Information about Course SF2980 "Risk Management" Fall term 2019

Anja Janssen

October 27, 2019

Instructor and Teaching Assistant

Instructor:
Anja Janssen
Department of Mathematics
Office: Room 3543, Lindstedtsvägen 25 (5th floor)
Telephone: 08 790 6149
Email: anjaj [at] kth (dot) se
Office hours (obs! new date): Wednesday 10:00–11:00.

Teaching assistant:
Carl Ringqvist
Department of Mathematics
Office: Room 3738, Lindstedtsvägen 25 (7th floor)
Email: carrin [at] kth (dot) se

Place and time

Please check schema (search for course) for up to date information.

Brief description of course contents

Intended learning outcomes

To give a good knowledge of risk measures and advanced modelling and computational methods of relevance for the assessment and management of financial risks.

Course main content

- Modeling and analysis of financial and insurance risks.

- Risk measures: Traditional risk measures, Value at Risk, Expected shortfall, Spectral risk measures.

- Empirical distributions, quantiles and risk measures. Analysis of uncertainty with confidence intervals and Bootstrap.

- Parametric models: model selection, parameter estimation, validation, simulation.

- Extreme value statistics

- Multivariate models: measures of dependence, elliptical distributions, copulas, simulation, models for large portfolios, diversification and hedging

Prerequisites

Basic courses in analysis in one and several variables, linear algebra, differential equations, mathematical statistics, numerical analysis.

Furthermore, SF2940 Probability Theory and SF2942 Portfolio Theory and Risk Management.

Instructional method and organization of the course

Lectures can be divided into two types: Theory and problem sessions.

Theory sessions / lectures will cover the basic theoretical concepts of the course, as well as relevant examples and applications that highlight the theory.

The instructional method will be a mixture of blackboard presentations, slides and examples in R when appropriate. Slides will be available latest on the afternoon of the day before the corresponding lecture.

At problem sessions with TA Carl, exercises will be discussed and solutions to them will be presented. The exercises will be announced a few days in advance in Canvas. In order to enhance the use of the exercises, students are encouraged to look into the exercises for themselves before problem sessions.

Course material

The main text for the course is (as already in SF2942):

Hult, H., Lindskog, F., Hammarlid, O. and Rehn, C. J.:
Risk and Portfolio Analysis: Principles and Methods.
Springer, New York, 2012.

The book is also available as an e-book via KTH library. This course will cover the second part of the book, labelled "Methods", consisting of Chapters 7 to 9 (with a recapture of Chapter 6). (See also Henrik's homepage about the book with additional material and errata.)

Additional material of the course will be based on

McNeil, A. J., Frey, R. and Embrechts, P.:
Quantitative Risk Management
Concepts, Techniques and Tools - Revised Edition
Princeton University Press, Princeton, 2015.

The book is a good resource for risk management, but it is not necessary to buy the book in order to follow the course. I will provide handwritten lecture notes for those parts of the lecture which are not based on Hult et al.

Examination

There will be a written exam on Tuesday, 14/1/2020, 14:00–19:00, counting for 4.5 hp of the 7.5 hp of the course. Registration for the exam is required. Please refer to Studentexpeditionen Matematik / Student Affairs' Office Mathematics for any questions regarding enrollment in the course and registration for the exam.

Allowed aids at the exam:

- A calculator is necessary at the exam.

- Students are allowed to bring a copy or printout of the aforementioned book by Hult et al. as well as a copy of the BETA mathematics handbook. The books and print-outs may contain a few personal annotations up to an usual extent for course literature (please contact me in advance if you feel unsure about this). No additional sheets / pages in the books / print-outs or notes on backsides of printouts are allowed.

Grades for the course are the grades of the final exam and given in the range A-F, and Fx. The grade Fx gives you the right to a complementary examination to reach the grade E. The criteria for Fx is F and that an isolated part of the course can be identified where you have shown particular lack of knowledge. A complementary examination on this part can give the grade E. A request for a complementary examination must be received within six weeks.

The project work (see extra pdf) can give up to five bonus points on the final exam. Bonus points from project work are valid for this academic year's exam and re-exam. There is no guaranteed right to use bonus points from this year in future instances of the course - it is up to the future course responsible to decide about acknowledgement of bonus points from previous instances in his / her course round. Bonus points / credit for projects from previous years are not valid this year.

Bonus points will only be added if the achieved points in the exam alone allow for a passing grade, i.e. A-E.

Re-exam

The date for the re-exam in April 2020 will be announced with the spring schedule. The rules regarding the bonus points from the two assignments are the same as for the first exam, if the student did not attend the first exam or did not pass. However, points can only be used once, so if the re-exam is only taken for grade improvement, the bonus points will not be added.

Projects

The projects are mandatory for passing the course and count for 3 ECTS. The projects are done in groups and graded with "pass" or "fail". If a student

received a passing grade in the projects at an previous instance of the course, it is not necessary to re-do the project this year in order to pass the course (but it is possible, if the student wants bonus points for this round's exam). More details about projects can be found in a separate pdf.

Further material

On the homepage of 2016's instance of the course, `http://www.math.kth.se/matstat/gru/sf2980/`, you can find some additional material which may be of interest. This includes previous exams, including solutions.

PINGO surveys

Occasionally during lectures there will be student surveys, for example short quizzes. We will use the PINGO system for them (`http://pingo.upb.de/`). All students who attend the lecture can take part in those quizzes if they have some device which is connected to the internet. No signing up or additional software is needed. When a survey is started, it will be visible at the PINGO surveypage for this course: `http://pingo.upb.de/292653`. (Or go to `http://pingo.upb.de/` and enter the session number 292653.)