

# Descriptive Statistics (PSYCH2XE3) Course Outline - Winter 2011-12

**NOTE: This is a preliminary version of the course outline and may be updated as the course proceeds. For the most up-to-date version please go to**

**<http://www.science.mcmaster.ca/psychology/psych2xe3/index.html>**

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## Instructor

Professor Sue Becker, *becker at mcmaster dot ca*  
Office hours: by appointment.

## Course Assistance

Please post any course-related questions to Avenue (click on Psych2XE3 and go to the Discussion tab). Rather than emailing the professor or one of the individual TA's you should post your question on Avenue (unless it is of a personal nature). Others will likely have the same question and will benefit from seeing the answer. From Jan 8 onwards, your TA's will be monitoring the Avenue discussion board several times daily and you will get a fast response this way.

## Teaching Assistants

TO1 Emilie Harvey *harvee3 at mcmaster dot ca*  
TO2 Jeff Bruce *jeffbruce at gmail dot com*  
TO3 Anna Finkelshtein *finkela at mcmaster dot ca*  
TO4 Mitchell LaPointe *lapoimrp at mcmaster dot ca*  
TO5 Amy Beth Warriner *warrinab at mcmaster dot ca*  
Course co-ordinator: Sandra Thomson *thomsosj at mcmaster dot ca*

## Private tutor available for statistics:

Lindsay Farber, Ph.D. (c)  
Neuroscience Graduate Student, MiNDS program  
Bennett/Sekuler Vision and Cognitive Neuroscience Lab  
*farberle@mcmaster.ca*  
905 525 9140 ext. 24489  
*(please email Lindsay directly to inquire about her rates and availability)*

## Schedule

Lectures: Mondays and Thursdays 1:30-2:20 ITB-AB102  
Labs:  
T01 Mo 09:30 KTH/B123  
T02 We 09:30 KTH/B123  
T03 We 12:30 BSB/249  
T04 We 14:30 KTH/B121

T05 Fr 14:30 BSB/249

## Course Objectives

Students should gain a strong foundation in core statistical concepts including measures of central tendency and dispersion, correlation, data distributions, comparing groups, different ways of plotting data and other exploratory data analyses through a combination of lectures and hands-on exercises in weekly computer labs. Note that labs are not optional and all lab assignments must be submitted during the lab time.

## Materials and Fees

### Course textbook:

Fundamental Statistics for the Behavioral Sciences, edition 7e, by David C. Howell, published by Wadsworth. Some supplementary readings from online sources will be added for the second half of the course.

### Software:

We will use Excel and SPSS, both of which are available in all of the computer labs. Assignments will be completed and submitted during the lab times so students should not need to purchase their own copy of the software.

### iClickers:

Every student needs to purchase an iClicker and should bring it to every lecture. iClickers can be purchased at the Titles campus bookstore and must be registered online with your name and McMaster student ID in order to receive participation credit for your iClicker response, see <http://www.bookstore.mcmaster.ca/textbooks/iclicker-faq.html>

### MacID:

You will need to activate your MacID if you have not already done so, to work on the computers in the labs, and to receive course emails. See <http://www.mcmaster.ca/uts> for information on obtaining and activating your MacID.

### Avenue:

You should check the Psych2XE3 discussion group on a daily basis for questions and answers, and also check the Course Announcements section.

## Assessment

There will be 3 multiple-choice exams. There are no make-up exams. You may bring only an approved calculator, pencils and erasers suitable for multiple-choice scan sheets, and your McMaster student ID card to the exams. Sheets with formulae (if required) will be supplied for you. An approved calculator is any calculator whose name starts with Casio fx991. The possible weights for the three exams are presented below. The option that generates the highest value will determine your final grade. The instructor reserves the right to alter the evaluation scheme if necessary.

	Option 1	Option 2	Option 3	Option 4
Midterm 1	20%	0%	20%	0%
Midterm 2	20%	20%	0%	0%
Final Exam	40%	60%	60%	80%
Lab Assignments	15%	15%	15%	15%
Participation	5%	5%	5%	5%

**Lab assignments:** Each lab assignment must be completed and submitted on Avenue during the

corresponding lab time (see schedule below). There will be a total of 9 lab assignments and the best 7 will make up 15% of your final mark. Late submissions outside of the regular lab time will not be accepted. There will be no make-up assignments.

**Participation** is earned by using your iClicker to answer questions posed during the lectures. Full marks (5/5) for participation will be earned for participating in 80% or more of the posed iClicker questions throughout the term, 4/5 marks for answering 70-79% of questions, 3/5 marks for 60-69% of questions, 2/5 for 50-59%, 1/5 for 40-49% and 0/5 for answering less than 40% of the questions.

## Week-by-week lecture and lab schedule

### Week 1

*Lecture Jan 5:* Overview of course structure and evaluation. Two types of statistics: descriptive and inferential. Scales of measurement.

*Lab:* there is no lab this week.

*Readings:* Chapters 1 and 2

### Week 2

*Lectures Jan 9, 12:* Visualizing data, frequency histograms, binomial, normal and skewed distributions. Graphing with excel.

*Lab 1:* Intro to excel. Review of scales of measurement. Exercise involving data collection, multiple response measures. Submit lab 1 writeup.

*Readings:* Chapter 3

### Week 3

*Lectures Jan 16, 19:* Measures of central tendency, mean, median, mode. Calculating with Excel.

*Lab 2:* Using iClicker data collected during Week 2 lectures, investigate data and plot with different distributions. Submit lab 2 writeup.

*Readings:* Chapter 4

### Week 4

*Lectures Jan 23, 26:* Measures of dispersion, range, quartiles, standard deviation, skewness. Calculations with Excel.

*Lab 3:* Using iClicker data collected during Week 3, investigate different measures of central tendency. Submit lab 3 writeup. Hour 2 of lab will be devoted to review for midterm.

*Readings:* Chapter 5

### Week 5

*Lecture Jan 30:* visualizing data, box plots, scatterplots, group differences.

*Midterm Test 1 Feb 2*

Surnames beginning with A-M write in T28-001, surnames N-Z write in T29-105

*Lab:* no lab this week due to midterm.

*Readings:* Section 5.8 (boxplots), section 9.1 (Scatter diagrams).

### Week 6

*Lectures Feb 6, 9:* Pivot tables, formulae in Excel, re-grouping and transforming data, the normal distribution, z-scores, percentiles.

*Lab 4:* Run a memory experiment (forward and backward digit span), view the data in a variety of ways including boxplots

*Readings:* Chapter 6.

### Week 7

*Lectures Feb 13, 16:* Correlation, Fitting a line vs fitting a curve to data.

*Lab 5:* Using the data collected in week 5 lecture (survey of study habits, partying, GPA etc), view the data in a variety of ways using pivot tables.

*Readings:* Chapters 9-10.

Week 8

*Lectures Feb 27, Mar 1:* Regression.

*Lab 6:*

*Readings:* Chapters 10-11.

Week 9

*Lectures March 5, 8:* Probability

*Lab 7:* Collect data in a free word recall task, explore best-fitting line versus best-fitting curve.

*Readings:* Chapter 7

Week 10

*Lecture March 12:* Repeated sampling from the same distribution, central limit theorem

*Midterm Test 2 March 15*

*Lab:* no lab this week due to midterm.

*Readings:* Chapter 7, chapter 8 up to and including section 8.2, chapter 12 section 12.1

Week 11

*Lectures March 19, 22:* Sampling distributions and hypothesis testing

*Lab 8:*

*Readings:* Chapter 8

Week 12

*Lectures March 26, 29:* The t-test.

*Lab 9:* Explore data from a two-group experiment. Calculate mean and probability. Identify a hypothesis and explore whether it is supported by the data. Submit lab 9 writeup.

*Readings:* Chapter 12

Week 13

*Lecture April 2:* Final exam review.

*Lab:* no lab this week.

### **Academic integrity:**

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: .Grade of F assigned for academic dishonesty.), and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at <http://www.mcmaster.ca/academicintegrity>

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

### **Notice of changes to course structure:**

The university reserves the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type

of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes."

The professor reserves the right to change any and all course requirements if the need should arise. Any change in the course requirements will be posted on the webpage and emailed to the class, and the details will be announced in class. Any concerns about announced changes should be addressed with the professor as soon as the changes are announced.

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### **Other courses taught by Sue Becker**

Psych 3BN3 - Cognitive Neuroscience I

Psych 4BN3 - Cognitive Neuroscience II

Neural network models of cognition and perception (graduate course)

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