MACQUARIE
UNIVERSITY

FACULTY OF
BUSINESS AND ECONOMICS

ACST212
Combinatorial Probability

Semester 2, 2010

Department of Actuarial Studies

Year and Semester: Semester 2, 2010

Unit convenor: Jim Farmer

Prerequisites: **(**Admission to BCom-Act Stud or BActStud) and STAT171(Cr)

Corequisite: MATH133.

Students in this unit should read this unit outline carefully at the start of semester. It contains important information about the unit. If anything in it is unclear, please check the administration section of the unit's web site for clarification. If that provides no further guidance, use the mail tool on the unit's web site to send an inquiry to the "administration inquiries" account.

ABOUT THIS UNIT

Unit Description:
Much of the work that actuaries do relates to the assessment and management of the financial consequences of risk. This analysis typically requires calculations involving probability. This unit is a study of probability, its nature and meaning, and a range of techniques for determining a numeric measure of the probability that a specific event will occur. The unit has a practical emphasis, focusing on applications of theory to evaluate probabilities of defined events.

Unit rationale
Most of the examples encountered in this unit will not appear to be actuarial examples, since we deliberately adopt the clearest examples we can find to demonstrate concepts. However, most of the concepts we examine will be used in actuarial contexts in most of the 300-level ACST units.

TEACHING STAFF

The unit convenor and lecturer, Jim Farmer, can be contacted via the unit's web site. Questions about the unit material should be placed in the Discussion Area. Administrative questions may be sent to the "Administration Inquiries" account using the mail tool in the unit's web site. Tutors cannot be contacted other than at tutorials.

CONSULTATION METHODS

You are encouraged to seek help at a time that is convenient to you by using the discussion area on the unit's web site. Students experiencing significant difficulties with any topic in the unit must seek assistance immediately.

Administration questions which have not already been answered in this document or the other documentation in the administration section of the unit's web site should be sent to the Administration Inquiries account using the mail tool in the unit's web site.

CLASSES

- There are 4 hours of face-to-face teaching per week consisting of 2 hours of lectures and 2 hours of tutorial.
- The timetable for classes can be found on the University web site at: http://www.timetables.mq.edu.au/
- Since all tutorial are held in the same timeslot, we take the opportunity to stream tutorials by performance. Ignore the tute location showing in eStudent. Consult the list of tute locations that will appear on the unit's web site around Thursday of Week 1 of classes.

REQUIRED AND RECOMMENDED TEXTS AND/OR MATERIALS

- No textbooks are prescribed for this unit.

TECHNOLOGY USED AND REQUIRED

- While mathematical in nature, this unit is about thinking rather than using technology. The only technology required is a calculator. Sometimes it will be possible to verify solutions by using a spreadsheet to apply a "brute force" method, but this is not required.

UNIT WEB PAGE

- Course material is available on the learning management system (BlackBoard). Logon via http://learn.mq.edu.au

LEARNING OUTCOMES

The learning outcomes of this unit are:

1 You should understand the fundamental concepts and principles of the range of probability approaches examined.
2 You should be able to confidently apply those concepts and principles in determining probabilities for defined events and solving probability-based problems.
3 You should be able to explain the concepts, principles and processes you are using, in clear, simple non-technical language, so that another student of the unit could follow your explanation
4 You should be able to clearly explain why a problem solution is correct (or not correct), so that another student of the unit could follow your explanation.
5 You should have further developed your problem-solving skills

GRADUATE CAPABILITIES

In addition to the discipline-based learning objectives, all academic programs at Macquarie seek to develop the capabilities the University's graduates will need to develop to address the challenges, and to be effective, engaged participants in their world.

This unit contributes to this by developing the following graduate capabilities:

1 Discipline Specific Knowledge and Skills: Have a deep intuitive understanding of the meaning of probability and the methods of manipulating probabilities.
2 Critical, Analytical and Integrative Thinking
3 Problem Solving Capability
4 Creative and innovative
5 Effective Communication
6 Capable of Professional and Personal Judgement and Initiative
7 Commitment to Continuous Learning

TEACHING AND LEARNING STRATEGY

This unit is taught via lectures and tutorials. However, a significant amount of the lecture time will be spent on attempting problems. The emphasis is on learning by doing.

Week Number	Week Beginning	Topic
1	2 August	1. Permutations
2	9 August	2. Combinations
3	16 August	3. Evaluating Probabilities by Enumeration of Cases
4	23 August	4. Probability Theorems
5	30 August	5. Bayes' Theorem **Monday - Test**
6	6 September	6a. Linear Difference Equations 6b. Random Variables – Reading Topic
7	13 September	7. Generating Functions **Monday - Test**
		2 week study break
8	4 October	8. Volumes by Double Integrals **Monday Public Holiday**
9	11 October	9. Expected Values
10	18 October	10. Recursive Methods
11	25 October	11. Probabilities by Multiple Integrals
12	1 November	12. Principle of Inclusion and Exclusion
13	8 November	13. Revision

RELATIONSHIP BETWEEN ASSESSMENT AND LEARNING OUTCOMES

Early Low Risk Diagnostic Task: The university's assessment policy requires each unit to have an early low risk diagnostic task. For this unit, the online quizzes available on the unit's web site achieve this purpose. The first quiz becomes available after the Tuesday lecture in week 1 and you can access feedback as soon as you have submitted the quiz. These quizzes do not count for assessment and hence have zero risk. You may attempt them as many times as you wish.

	Non-assessable	Assessment Task 1	Assessment Task 2	Assessment Task 3	Assessment Task 4
Title/Name	Online quizzes	Test 1	Test 2	Final Exam – Paper 1	Final Exam – Paper 2
Description	Cover first 6 topics	Covers topics 1 to 3.	Covers topics 4, 5, and 6b.		
Date	Weekly for 1st 6 weeks	30 August	13 September	To be determined	To be determined
% Weighting – Pass/Fail assessment	0	20%	20%	60%	0
% Weighting – Splitting passes into higher grades	0	10%	10%	30%	50%
Grading method	Not applicable	To earn a clear pass you should demonstrate competence in solving short routine problems for all topics in this unit. The tutorial questions labelled "routine" are indicative of the standard. To earn a grade of credit or higher you should demonstrate understanding by being able to apply concepts and principles to solve problems which are not necessarily of exactly the same type as problems encountered previously or to explain in clear, simple, non-technical language the concepts, processes and rationale behind the mathematical symbols. Paper 1 of the final exam contains only routine questions and paper 2 contains only harder questions.			
Feedback	Available after quiz submitted.	Tests will be returned as soon as possible.		Not applicable.	
Estimated student workload (hours)	6	4	4	11	
Learning outcomes assessed	1, 2	1-5	1-5	1, 2, 5	1-5, with particular emphasis on 3 and 4.
Graduate capabilities assessed	1.	1-3	1-3. Limited use of 4.	1-3	1-4,6.

A final examination is included as an assessment task for this unit to provide assurance that:
  i)   the product belongs to the student and
  ii)   the student has attained the knowledge and skills tested in the exam.

A 3 hour final examination for this unit will be held during the University Examination period.

The University Examination period in Second Half Year 2010 is from 15 November to 3 December.

You are expected to present yourself for examination at the time and place designated in the University Examination Timetable. The timetable will be available in Draft form approximately eight weeks before the commencement of the examinations and in Final form approximately four weeks before the commencement of the examinations.
http://www.timetables.mq.edu.au/exam

The only exception to not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for Special Consideration. The University's policy on special consideration process is available at
http://www.mq.edu.au/policy/docs/special_consideration/policy.html

If a Supplementary Examination is granted as a result of the Special Consideration process the examination will be scheduled after the conclusion of the official examination period.

The Macquarie university examination policy details the principles and conduct of examinations at the University. The policy is available at:
http://www.mq.edu.au/policy/docs/examination/policy.htm

ACADEMIC HONESTY

The nature of scholarly endeavour, dependent as it is on the work of others, binds all members of the University community to abide by the principles of academic honesty. Its fundamental principle is that all staff and students act with integrity in the creation, development, application and use of ideas and information. This means that:

- all academic work claimed as original is the work of the author making the claim

- all academic collaborations are acknowledged

- academic work is not falsified in any way

- when the ideas of others are used, these ideas are acknowledged appropriately.

Further information on the academic honesty can be found in the Macquarie University Academic Honesty Policy at
http://www.mq.edu.au/policy/docs/academic_honesty/policy.html

GRADES

Please refer to relevant Bachelor Degree rule in the Handbook of Undergraduate Studies.

GRADING APPEALS AND FINAL EXAMINATION SCRIPT VIEWING

If, at the conclusion of the unit, you have performed below expectations, and are considering lodging an appeal of grade and/or viewing your final exam script please refer to the following website which provides information about these processes and the cut off dates in the first instance. Please read the instructions provided concerning what constitutes a valid grounds for appeal before appealing your grade.

http://www.businessandeconomics.mq.edu.au/for/new_and_current_students/undergraduate/admin_central/grade_appeals.

SPECIAL CONSIDERATION

The University is committed to equity and fairness in all aspects of its learning and teaching. In stating this commitment, the University recognises that there may be circumstances where a student is prevented by unavoidable disruption from performing in accordance with their ability. A special consideration policy exists to support students who experience serious and unavoidable disruption such that they do not reach their usual demonstrated performance level. The policy and procedure are available at:

http://www.mq.edu.au/policy/docs/special_consideration/policy.html

http://www.mq.edu.au/policy/docs/special_consideration/procedure.html

STUDENT SUPPORT SERVICES

Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at http://www.student.mq.edu.au.

BESS. Business and Economics Student Services (BESS) is located in room E4B106 and offers photocopying facilities, reading areas and reference material. Class tests will be returned to BESS. Information about facilities and services is at http://businessandeconomics.mq.edu.au/for/new_and_current_students/undergraduate/bess.

IT CONDITIONS OF USE

Access to all student computing facilities within the Faculty of Business and Economics is restricted to authorised coursework for approved units. Student ID cards must be displayed in the locations provided at all times.

Students are expected to act responsibly when utilising University IT facilities. The following regulations apply to the use of computing facilities and online services:
● Accessing inappropriate web sites or downloading inappropriate material is not permitted. Material that is not related to coursework for approved unit is deemed inappropriate.

● Downloading copyright material without permission from the copyright owner is illegal, and strictly prohibited. Students detected undertaking such activities will face disciplinary action, which may result in criminal proceedings.

Non-compliance with these conditions may result in disciplinary action without further notice.

Students must use their Macquarie University email addresses to communicate with staff as it is University policy that the University issued email account is used for official University communication.

INSTITUTE OF ACTUARIES OF AUSTRALIA

The Institute of Actuaries of Australia (IAAust) has recently launched a new free offer for students to become IAAust University Subscribers. Full time undergraduates studying at an Institute accredited university who are members of a university student actuarial society are eligible. To sign up, go to

http://www.actuaries.asn.au/Membership/MembershipoftheInstitute/Subscriber.aspx.

The University Subscriber offer is not a membership of the IAAust but a subscription to receive information on career opportunities, invitations to selected IAAust events and online publications. You might also consider joining the IAAust – there are advantages in doing so while a full-time student. For membership information, go to

http://www.actuaries.asn.au/Membership/MembershipoftheInstitute.aspx