Time series: estimation and prediction
7 1/2 hp

Course period:
January 24, 2016 – March 18, 2016

Last day for application:
January 24, 2016

Course leader / Address for applications:
Holger Rootzén (hrootzen@chalmers.se)

Course description (Advertisment for Ph.D. students)
The course participants will learn the theory of time series analysis and will get experience from using the methods in practice.

Course content: basic theory for stationary stochastic processes; ARMA modelling; spectral analysis; non-stationary and seasonal time series; multivariate time series; Ssate space models and Kalman filtering; stochastic volatility models.

The main course literature is the books "*Time Series: Theory and Methods, second edition*" (1991) by P.J. Brockwell and R.A. Davis, Springer-Verlag, New York and "*Introduction to Time Series and forecasting, second edition"* (2002) by P.J. Brockwell and R.A. Davis, Springer-Verlag, New York.

The course will consist of lectures; problem sessions where participants present solution to selected problems; and projects where the methods are applied to practical time series analysis problems.

More details will be found at the course homepage, (opened in December) http://www.math.chalmers.se/~rootzen/timeseries/timeseries/timeseries-homepage2016.htm

The course meets four hours per week.

Mathematics Department

Teachers:
Holger Rootzén

Examiner: Holger Rootzén

Faculty of Science; Department of Mathematical Sciences

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1. Confirmation

The syllabus was confirmed by the Head of the Department of Mathematical Sciences 2015-10-05.
Disciplinary domain: Science
Department in charge: Department of Mathematical Sciences

2. Position in the educational system

Elective PhD course.

3. Entry requirements

None.

4. Course content

The theory of time series analysis and work with using the methods in practice. Topics include

- basic theory for stationary stochastic processes
- ARMA modelling; spectral analysis
- non-stationary and seasonal time series
- multivariate time series
- state space models and Kalman filtering
- stochastic volatility models.

5. Outcomes

The participants will have understood the basic concepts of time series analysis, including the topics listed above. They will have acquired some skill in solving

problems in the area and in using the methods in practice, and will be prepared for research in the area.

6. Required reading

The main course literature is the books "*Time Series: Theory and Methods, second edition*" (1991) P.J. Brockwell and R.A. Davis, Springer-Verlag, New York and "*Introduction to Time Series and forecasting, second edition"* (2002) P.J. Brockwell and R.A. Davis, Springer-Verlag, New York.

7. Assessment

A passing grade requires active participation in solving the homework exercises and projects, and passing a final individual oral exam. A Ph.D. student who has failed a test twice has the right to change examiner. A written application should be sent to the Department.
In cases where a course has been discontinued or major changes have been made a Ph.D. should be guaranteed at least three examination occasions (including the ordinary examination occasion) during a time of at least one year from the last time the course was given.

8. Grading scale

The grading scale comprises Fail, (U), Pass (G)

9. Course Evaluation

The course evaluation is carried out together with the Ph.D. students at the end of the course, and in an individual, anonymous survey. Changes in the course will be shared with the students who participated in the evaluation.

10. Language of instruction

The course language is English.