



The University of Southern Queensland

## Course specification

The current and official versions of the course specifications are available on the web at <http://www.usq.edu.au/coursespecification/current>.  
Please consult the web for updates that may occur during the year.

### Description: Time Series

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
STA	8304	74734	1, 2008	ONC	1.00	Toowoomba

<b>Academic group:</b>	FOSCI
<b>Academic org:</b>	FOS003
<b>Student contribution band:</b>	2
<b>ASCED code:</b>	010103

## STAFFING

Moderator: Ron Addie

## RATIONALE

The analysis of discrete time series is performed for a variety of reasons: to identify the dominant interactions between the measured variables of a process; to model a process; to improve the control of a process; to forecast trends. Time series analysis has application to a wide variety of processes, including econometric, actuarial, commercial, industrial, agricultural, environmental, meteorological and medical processes.

## SYNOPSIS

This course is normally offered only in odd years. This course will consist of advanced studies in time series analysis. Topics will include: identification, estimation, testing and forecasting for univariate and multivariate models of time series; the spectral representation of a time series; non-linear models, including identification, estimation, testing and forecasting; cointegrated models.

## OBJECTIVES

On completion of this course students will be able to:

1. understand the mathematical definition of a stationary time series (univariate and multivariate) (Assignments 1 and 4);
2. identify the type of model to apply to a given time series by observing its autocovariance, partial autocovariance and periodogram (Assignments 1, 2, 3 and 4);
3. estimate the coefficients of a model of a time series with the assistance of a computer package and understand the mathematics on which the computer package is based (Assignments 1, 2, 3 and 4);
4. interpret diagnostic tests on the fit of a model to data (Assignments 2 and 4);
5. understand how to use a time series model for forecasting or prediction of the behaviour of a system (Assignments 2, 3 and 4);
6. understand how to apply non-linear modelling methods such as the nearest-neighbour method and radial basis functions (Assignments 3 and 4);

7. understand the concept of long-range dependent time series and their applications (Assignments 3 and 4);
8. evaluate a time series model and assess its strengths and weaknesses (Assignments 3 and 4);
9. compare different time series models applied to the same time series data (Assignments 3 and 4);
10. write computer code for fitting time series models (Assignments 1, 2, 3 and 4).

## TOPICS

	Description	Weighting (%)
1.	Models of stationary univariate time series	25.00
2.	Models of stationary multivariate time series	5.00
3.	Forecasting formulae for multivariate time series	15.00
4.	System identification and parameter estimation techniques	15.00
5.	Diagnostic tests	15.00
6.	Non-linear time series modelling and forecasting methods	25.00

## TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at <http://bookshop.usq.edu.au> click 'Semester', then enter your 'Course Code' (no spaces).

Box, G.E.P., Jenkins, G.M. & Reinsel, G.C 1994, *Time Series Analysis Forecasting and Control*, 3rd edn, Prentice Hall, New Jersey.

Brockwell, P.J. & Davis, R.A 1991, *Time Series: Theory & Methods*, 2nd edn, Springer-Verlag, New York.

Hamilton, J.D 1994, *Time Series Analysis*, Princeton University Press, Princeton.

Weigend, A.S. & Gershenfeld, N.A. (eds.) 1994, *NATO Advanced Research Workshop on Comparative Time Series Analysis Time Series Prediction*, Addison Wesley, Reading, M.A.

## REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

## STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessments	40.00
Consultation	7.00
Directed Study	50.00
Examinations	2.00
Private Study	65.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ASSIGNMENT 1	20.00	20.00	04 Apr 2008
ASSIGNMENT 2	20.00	20.00	02 May 2008
ASSIGNMENT 3	20.00	20.00	13 Jun 2008
ASSIGNMENT 4	40.00	40.00	27 Jun 2008

## IMPORTANT ASSESSMENT INFORMATION

- 1 Attendance requirements:  
It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, tutorials, laboratories and practical work) scheduled for them, and to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.
- 2 Requirements for students to complete each assessment item satisfactorily:  
To satisfactorily complete an assessment item a student must achieve at least 50% of the marks or a grade of at least C-. Students do not have to satisfactorily complete each assessment item to be awarded a passing grade in this course. Refer to Statement 4 below for the requirements to receive a passing grade in this course.
- 3 Penalties for late submission of required work:  
If students submit assignments after the due date without prior approval then a penalty of 5% of the total marks gained by the student for the assignment will apply for each working day late.
- 4 Requirements for student to be awarded a passing grade in the course:  
To be assured of receiving a passing grade a student must achieve at least 50% of the weighted marks available for the course.
- 5 Method used to combine assessment results to attain final grade:

The final grades for students will be assigned on the basis of the aggregate of the weighted marks obtained for each of the summative assessment items in the course.

- 6 Examination information:  
There is no examination in this course.
- 7 Examination period when Deferred/Supplementary examinations will be held:  
As there are no examinations in this course, there will be no deferred or supplementary examinations.
- 8 University Regulations:  
Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL <http://www.usq.edu.au/corporateservices/calendar/part5.htm> or in the current USQ Handbook.

## **ASSESSMENT NOTES**

- 9 The due date for an assignment is the date by which a student must despatch the assignment to the USQ. The onus is on the student to provide proof of the despatch date, if requested by the Examiner.
- 10 In accordance with University Policy, the Examiner may grant an extension of the due date of an assignment in extenuating circumstances.
- 11 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time may apply to defer an assessment in a course. Such a request must be accompanied by appropriate supporting documentation. One of the following temporary grades may be awarded IDS (Incomplete-Deferred Examination); IDM (Incomplete Deferred Make-up); IDB (Incomplete - Both Deferred Examination and Deferred Make-up).
- 12 Students may be required to provide a copy of assignments submitted for assessment purposes. Such copies should be dispatched to the USQ within 24 hours of receipt of a request to do so.

## **OTHER REQUIREMENTS**

- 1 Students will require access to e-mail and internet access to USQConnect for this course.
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