Lecture 27	Thursday 19 December	8 - 9.45 am in MVF33	Financial applications
Lecture 28	Thursday 19 December	10 - 11.45 am in MVF33	Financial applications

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

on Hsu's book are available from the course web-page. Financial lecture notes authored by Simone Calogero available from course web-page and a finacial project in Matlab handed out by Simone Calogero during financial part of course.

Contents of course. Chapter 5, Sections 6.1-6.3B and Chapter 9 in Hsu's book. Financial literature as listed above. (Note that Sections 6.3C-6.5 in Hsu's book were included in the course Fall 2017 but has been replaced with Chapter 9 starting Fall 2018.)

Exercises. The exercise material on Hsu's book is available from the course web-page

The problems for own work in Hsu's book are discussed during the exercise sessions, see below, while the computer problems for own work are discussed by Patrik during lecture time. There are two weekly exercise session during course weeks 2-5 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 14 November	1.15-3 pm in room Euler
	Friday 15 November	3.15-5 pm in room Euler
Exercise Session 2	Thursday 21 November	1.15-3 pm in room Euler
	Friday 22 November	3.15-5 pm in room Euler
Exercise Session 3	Thursday 28 November	1.15-3 pm in room Euler
	Friday 29 November	3.15-5 pm in room Euler
Exercise Session 4	Thursday 5 December	1.15-3 pm in room Euler
	Friday 6 December	3.15-5 pm in room Euler

At Exercise Sessions 1-4 the problems for own work in Hsu's book are discussed and 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.

Examination. Written exam three hours AM Saturday 7 December 2019 with reexams April 2020 and August 2020. 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 4 tasks with a total 20 possible points - you need 8 points for grade 3, 12 points for grade 4 and 16 points for grade 5.

The financial application part of the course is examined by means of a Matlab project that is reported to Simone Calogero at the end of the course. The projects only have grades pass and failure and when a pass has been recived it is the written exam that determines the final grade on the course (for which a passed project of course is required). There will be additional opportunities to report the project (if not passed before) in connection with the written re-exams. A passed project can be used during one academic year (up to and including the August re-exam) after which it is nullified and project must be reported again next academic year (if written exam has not been passed).

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.

Language. All teaching and literature on course is in English.