Syllabus1112014

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STAT 111 – Fall 2014

GENERAL INFORMATION AND SYLLABUS

Lecturer: Dr W J Ewens

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Office: Room 324 Leidy Labs (the "Zoology building"),
at the corner of 38th Street and Hamilton Walk.

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Dr Ewens' office hours: Dr Ewens' office hours are open. Do not hesitate to make an appointment at any time via the email address above. You will have to swipe your Penn card in the elevator to get to the third floor.

Sections Lectures are given through three sections, Sections 1, 2 and 3. On any given day the lectures in the three sections are identical, so that if on some day you cannot go to your normally scheduled section you can go to another section meeting on that same day. When you register for this course you also register for the section you will attend.

Lectures Section 1 meets Mon - Wed at 11:00 am - 11:50 noon in Huntsman Hall (the "Wharton building") in room G60. Section 2 meets Mon - Wed at 12 noon- 12:50 pm in Huntsman Hall in room G60. Section 3 meets Mon - Wed 2:00 pm - 2:50 pm in Stitler Hall room B6.

Announcements Important announcements will often be given in class. If for some reason you miss a class it is up to you to find out from a friend if any important announcements were made in the class that you missed. So far as is possible these announcements wil also be posted on "Canvas". (For more on "Canvas" see **Web Resource: "Canvas"** below.)

Recitation classes Except for October 10 and November 28 (see below), recitation classes are held on Fridays. The first recitation class will be on **Friday September 5**. (The recitation class for the week November 25-29 will be held on Wednesday November 27 - see below.) Homeworks will be handed out to you in recitation classes and your answers will be due in the recitation class one week after each homework is handed out. (Homeworks will also be posted on Canvas - see below). When you register for this course you also register for the recitation class you plan to attend. Students attending Section 1 lectures must register for either recitation section 201, 202, 203 or 204. Students attending Section 2 lectures must register for either recitation section 205, 206, 207 or 208. Students attending Section 3 lectures must register for either recitation section 209, 210, 211 or 212.

Recitation classes are given by teaching assistants (TAs) and will be held in Huntsman Hall.

The times and places for these are as follows:

Recitation class 201 is at 11 am, room G86
Recitation class 202 is at 11 am, room G90
Recitation class 203 is at 12 noon, room G86
Recitation class 204 is at 1 pm, room G86
Recitation class 205 is at 12 noon, room G90
Recitation class 206 is at 12 noon, room G88
Recitation class 207 is at 1 pm, room G88
Recitation class 208 is at 2 pm, room G88
Recitation class 209 is at 11 am, room G88
Recitation class 210 is at 1 pm, room G90
Recitation class 211 is at 2 pm, room G86
Recitation class 212 is at 2 pm, room G90

The TAs for these classes are as follows:

Recitation classes 201, 203 and 208: Zijian Guo (zijguo@wharton.upenn.edu)
Recitation classes 202, 207 and 212: Keyan Halperin (keyan@sas.upenn.edu)
Recitation classes 204, 205 and 211: Sam Pimentel (spi@wharton.upenn.edu)
Recitation classes 206, 209 and 210: Yuchao Jiang (yuchaoj@mail.med.upenn.edu)

TAs are there to help you. You can contact them at the above email addresses.

Fall mid-term break and Thanksgiving arrangements The Fall mid-term break is Th-Fri October 9-10. Thus there will be no recitation classes on October 10. Also, for the week Nov 24-28, that is the week that includes the Thanksgiving break, normal Tuesday and Wednesday activities will it not be held, and instead any activity normally scheduled for Thursday Nov 27 and Friday of Nov 28 will be moved respectively to Tuesday Nov 25 and Wednesday Nov 26. Thus there will be STAT 111 recitation classes but no lecture on Wednesday Nov 26.

Homeworks See above - homeworks will normally be handed out on Fridays in recitation classes, and your answers will be due in the following recitation class one week later. (A special arrangement will be made for the week of Thanksgiving.) Apart from indicating your name on any homework, with your family name in CAPS, also indicate the recitation section that you will come to in the following week (when your graded homework will be given back to you). Homework 1 will be handed out in *in class* on August 27 and will be due in at recitation classes on Friday September 5.

Homework and exam point scores are posted on "Canvas" - see more on Canvas below.

You should check regularly that all your homework scores are entered in on Canvas and are entered correctly. If you have problems concerning this, contact Sam Pimentel at spi@wharton.upenn.edu

Exams There will be one mid-term exam, to be given **6 - 8 pm Monday October 20**. The location of this exam is still being finalized, and you will be told what it is several days before the exam. Thus keep this time clear of other activities. The final exam is **Friday 12 December, 3 - 5 pm**. More details as to the location of this exam will be given later, when they become available. The timing of both exams is set by the university and cannot be changed.

Assessment The assessment in this course is by homeworks (10%), the mid-term exam (30%) and the final exam (60%). Some of the questions on the mid-term and final exams will be questions previously set in homeworks. Thus the homeworks actually carry a higher percentage value of the overall score than is suggested by the above.

Textbook There is no required textbook for this course. Printed notes will be available at no cost to you, and these can serve as a textbook. If however you do want to buy a textbook you should get Downing and Clark, "E-Z Statistics", Barron, 2009, ISBN 13: 978-0-7641-3978-9. However this book is **not** required, since it is used only as a general guide to the course material and the course is not firmly based on it. (It also contains some errors.)

Web resource: "Canvas" The web resource in this course is "Canvas". This is available to all Penn students at **https://canvas.upenn.edu** You will need pennkey authentification.

If you have any questions about using Canvas or more generally any web resource, email Zijian Guo at zijguo@wharton.upenn.edu or else contact the Wharton Computing Student support office at 215 898 8600 or at **https://spike.wharton.upenn.edu/support**

JMP The course will in part be given in association with use of the statistical package JMP. You should either buy and install this package on your computer or (much better, since buying JMP is expensive) use the Wharton computers that have it installed. You will not be able to use these computers until you have created a Wharton account. If you are a non-Wharton student please create a class account at: https://whartonstudentsupport.zendesk.com/hc/en-us/articles/202127736-Creating-a-Wharton-CLASS-Account

Alternatively Penn students can get a JMP license through e-academy at **http://www.onthehub.com/jmp/** for $30 for a 6 month license or $50 for a year license.

If you have any questions about JMP, email Yuchao Jiang at yuchaoj@mail.med.upenn.edu

Disabilities If you are registered through the Weingarten Center for special arrangements for exams etc., please contact Dr Ewens as soon as possible.

Course description The content of this course falls into two broad categories, namely probability theory and Statistics. The reason why we discuss probability theory will be given in the first lecture. A more detailed list of the topics covered within these two categories is given in the syllabus on the next two pages. **References to corresponding material in the textbook by Downing and Clark for these topics are given in parentheses (....), as for example (DC107-118).** Note that some material in the course is not covered by Downing and Clark, that sometimes the approach taken in class to some topics differs from that in Downing and Clark, and that sometimes material given in class contradicts (incorrect) material in Downing and Clark. Therefore the references to Downing and Clark are only a general guide to the material that will be covered in class.

SYLLABUS

INTRODUCTION

1 Statistics and probability theory

1.1 What is Statistics?
1.2 The relation between probability theory and Statistics
1. An example

PROBABILITY THEORY

2. Events (DC 32–34)
2.1 What are events?
2.2 Notation
2.3 Unions, intersections and complements of events (DC 34–40).

3 Probabilities of events (DC 35–40)
3.1 Probabilities of derived events
3.2 Mutually exclusive events
3.3 Independence of events. (DC 79-80).
3.4 Examples of probability calculations involving unions and intersections
3.5 Conditional probabilities of events. (DC 75–86).
3.6 An unfair die

4 Probability: one discrete random variable

4.1 Random variables and data
4.2 Definition: one discrete random variable (DC 87–92)
4.3 The probability distribution of a discrete random variable (DC 87–106).
4.4 Parameters
4.5 The binomial distribution (DC 107-118)
4.6 The mean of a discrete random variable (DC 93–95).
4.7 The variance of a discrete random variable (DC 95–99).

5 Many random variables

5.1 Introduction
5.2 Notation
5.3 Independently and identically distributed random variables
5.4 The mean and variance of a sum and of an average
5.5 Two generalizations
5.6 The proportion of successes in n binomial trials
5.7 The standard deviation and the standard error
5.8 Means and averages

6 Continuous random variables (DC 131–140).

6.1 Definition
6.2 The mean and variance of a continuous random variable (DC 138–140).
6.3 The normal distribution (DC 143–155).
6.4 The standardization procedure (DC 147–151).
6.5 Numbers that you will see often (DC 230)
6.6 Sums, averages and differences of independent normal random variables
6.7 The Central Limit Theorem (DC 192-198)
6.8 The normal distribution and the binomial distribution (DC 193)
6.9 The chi-square distribution (DC 161–164).

STATISTICS

7 Introduction

8 Estimation (of a parameter)

8.1 Introduction
8.2 General principles of the estimation of a parameter

9 Hypothesis testing (DC 227–245)

10 Tests on means