

MODULE SPECIFICATION • ELECTIVE

Econometrics of High-Frequency Data

The purpose of this course is to provide students with an introduction to various methods applicable to high frequency financial data. This includes the study of the statistical properties of these series such as heteroskedasticity, periodicity, the presence of jumps and microstructure noise. Different methods are discussed, such as GARCH models, the estimation of the intraday periodicity in volatility, jump tests and various non-parametric estimators of the realized volatility.

10	15h	85h	100h
CREDITS	CONTACT HOURS	PRIVATE STUDY	TOTAL STUDY

COURSE CONVENOR

NAME Sébastien Laurent

OFFICE By appointment — please email to arrange a convenient time

COURSE STRUCTURE

Econ 7912 is a 10-credit course and students are expected to input approximately 100 hours of study. The total number of contact hours is 15 hours, leaving 85 hours for private study. Delivery is by lectures — 15 hours across the first three weeks of term, comprising 10 hours of lectures and 5 hours of tutorials. Optional clinics run on the last day of the course.

During private study, balance the course material (the primary source) against the recommended textbooks: think critically about how these fit into the body of knowledge, perform the exercises, complete coursework and revise. You can expect to perform well only by working consistently through the year.

MODULE PROGRAMME

LECT.	TOPIC	SESSION CONTENT
01	Stylized facts for (intraday) financial returns	
02	Univariate GARCH models	
03	Non-parametric volatility	
04	Intraday periodicity	
05	Jumps	

KEY SKILLS

By the end of this course, students should have some knowledge and understanding of:

— The basic properties of high-frequency financial series

— The main continuous time processes

- The identification of jumps in high-frequency financial series
- The calculation of the daily volatility from intra-day data

DESIRED OUTCOMES

By the end of this course, students should be able to:

- Understand research papers focusing on intraday financial data
- Estimate realized volatility and bi-power variation
- Test the presence of discontinuities in intraday prices
- Estimate the intraday periodicity in the volatility
- Understand the concept of the Epps effect
- Calculate realized correlations
- Apply basic statistical techniques to analyse intraday financial data
- Work effectively both individually and within a team environment

ASSESSMENT

WEIGHTING	100% coursework
ISSUED	End of week 6
DUE	End of week 10 — four weeks for completion
SUBMISSION	Electronically via the Moodle site for this course
FEEDBACK	Returned within 4 weeks of the deadline, as marker's notes appended to the PDF of your coursework

Marking criteria and penalties are set out in the Economics Undergraduate Handbook and the general course information paper, available via the Current Student page of the university website under Academic Regulations.

COURSE TEXT & RECOMMENDED READING

Copies of the lecture slides are made available on the course web pages, together with additional material and course announcements.

- Estimating and Forecasting ARCH Models using GARCH 8. Available at <http://slaurent.net/>, section GARCH — students should purchase a copy of this book
- For the computer labs you will also need OxMetrics 9
- Bauwens, L., Hafner, C. and Laurent, S. (eds). Handbook of Volatility Models and Their Applications