Postgraduate study in Financial Mathematics

2011 Induction for King’s College

Professor Damiano Brigo

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If you miss this induction lecture

So if you are reading this from the web having not been able to attend:
At the formal presentation I explained that the best strategy for full time (FT) students is to attend all lectures for now while you figure out your options. FT students should go to the compulsory courses FM01 and FM02 and all of 03, 05, 06 for the first period, in addition to courses from other MScs, then decide which two to formally register for. Part time students should register for FM01 and FM02 in their first year.
Focus of Presentation

This talk is mainly aimed at new full-time and part-time students on the KCL MSc in financial mathematics. If any PhD students have arrived, you are welcome to listen but focus on seeing if you want to attend MSc lectures and note seminar arrangements. Separate info on London Graduate School.
We all hope you find this course a rewarding and stimulating experience. This course is hard work.

*This is graduate school, not primary school.* Over one or two years you typically take about 8 extensive courses and do a substantial project. *You are here to work hard.*

You need to organize your time and focus often on several things at once. PT students should make sure their managers/employers are on board.
We wonder about how the events of the last 4 years will impact job prospects/research in this area. Our view is that the right way forward includes

- better maths, not less maths
- better pricing and hedging models
- better risk management
- better models of dependency, information and dynamics
- fewer idealizations, more realism

Good reasons to study financial mathematics.
Who are we?

FM Group has web site at:

http://www.kcl.ac.uk/finmath

Good idea to note this as a lot of information can be found by linking from that page. I will flag up key things to write down.

Write that down. Also read any information given out, the web sites and please do not ask us for information that is already there. READ IT!!!
Who are we?


Damiano.Brigo@kcl.ac.uk
www.damianobrigo.it

Prof. Brigo is Master Programme Director and will teach FM07 Interest Rate and FX dynamics in S2. He taught FM10 Credit Risk last year. This year he will teach a CVA course for the doctoral courses of the LGS. Research in Counterparty Default Risk and CVA, Interest rate models, Liquidity modeling, Longevity Risk, Risk Measures and Signal Processing. He has written field reference books in Interest rate and credit modeling, more than 60 publications and has been the most cited author in the industry influential Risk Magazine.
Prof. Claudio Albanese


Claudio@albanese.co.uk
www.albanese.co.uk

Prof. Albanese will teach FM03 Financial Markets in S1. He has interests in diverse topics in mathematical finance, and currently has a special interest in GPU computing. He has been an industry consultant, Professor at Imperial College and Toronto, VP of FI derivatives, MSDW NY, and he is currently CEO of the GLOBAL VALUATION company. FM03 is a quite challenging course, and students should not underestimate it.
Dr Tiziana Di Matteo

Reader in Financial Mathematics.

tiziana.di_matteo@kcl.ac.uk
www.kcl.ac.uk/nms/depts/mathematics/people/atoz/dimatteot.aspx

Dr Di Matteo’s research interests may broadly be described as Econophysics, but more particularly she is interested in real-world models of dependency, and understanding the nature and origins of real-world probability distributions and their inevitably fat tails.

FM05 Distribution Theory in S1 and FM09 Risk in Finance in S2. Dr Di Matteo consults regularly for the regulators and for hedge funds.
Dr Cristin Buescu

Lecturer in Financial Mathematics.
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Dr Buescu will lecture the undergraduate course this semester and also the FM06 course on Numerical and Computational methods. He taught also FM04 Stochastic Analysis in the past in S2. His research includes real work friction effects (e.g. taxation) and he is interested in applications of GPU computing. Recently he joined the research effort on counterparty risk and CVA.
Dr Andrea Macrina

Lecturer in Financial Mathematics.
andrea.macrina@kcl.ac.uk

Dr Macrina has spent a period as Visiting Research Associate Professor in Kyoto and is linked with several other important institutions across the world. Credit risk and information-based pricing are his main interests, as well as longevity risk modeling and interest rates modeling, with new work in carbon pricing. In the past he has taught FM02 Risk Neutral Valuation in S1 (this year replaced by Dr Giuseppe Di Graziano from Deutsche Bank) and will teach FM08 Exotics in S2.
Prof. Teemu Pennanen

Professor in Financial Mathematics.
teemu.pennanen@kcl.ac.uk
http://math.tkk.fi/~teemu/

Prof. Pennanen will join the group in October 2011. He is a leading researcher in mathematical optimization and stochastics for financial risk management. Convex and nonsmooth analysis as the basis of modern optimization theory and variational analysis. Pricing and hedging of financial and actuarial products under illiquidity and for long term asset liability management. Prof. Pennanen also runs his own consulting firm.

Prof. Pennanen will lecture FM10, Credit Risk Management, formerly taught by Prof. Brigo. He will also take up some managerial tasks in 2012.
Dr Markus Riedle

Reader in Financial Mathematics.
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http://personalpages.manchester.ac.uk/staff/Markus.Riedle/index.html

Dr Riedle will join the group in November 2011. His research interests concern stochastic analysis and stochastic integration. Dr Riedle will teach FM04 Stochastic Analysis in S2.
Dr Martin Forde

Lecturer in Financial Mathematics.
martin.forde@kcl.ac.uk

Martin has just joined the college from DCU Dublin. Martin will lecture Applied Probability FM01 this semester and the continuous-time UG course in S2. His research interests include stochastic and local volatility modeling and several aspects of stochastic calculus, including hitting times and diffusion theory.
Dr Kyriakos Chourdakis

Lecturer in Financial Mathematics.
kyriakos.kcl@gmail.com

Dr Chourdakis works in the industry (Rating Agencies, Hedge Funds, Investment Banking) and will teach the FM12 course in S2 on Numerical method in finance. He is a specialist on Fourier transforms methods and on numerical methods, and he is an eclectic professional working in quantitative finance. This is an important course with computer coding and numerical implementation of models and methods.
Structure of FM MSc

Each student must attend eight one-semester courses. Six one-semester courses must be chosen from the following list. S1 Autumn 2011-2012:

- FM01 [C] Applied Probability and Stochastics
- FM02 [C] Risk-Neutral Valuation
- FM03 [O] Financial Markets
- FM05 [O] Distribution Theory
- FM06 [O] Numerical and Comp. Methods
Expected but provisional topics:

- FM04 [O] Stochastic Analysis
- FM07 [C] Interest Rate and Foreign Exchange
- FM08 [O] Exotic Derivatives
- FM09 [O] Risk in Finance
- FM10 [O] Credit Risk Management
- FM12 [O] Applied Computational Finance
Making up to 8 courses

Two further courses, to make eight are normally chosen from the list above. Alternatively it is possible to take up to two courses from the list of mathematics MSc courses (see web-page for a complete list).
The Project

Each student must also undertake a research project that is developed individually, leading to a Project Report of approximately 40 pages (CMFM50). The FM50 course manager this year will be Dr Macrina. The project is the same for all students and is formulated carefully in line with the programme and with the developments in the industry, to have the right difficulty level and relevance. Alternatively, students may take the standard project of the previous year.
Full-Time Students

- A full-time student normally attends 4 courses during semester 1 and 4 courses during semester 2, but this arrangement may be varied with the approval of the Programme Director.

- Students may, with the approval of the Programme Director, alternatively attend 3 courses in one semester and 5 in the other. Not recommended.

- Full-time students will normally carry out their research and write their Project Reports after the summer examination period, during the months June, July and August.
Part-Time Students

- A part-time student normally attends four courses during the first year and four courses during the second year, but this arrangement may be varied with the approval of the Programme Director. In year one, part-time students normally take CMFM01, CMFM02, CMFM07 + one other.

- Part-time students may spread their research and Project Report writing over the second year, but in any event, they are expected to devote to it an amount of time roughly equivalent to that of the full-time students (i.e. three months full-time).
The “default” arrangement for Financial Mathematics MSc lecture courses is normally one two-hour lecture per week for the duration of the semester.

These arrangements may be varied in the case of some courses at the lecturer’s discretion.

For some courses there are also tutorials.
In the case of MSc lectures there is normally no formal marking or grading of course work.

A two-hour revision class is held for each course in the spring for preparation for examinations.
Assessment 1

Each lecture course has one two-hour unseen written examination. Most written examinations will be in May and early June. Depending on a student’s selection of optional courses, some first semester courses may be examined in January. NOT for FM courses: all are in May/June.
Assessment 2

Each student individually writes a report on the research project of approximately 40 pages.
Progression Requirements

- A student who fails one or more exams will be permitted to proceed to the research project only at the discretion of the Board of Examiners.

- The Board may at its discretion terminate a research project already commenced in the event of failure in one or more exams.

- A part-time student who fails one or more exams in their first year of study will be permitted to proceed to their second year of study only at the discretion of the Board.
Marks and Grades - Courses

The pass mark for each element of the programme (individual lecture courses and Project Report) is 50%. The correspondence between literal marks and percentage marks is as follows:

- 70-100: A, Distinction
- 60-69: B, Merit
- 50-59: C, Pass
- 0-49: F, Fail
Grades for Projects

The student’s Project Report is assessed independently by two examiners. Each examiner assigns a numerical grade, as defined above, reflecting the candidate’s performance in relation to each of the following four criteria:
Project Marking Criteria

1. Elements of originality, critical thought and analysis, and mathematical sophistication in developing the proposed topic.
2. Presentation, style, and elegance.
3. Diligence, care, and thoroughness.
4. Selection of sources and references, scope and depth of literature review.
These four specific grades, together with a recommended overall numerical and literal grade, as defined above, are incorporated in a written report. Grade F is awarded if the material, though correct, is judged to be largely copied in a mechanical manner.
Overall Grading

There are complicated rules which we shall explain later, also see programme guide. Key Issues:

- 2/3 courses; 1/3 project;
- P,M,D require corresponding overall mark AND on thesis (50,60,70)
- Passes in at least six lecture course (N.B. *first time for M,D*)
Prizes

Up to two prizes will be awarded by the Department of Mathematics each year for overall outstanding performance in the MSc in Financial Mathematics.
A candidate who fails one or more written examinations at the first attempt and, as a consequence fails to satisfy the written examination component of the requirements for the award of the MSc in Financial Mathematics may, at the discretion of the Board of Examiners, be re-assessed on one occasion. This takes place the following year. (Summer is focused on project).
The re-assessment will consist of re-sitting, at the next following examination, some or all of those written examinations for the courses which the candidate failed at the first attempt. A candidate may only re-sit a written examination for a course at the next following examination for that course. If in the meanwhile there has been any change of syllabus for the course, the student is responsible for taking this into account in their preparation for the re-assessment.
Re-Sits 3 - Project

A candidate who fails the project at the first attempt may, at the discretion of the Board of Examiners, re-register for the project in the next academic year. The second attempt must be completed in the time-frame allocated for the project in that academic year.
Advisors

At the beginning of the academic year, each student is assigned an Advisor who will be able to advise on the choice of courses and other academic matters arising with the programme as the year goes by. Project Supervisors are assigned later in the academic year. For all questions please check web sites and the handbook first.
Provisional Academic Advisors

For today, students can meet Prof. Brigo, Dr Buescu, Dr. Forde and Dr Macrina 2-4pm to discuss course choices and general questions. Dr Di Matteo is available for a 1st meeting this Friday 12-2pm. More generally, based on the initial letter of your family name - E-MAIL US for queries on course choices, or for a meeting. Email addresses need to be completed by "@kcl.ac.uk"

- A-F Brigo email: damiano.brigo room: S5.35
- G-K Buescu cristin.buescu S5.37
- L-P Di Matteo tiziana.di_matteo S5.28
- Q-U Forde martin.forde S5.38
- V-Z Macrina andrea.macrina S5.36
Faculty have weekly office hours, usually two hours per week. Other times can be arranged by appointment, and students are encouraged to contact the faculty to discuss any matter relating to their studies when this is necessary. Normally in operation during periods when faculty is lecturing.
**E-mail**

This is the primary means of communication between faculty and students. Get into the habit of checking it on a daily basis. Not just begin/end term or run up to exams etc.

At the beginning of the academic year, each financial mathematics student is given a standard KCL email account (such as john.brown@kcl.ac.uk). All correspondence concerning the Financial Mathematics Programme normally comes through this address (for example, seminar announcements).
Should it ever be necessary to cancel or rearrange a lecture at short notice, then this is normally how students are notified about alternative arrangements. Important notices about examination arrangements, project arrangements, and so on, are also communicated this way.
The college has a system of public access workstations - PAWS. Get yourself a userid and password and figure out the system. See [www.kcl.ac.uk/iss/it](http://www.kcl.ac.uk/iss/it) and helpdesk at Chancery Lane Library. Many of you will have your own desktop or laptop at work and/or home. Suggest you set up mail forwarding. Do NOT physically connect to network. Use ISS Wifi.
For support e-mail:

maths-support@kcl.ac.uk

Use that and not named individuals.
Seminars

Seminar in Financial Mathematics and Applied Probability
These are on Tuesdays at 5.30 pm in Room 2C during term. Tea is served before the seminar at 5.00 pm. All Financial Mathematics MSc students are strongly encouraged to attend. Seminars are presented by both academics and by practitioners working in the field. The schedule is posted on the website and announcements also made by e-mail.
Mathematics Dept Colloquium

These are on Friday afternoons during term from time to time and are recommended as an interesting way of broadening your mathematical culture.
King’s College London houses its extensive science and mathematics collections and information facilities in a Victorian Gothic building on nearby Chancery Lane. PG maths students at King’s have full access to the DMS Watson Library in UCL which holds the library of the LMS. Arrangements can also be made for use of the LSE Library, which has a good selection of relevant journals and books.
Beyond the MSc....

Many of you will be looking for well-paid jobs. A few of you may contemplate PhD studies either immediately or later. We prefer FT study, but will consider motivated and organized PT applicants.

Very good performance on course expected, particularly on project.
KCL is part of the London Graduate School in Financial Mathematics, jointly with Imperial, LSE and Birkbeck. Shared delivery of four courses for Year 1 PhD students, plus joint seminars. (If any starters present get an e-mail account and look out for LGS announcements and seminars - you can also go to MSc lectures). Note KCL is Credit Risk/CVA node of LGS (course taught by Prof. Brigo).
Further Questions?

For questions on administrative issues concerning your Master you may contact the dept. office, and specifically Ms Joanne Cooke,
joanne.cooke@kcl.ac.uk
who follows the Master programmes of the department.

For academic questions you may contact the group members according to the initial letter of your family name, as explained above in slide 37.

Welcome to the Financial Mathematics group of King’s College!!!