

STAT278 Unit Outline

UNIT IDENTIFICATION

Division: Economic and Financial Studies
Department: Statistics
Unit code and name: STAT278: Computer Simulation
Year and semester offered: Daytime, second semester 2004

	Role	Staff member	Room	Phone	Consultation hours
Staff:	Lecturer and tutor	David Bulger	C5C 464	9850-8546	Tuesday 12-2
	Tutor	Clive Cheong			

Lectures: Wednesday 3pm-5pm and Friday 2pm-3pm in E7B 100, beginning 4 August
Tutorials: Thursday at 10am or 2pm, for one hour, in C5C 217, beginning 5 March
Contact hours per week: 4
Noncontact hours: You should plan to spend at least five hours per week on STAT278 beyond lectures and practical sessions, sometimes individually, sometimes in groups.
Credit points: 3

INTRODUCTION AND LEARNING OBJECTIVES

Simulation is a powerful investigative tool for understanding and predicting systems and processes of interest in a wide variety of applications, especially where analytical methods are ineffective. In this unit, using the software applications *Excel*, *Extend* and *Matlab*, you will gain an overview of the concepts and practicalities of simulation. In particular, you will learn about

- the difference between deterministic and stochastic processes,
- how computers produce seemingly random numbers,
- decomposing a system into simple elements for modelling and simulation purposes,
- implementing models in *Excel*, *Matlab* and *Extend*,

- interpretation of the results of single simulation runs,
- the *systematic* use of multiple simulations to make inferences,
- organising and summarising simulation data graphically and numerically,
- analysis of data, using confidence intervals and basic hypothesis testing where appropriate,
- drawing conclusions from the results of data analysis,
- optimisation of stochastic system parameters by simulation,
- discrete event processes such as queues,
- correlation, time series and random walks.

Moreover, like any unit at Macquarie, STAT278 will extend your “generic” skills, for instance in problem-solving, communication, teamwork, use of the internet, time management, taking responsibility for your own learning and so forth.

LEARNING PROGRAMME

STAT278’s lectures will be complemented by several other learning opportunities. In the tutorials you will use specialised software to solve exercises in simulation and related topics. Also, both here and on the online discussion board, you will be able to discuss the unit content with your classmates and tutor.

Furthermore, the unit includes a group project. In this project, you and a few of your classmates will pretend to be a consulting team. You will collect actual queue data, analyse it, and compose a report to submit to your fictional client. Students in previous semesters have found the group project very educational.

ASSESSMENT

Your final grade will be based on a combination of your final **Exam mark** and your **Coursework mark**.

Examination

The final examination will be held during the end-of-year exam period. You may take into the examination a calculator. Also, you may prepare notes, in your own handwriting, on both sides of a single A4 sheet of paper, to bring into the examination. The exam will cover all aspects of the unit.

Coursework Mark

Your coursework mark is the average of your two assignment marks, your group project mark, and your tutorial mark. Thus each of the two assignments, the group project, and your tutorial mark contribute 25% to your coursework mark.

Group Project (25% of Coursework mark)

The group project will be completed in groups of about four. The focus here is more on learning than assessment. Every group ought to be able to get a high mark here; group members who pull their weight will have a much easier time with the remainder of the unit. (Let's disprove the words of William Lowe Bryan: "Education is one of the few things a person is willing to pay for and not get.")

Tutorials (25% of Coursework mark)

This mark is mainly based on tutorial attendance, performance in the tutorial exercises. There will also be some weight placed on participation in the online discussion, accessible through the unit website.

Assignments (25% + 25% of Coursework mark)

You will be issued two assignments during the semester to be completed individually.

TEXT AND NOTES

STAT278 has no text. Lecture notes will be handed out at the beginning of each module, and are available on the unit website.