Students in this unit should read this unit outline carefully at the start of semester. It contains important information about the unit. You should also refer to the Stat273 web page at http://www.stat.mq.edu.au/units/stat273/.

*Note: STAT273/STAE273 will be renamed as “Introduction to Probability” from 2007 onwards. Contents will be expected to be similar.
About Stat 273:
Stat273 is a 3 credit point unit run by the Statistics Department in the Division of Economic and Financial Studies (EFS).

This unit is designed for students majoring in Statistics and/or any discipline other than Actuarial Studies. The teaching will focus on the understanding of probability concepts and their applications. EXCEL and Scientific Notebook will be used to assist in calculations and simulation.

Prerequisites: The minimum prerequisites for this unit are:
Stat170(P); Math 123(P) or equivalent; Stat172(P) or Stat175(P) or GPA>1.5.

Basic skills of calculus, such as elementary differentiation and integration, are essential for this course. However, the emphasis will be on the understanding of the processes, rather than the actual calculations.

Lecturer:
Dr. Frederick Wong
Room: E4A 507
phone: 9850 8544     fax: 9850 7669
fwong@efs.mq.edu.au

Classes
Lectures:
Tue 11-12 E6A 133
Thu 3-5pm E6A 131

Tutorials:
Tutorial participation is a compulsory component of this course. Tutorials will be held on:
Tue 13 E4B 102
Tue 14 E4B 111
Tue 15 E4B 111
Fri 11 E4B 111

Tutorials start in the second week of the semester.

Texts:
Required: STAT273 Course Notes – 2006, from the Co-op Bookshop.
References that may be useful:
Copies these books are held in the Reserve section of the library. Students will also be directed to relevant websites each week.

**Websites:**

   (for general information, homework, assignments and solutions)

**Learning Outcomes:**

**Probability theory**

By the end of this unit, students should;

- Have a solid understanding of introductory probability theory,
- Understand the difference between discrete and continuous random variables
- Understand the difference between theoretical and empirical probability,
- For various discrete and continuous random variables,
  - Be familiar with the distributions
  - Write the function and the cumulative distribution functions.
  - Graph the distribution and the cumulative distribution function
  - Calculate probabilities, expected values, variances and standard deviations
  - Generate Distributions
  - Generate random numbers from Distributions
  - Solve probability problems
- For bivariate probability distributions (discrete and continuous), find
  - Joint, marginal and conditional probabilities,
  - covariance
- Understand basic anatomy of homogeneous Markov Chains and
  - Find stationary distribution, if one exists,
  - Manipulate and interpret Markov Chains with absorbing states.

**Generic Skills**

- By the end of this unit, students should;
- Have enhanced their problem solving ability,
- Have improved their report writing and written communication skills,
- Have acquired useful Internet skills.

**Statistical computing**

- By the end of this unit, students should;
- Be able to generate probability distributions and cumulative distributions, and graph these distributions
- Be able to simulate random numbers from probability distributions and cumulative distributions,
- Be able to organise and summarize random data,
- Determine whether random data fits a particular model
Be able to find probabilities, expected values etc, using an appropriate statistical package.

The Ho Kam-chiu Prize in Statistics

The prize is open to all students taking at least 9 credit points in 200-level and/or 300-level Statistics units in one academic year. The prize will be awarded to the student in this category with the highest average SNG in all Statistics units taken at 200 and 300 level in the particular year. A student may be awarded the prize more than once if he/she continues to be the best student in successive years of study.

Teaching and Learning Strategy:

Lectures

Lectures begin in Week 1. Students should attend ONE 3-hour session per week. The Study Guides package should be brought to lectures each week as it includes copies of the lecture slides, tables and homework problems.

Tutorials

Tutorials begin in Week 2 and are based on work from the previous week’s lecture. The aim of tutorials is to apply techniques learnt in lectures to solving problems using a statistical package.

Students are required to attend one tutorial a week. Practical exercises and worksheets will be handed out at each tutorial and sometimes a word processed report will be required. **All tutorial work will be assessed** either by your tutor or online or both.

Additional Exercises

A number of exercises appear at the end of each lecture in the Study Guide. It is expected that students will attempt all the questions. The exercises will not be discussed during the tutorial, although some may be discussed during the lectures. A solution will be made available on the website.

Students should also investigate the websites recommended in the lectures each week.

Online Quizzes

These provide you with an opportunity to practice and gauge your basic understanding of the concepts introduced in the course. They contribute 12% towards the total assessment.

Your **login ID** is 8-digit Student ID Number found on your Campus Card. Your password will be the same password used to access myMQ Student Portal ([https://my.mq.edu.au](https://my.mq.edu.au)).

Further information about WebCT and IT support arrangements is available at: [http://online.mq.edu.au/docs/tecinf.html](http://online.mq.edu.au/docs/tecinf.html) and [http://online.mq.edu.au/docs/ann_samesignon.html](http://online.mq.edu.au/docs/ann_samesignon.html)

Assessment:

The unit will be assessed as follows:

- Two Mid-semester Tests: 8% (4% each)
- Two Assignments: 8% (4% each)
- Online Quizzes: 12%
A satisfactory performance is required in all aspects of the unit. **To pass the unit you must pass the final examination.** Your final grade will reflect your performance in all aspects of the course. In order to attain a particular grade in the unit, the requirement for that grade must be met in the exam and the coursework. You should also refer to the University’s rules on grades, rule 10(2), http://handbook.mq.edu.au/PDFs/ug-bachelor-degree-rules.pdf.

**Assignments:**
There will be two compulsory assignments. They are to be handed in at the lecture on the due date. Late submission of assignments will be penalized at the rate of 20% per day. Failure to submit assignments may result in automatic exclusion from the unit. The due dates are:
- Assignment 1 Due: Thursday, 14th September (week 7)
- Assignment 2 Due: Thursday, 2nd November (week 12)

The assignment will not be marked unless it is accompanied by the appropriate assignment cover sheet.

**Plagiarism**
The University defines plagiarism in its rules: "Plagiarism involves using the work of another person and presenting it as one's own." Plagiarism is a serious breach of the University's rules and carries significant penalties. You must read the University's practices and procedures on plagiarism. These can be found on the web at: http://www.student.mq.edu.au/plagiarism/. Penalties may include a deduction of marks, failure in the unit, and/or referral to the University Discipline Committee.

**Mid-semester Tests:**
Two mid-semester tests of 50 minutes will be held in the first lecture hour. The tests will be on:
- Week 6, 5th September (Tuesday)
- Week 10, 17th October (Tuesday)

Any student who cannot attend the test due to unavoidable disruption must report the circumstances (supported by medical certificate or other proper evidence) in writing to the Registrar as soon as possible.

**Final Examination**
This will be of 3 hours duration with 10 minutes reading time.

For both of the Mid-semester tests and Final examinations you are allowed to bring in one A4 page of handwritten notes, written on both sides. All necessary statistical tables will be provided. **Photocopied notes or computer printouts are strictly forbidden.**

An electronic calculator is essential and will be required for the final examination and class tests. Text-returnable calculators are not permitted in the tests or exam.

**Students with Disabilities**
Students with disabilities are encouraged to contact the Equity Support Unit to determine whether they are eligible for support service. The Equity Support Staff can be contacted on 9850 7497. The web page is

**Misadventure**

Should you suffer illness or other misadventure which affects your performance during term or for the exam, then you should fill in an Advice of Absence or other Circumstances and/or Request for Special Consideration.

Students should read the DEFS’ information regarding supplementary exams, [http://www.efs.mq.edu.au/services/policies_consid.htm](http://www.efs.mq.edu.au/services/policies_consid.htm)

### STAT273 Risk and Chance

#### UNIT SCHEDULE

**Semester 2, 2006**

<table>
<thead>
<tr>
<th>WEEK</th>
<th>LECTURE TOPIC</th>
<th>To Do</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 July</td>
<td>Experiments, sample spaces, Probability Rules, Permutations and Combinations Theoretical vs. Empirical probability</td>
<td>Obtain Course Notes from Bookshop. Quiz 1, Practice Ex 1</td>
</tr>
<tr>
<td>7 August W1</td>
<td>Conditional Probability Independence, Bayes’ Theorem</td>
<td>Quiz 2, Prac Quiz 2, Practice Ex 2</td>
</tr>
<tr>
<td>14 August W2</td>
<td>Random Variables Probability Functions, Discrete Probability Distributions, Cumulative Distribution functions, Expected value and Variance</td>
<td>Quiz 3, Prac Quiz 3, Practice Ex 3</td>
</tr>
<tr>
<td>21 August W3</td>
<td>Discrete Distributions; Bernoulli, Binomial, Geometric and Poisson.</td>
<td>Quiz 4, Prac Quiz 4, Practice Ex 4</td>
</tr>
<tr>
<td>28 August W4</td>
<td>More Discrete Distributions; Negative Binomial and Hypergeometric.</td>
<td>Quiz 5, Tutorial 5, Practice Ex 5o, Assg 1</td>
</tr>
<tr>
<td>4 September W5</td>
<td>Introduction to Continuous random variables</td>
<td>Quiz 6, Tutorial 6, Practice Ex 6 Assignment 1, Test 1</td>
</tr>
<tr>
<td>11 September W6</td>
<td>Cumulative distribution function Functions of Random Variables, Sampling distributions, Uniform and Exponential Distributions.</td>
<td>Quiz 7, Tutorial 7, Practice Ex 7 Assignment 1 due</td>
</tr>
</tbody>
</table>

**Midsemester Break: 16th September – 2nd October**

<table>
<thead>
<tr>
<th>WEEK</th>
<th>LECTURE TOPIC</th>
<th>To Do</th>
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</thead>
<tbody>
<tr>
<td>3 October W7</td>
<td>Normal Distribution Model checking, Central Limit Theorem, Normal Approximations</td>
<td>Quiz 8, Tutorial 8, Practice Ex 8</td>
</tr>
<tr>
<td>9 October W8</td>
<td>Gamma Distributions, Beta Distribution Tchebysheff’s Theorem</td>
<td>Quiz 9, Tutorial 9, Practice Ex 9</td>
</tr>
<tr>
<td>16 October W9</td>
<td>Chi-squared Distribution, Distribution of sample variance, F-Distribution, Test for Equality of Variance, t- Distribution, Distribution of sample mean (σ unknown)</td>
<td>Quiz 10, Tutorial 10, Practice Ex 10 Assg 2, Test 2</td>
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<tr>
<td>Date</td>
<td>Week</td>
<td>Topic</td>
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<tr>
<td>23 October</td>
<td>W11</td>
<td>Joint Distributions: Discrete and Continuous cases</td>
</tr>
<tr>
<td>31 October</td>
<td>W12</td>
<td>Introduction to Markov Chains States, Transition probabilities, State vectors, Equilibrium, Absorbing States</td>
</tr>
<tr>
<td>6 November</td>
<td>W13</td>
<td>Review</td>
</tr>
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