MATH2881

QUANTITATIVE RISK

Semester 2, 2015
1 MATH2881 – Course Outline

2 Information about the course

**Lecturer:** Mr Gregory Monahan, formerly Head of Risk Practice at SAS.
Email: gregory.monahan@unsw.edu.au
Mobile: 0408 475 380.

Further internal UNSW contacts:

Professor Jim Franklin,
Room 6109 Red Centre;
ph : 9385 7093; email : j.franklin@unsw.edu.au

Mr Frank Reid
Room 3092 Red Centre
ph : 9385 7057; email : f.reid@unsw.edu.au

The School is grateful to SAS and to the Commonwealth Bank Of Australia for sponsorship of the course.

**Credit**

This course counts for 6 Units of Credit (6 UOC). It is a core course for the Quantitative Risk major in Advanced Science but is available to other students.

**Lecture:** There will be one two-hour lecture per week:
Weeks 1-12 Thursday 4-6 pm in Room 4082 in the Red Centre.

**Tutorial:** You will be required to attend one one-hour tutorial per week. Tutorials will be held in Weeks 2-13.

The tutorial will be held on Thursday 2-3 pm for all Weeks 2-13 in the Red Centre 4082, except for certain weeks when it will be held in the computer laboratory in G012A in the Red Centre. You will be given notice by the lecturer of the tutorials held in the computer laboratory.

**Moodle:** Further information, lecture notes, tutorial questions and other material will be provided via Moodle.
3 Prerequisites

The prerequisite for this course is any one of the following courses:
- MATH1231
- MATH1241
- MATH1251
- ECON1203 (credit or higher).

4 Rationale of the Course

With the increasing sophistication of risk analysis in banking and finance, driven especially by the BASEL II compliance regime, there is a strong demand for graduates with training in quantitative risk management. Such graduates are coming to form a profession of their own, related to bank risk as actuaries are related to insurance risk. Skill in statistics is the core of the new quantitative approach to risk.

5 Course schedule

It is intended that the following topics will be covered in the given order. Any variation from this will be indicated by the lecturer.

- Overview of risk measurement and mitigation in banks.
- Types of risk: market, credit, operational and their characteristics.
- The banking environment, regulation, and capital reserving; risk at the macro level.
- Economic capital and RAROC.
- The VaR formalism.
- Issues on sensitivity to data: heavy tails, heteroskedasticity, mean reversion, robustness of correlation estimates.
- Measurement of market risk, credit risk and operational risk.
- Combination of risk and attribution.
- More on Basel II requirements.
- Other concepts: Concentration analysis, Correlation, Model risk.
6 Student Learning Outcomes

At the end of this course students will have a thorough understanding of
• the risks faced by financial services organisations;
• the mathematical techniques applied in the measurement of the risks faced by financial institutions;
• the practical application of risk management methodologies in financial institutions.

7 Assessment

Assessment in this course will consist of:
• Tutorial Questions : Weighting 15%.
  Answers to short questions are to be handed in at the end of each tutorial. Tutorials will not necessarily be of equal value.
• Two assignments: Total weighting 30%.
  Assignment 1 (15%) is due September 3, 2015.
  Assignment 2 (15%) is due October 8, 2015.
• Examination : Weighting 55%.
  Examination period from November 6, 2015.

7.1 Tutorial Exercises

A set of tutorial questions for each tutorial will be available on the webCT. You will be required to download the question sheets before the tutorial, answer the questions before the tutorial, and bring your answers to the tutorial, where you will submit them for marking.

7.2 Assignments

In each assignment you will be required to write an essay to illustrate your understanding of the issues involved in a given topic or situation. The assignment question will give points which are to be included in your discussion.

Assignments must be YOUR OWN WORK, or severe penalties will be incurred.

You should consult the University web page on plagiarism at www.lc.unsw.edu.au/plagiarism

7.3 Final examination

The final examination will be held in the examination period at the end of the session. This examination will be of 3 hours duration and will test the
entire course. The questions will give students the opportunity to show how successfully they have achieved the learning outcomes.

7.4 Recommended Reading


7.5 School Rules and Regulations

Fuller details of the general rules regarding attendance, release of marks, special consideration etc are available via the School of Mathematics and Statistics Web page at http://www.maths.unsw.edu.au/students/current/policies/studentpolicy.html.

7.5.1 Plagiarism and academic honesty

Plagiarism is the presentation of the thoughts or work of another as one’s own. Issues you must be aware of regarding plagiarism and the university’s policies on academic honesty and plagiarism can be found at http://www.lc.unsw.edu.au/plagiarism and http://www.lc.unsw.edu.au/plagiarism/plagiarism_STUDENTBOOK.pdf.