CALENDAR DESCRIPTION

An introductory course in the application of statistical methods, intended for students in departments other than Statistical and Actuarial Sciences, Applied Mathematics, Mathematics, or students in the Faculty of Engineering. Topics include sampling, confidence intervals, analysis of variance, regression and correlation. Cannot be taken for credit in any module in Statistics, Actuarial Science, or Financial Modelling.


Prerequisite(s): A full (1.0) mathematics course, or equivalent, numbered 1000 or above. Statistical Sciences 1024A/B can be used to meet 0.5 of the 1.0 mathematics course requirement.

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

INSTRUCTOR DETAILS

Name: Jennifer Peter
Departments: Biology, and, Statistical & Actuarial Sciences

Drop-in hours: Mon 1:30–3:30 pm
Thurs 9:00—11:00 am
Both times in NCB 301L.
No appointments needed...just ‘drop-in’!

Contact: Please use “Messages” on our OWL site instead of email (my email is too similar to someone else’s, which causes problems); send to Jennifer Peter.

Have a question? Find the best communication medium below:

- OWL Forums
- Course material
- Course policies
- Deadlines
- Help on lab assignments
- Practice questions
- Strategies for studying
- Using R
- Ideas for improving
- Face-to-Face (class, drop-in hours)
- Anything related to your personal grades or performance in the course
- Academic accommodation
- OWL Messages

Fall 2019 lectures

- 001: Mon and Wed, 10:30–11:30 am, MC 110
- 002: Tues and Thurs, 4:30–5:30 pm, MC 110

See p.6 for lab sections

WHAT’S IN THIS SYLLABUS?

- Course Materials 2
- Expectations 2
- Evaluation Scheme 3
- How this course works 3
- Learning outcomes 4
- Assessment Descriptions 5-6
- Policies and Supports 7-8
- Course Outline 9-10
COURSE MATERIALS

These materials are “required” in that each student needs access to them to be successful in the course. Whether that access is individual, shared by a group of individuals, or borrowed from the commons (e.g. computer labs, libraries, etc.) is up to you. In addition to these three main resources, we will occasionally use articles, videos, and applets available freely online to supplement your learning. If you discover any (open access) resources that are helpful to you for this course, I encourage you to share the details with the rest of the class!

OWL Course Site: Statistics 2244A 001 FW19 (owl.uwo.ca)

The OWL site is used heavily. It provides:
• Lecture slides (PDF format)
• Content for independent study (lecture videos, readings, etc.)
• Online Modules for learning to use the statistical software, R
• Lab Assignments (and related materials)
• Access to quizzes and other graded components
• Practice questions
• Communication tools

Statistical Software: R (www.r-project.org)

The Lab Assignments require using statistical software—specifically, R (and the highly recommended integrated development environment, R Studio available at www.rstudio.com)—to visualize and analyse data. Both software packages are free programs that can be downloaded to your personal computers and are available on campus GenLab computers. Instructions for downloading is on OWL under Labs

Textbook:

You will be asked to read parts of the textbook as independent study. I promote the SaplingPlus version (i.e. 6-month subscription to online portal + ebook) because it is the cheapest option ($83.35 through the UWO Bookstore; search Stat 2244B), has extra practice questions, and I have created topic-related modules within it.

EXPECTATIONS

To help maintain a safe, respectful, and productive community in which we—students and teaching team alike—can take risks in our learning/teaching, tackle challenging concepts, and ultimately grow as scientists, we should endeavor to follow these mutual expectations:

Be active and participate in class settings.

Be prepared for class.

Be open to trying new ways to support learning.

Learn from mistakes and seek/review/provide feedback.

Other suggestions? Please share them at any time!

Actively listen to and respect others in all class-related environments.

Promote an inclusive and safe learning environment.

Ask & respond to questions/concerns in a timely manner (within constraints of a large class).

IN THE ACADEMIC CONTEXT...

In addition to these expectations, there are some not-always-obvious expectations associated with academia where intellectual property rights, and academic integrity, and confidentiality are important. Ask for written permission before:
• making an audio recording of class;
• sharing/reproducing/distributing course materials (for free or for profit)
EVALUATION SCHEME

The evaluation is set up to promote mastery of the material/skills by the end of the course, and to provide opportunities to learn from mistakes. The course evaluation is divided into ‘Fixed Distribution’ and ‘Flexible Distribution’ segments; for more details on each component/item, see pages 5 and 6.

### Fixed Distribution (35%)

Your final grade will be calculated using both Scheme 1 and Scheme 2. Your final course grade will use whichever scheme results in the highest grade for you as an individual.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Scheme 1</th>
<th>Scheme 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clicker Participation</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Activities</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>4 Lab Assignments</td>
<td>22% total</td>
<td>27% total</td>
</tr>
<tr>
<td>Highest lab</td>
<td>8%</td>
<td>9%</td>
</tr>
<tr>
<td>2nd highest labs</td>
<td>6%</td>
<td>8%</td>
</tr>
<tr>
<td>3rd &amp; 4th highest labs</td>
<td>4% each</td>
<td>5% each</td>
</tr>
</tbody>
</table>

### Flexible Distribution (63%)

Each of the following course items are initially weighted according to Scenario 1 (“S1”) below. Your final grade will be calculated under all four scenarios. Your final course grade will use whichever scenario results in the highest grade for you as an individual.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 1</td>
<td>10%</td>
<td>0%</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td>Test 2</td>
<td>13%</td>
<td>18%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40%</td>
<td>45%</td>
<td>53%</td>
<td>63%</td>
</tr>
</tbody>
</table>

### Why is this so complicated!?

The success-based weighting of Lab Assignments and the Flexible Distribution is set up so you have multiple opportunities to receive feedback and demonstrate mastery. If you discover your understanding is not complete, and/or you perform below your desired level of success on a particular item of the Flexible Distribution, you still have future opportunities to regain some/all marks associated with those items. Because all assessment items are cumulative, the relative weighting of course material is (approximately) equivalent under each scenario.

HOW THIS COURSE WORKS

This course follows a blended learning approach (i.e. online + in-person delivery) that integrates five ‘spheres’ of engagement. While days/weeks vary, in general, you should expect the following framework:
LEARNING OUTCOMES (LOs)

This course is both introductory and comprehensive, conceptual and practical. At a fundamental level, the course is organized to demonstrate that statistics is a scientific discipline that can and should inform research at all stages, from problem definition to interpretation and conclusion. To reinforce this overarching learning outcome, the course topics are organized around a “backbone” based on the PPDAC framework for scientific inquiry (MacKay and Oldford 2000).

More specifically, by the end of the course, you should be able to:

A. Design sampling and study procedures to collect relevant data to address a research question.
   - A1. Distinguish among sampling and study designs.
   - A2. Identify issues associated with sampling and study design (e.g. bias, validity, confounding)
   - A3. Identify relevant inference procedures based on research question and variables.

B. Create and interpret appropriate summaries of data.
   - B1. Select summaries based on research question and variables.
   - B2. Interpret summaries to identify and/or describe patterns, trends, and interesting features in data.

C. Analyse data using inference procedures to address a research question.
   - C1. Select appropriate inference procedures to address a research question.
   - C2. Interpret and describe confidence intervals and hypothesis test results (and associated concepts).

D. Use statistical software to explore, summarize, analyse, and interpret data.
   - D1. Use R to create and modify graphical and numerical summaries of data.
   - D2. Use R to conduct common inference procedures, including evaluating conditions for model fit.
   - D3. Interpret R output (including accompanying code) correctly.

E. Communicate statistical concepts, analyses, and arguments in an accurate and scholarly manner.
   - E1. Apply vocabulary accurately to describe statistical concepts, procedures, and ideas.
   - E2. Apply conventional formats for reporting and interpreting results of statistical analyses in written/graphic form.
   - E3. Justify the choice of statistical procedures (e.g. selected study designs).

F. Describe models and/or conceptual background for common inference procedures.
   - F1. Describe the models for common inference procedures.
   - F2. Describe sampling distributions (based on simple random samples) for commonly used statistics.
   - F3. Discuss and describe issues associated with inference (e.g. power, precision, Type I/II errors).

CLICKER PARTICIPATION


WHAT? Multiple choice questions during class. Students must attend their registered lecture section.

HOW? iClicker app (free); account set-up information under Administration on OWL site.

GRADES. Awarded for participation (not correct answers). Full participation in each class is worth 1 point; you earn a proportional fraction of the point for a given class based on the number of clicker questions you answer during the class. The percentage of points you earn across the course puts you in one of 6 categories (see table) to determine your final grade.

ACCOMMODATION? Built into the grading scheme (i.e. the 20% margins) and should cover occasional lapses in participation and/or technical problems. If you have circumstances that cause larger ‘absences’, please obtain relief/consideration from Academic Counseling.

% points earned Grade
0 0
0 < % < 20 1
20 ≤ % < 40 2
40 ≤ % < 60 3
60 ≤ % < 80 4
80 ≤ % ≤ 100 5

QUIZZES


WHAT? Multiple choice and/or numeric response questions. Not meant to reflect exam-style questions.

HOW? Quizzes & Activities tool on OWL site. Available for ~36 h before deadline; limited time for completion once started. One deadline for ALL students.

GRADES. Marked for correct answers. The percentage of quiz questions answered correctly across the entire term places you in one of 8 categories (see table) to determine your final grade.

% questions correct Grade
0 0
0 < % < 14 1
14 ≤ % < 28 2
28 ≤ % < 42 3
42 ≤ % < 56 4
56 ≤ % < 70 5
70 ≤ % < 85 6
85 ≤ % ≤ 100 7

ACCOMMODATION? Built into the grading scheme (i.e. the ~14% margins) and should cover occasional missed quizzes and/or technical problems. For more extenuating circumstances, please obtain relief/consideration from Academic Counseling.

ACTIVITIES

WHY? Collect data for use & discussion in class. Promote active learning of core concepts.

WHAT? Structure varies: instructions for each activity will be provided on OWL site. Often involves using an applet to collect some information/data.

HOW? Responses submitted via Quizzes & Activities tool on OWL site. Typically available for ~36 h before deadline (if not longer).

GRADES. Points are awarded for completion with plausible responses; instructions will specify exact requirements. The percentage of points collected (out of those offered) across the course places you in one of 4 categories (see table) to determine your final grade.

% points earned Grade
0 0
0 < % < 33 1
33 ≤ % < 67 2
67 ≤ % ≤ 100 3

ACCOMMODATION? Built into the grading scheme and should cover occasional missed activities and/or technical problems. For more extenuating circumstances, please obtain relief/consideration from Academic Counseling.

TESTS and FINAL EXAM

WHY? Assessment of understanding, application, and integration of course material.

WHAT? Multiple choice questions (unless stated otherwise); ~15-20 questions for Tests, ~45 questions for Final Exam.


GRADES. Your mark on the tests/exam is based on the number of correct answers submitted.

ACCOMMODATION? The Tests are part of the “Flexible Distribution” in course; weight from the Tests is automatically redistributed (see page 3). Students who miss the Final Exam must obtain relief/consideration from Academic Counseling. See information on Academic Policies under the Policies and Supports section (page 7).
**LAB ASSIGNMENTS**

**WHY?** Assessment of your application of course concepts in a authentic manner, including use of statistical software (R).

**WHAT?** 4 assignments, each composed of ~4 multiple part, short-answer questions requiring written responses (including graphs and R code). Assignments move progressively through the phases of the PPDAC framework (MacKay & Oldford 2000), and involve answering questions that relate to an overall research objective and set of research questions. Success on assignments will involve applying course concepts in a novel setting, and demonstrating appropriate use of R.

**HOW?** To earn credit, assignments are submitted as a PDF file to both (1) “Assignments (OWL Submissions)” on the OWL site and (2) Gradescope. The submission process will be discussed in the first lab session.

**GRADES.** Marked for correct/valid application of course concepts. Regrade requests must be made through Gradescope within one week of receiving graded assignment.

**ACCOMMODATIONS?** For any missed Lab Assignment, you must obtain relief/consideration from Academic Counseling, otherwise a grade of zero will be awarded. One missed and relieved assignment will be assigned a grade equal to the mean of the other non-relieved assignments, and will count as the lowest assignment weight (see page 3). If more than one lab assignments is missed with relief/consideration, a final course grade of Incomplete (“INC”) will be issued, and the student will be required to make up the relieved assignment(s) in the next term of the course.

**LAB EXEMPTION.** If you previously took Biol/Stat 2244 after Sept 2016, you may be eligible for a lab exemption. More details on the OWL site under Administration. Decision to take the exemption is due before the deadline for Lab Assignment 1.

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**DID YOU KNOW?**

Working with data in R (as assessed through Lab Assignments) is an essential requirement. To pass 2244, you must:

- submit and receive a non-zero grade for at least 3 of the 4 Assignments, and,
- Earn a passing grade for the lab assignments component of the course.

Otherwise, your final course grade will be recorded as 45% (or your calculated grade—whichever is lower).

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**COMMENTS ON 2244 GRADES AND EVALUATION**

The assessment weights have been set to:

- recognize the workload of each component;
- highlight the relative importance to the learning outcomes for the course;
- acknowledge that mastery takes time.

The evaluation scheme is also set up with an awareness that we aren’t ‘perfect’ every day, and some of our not-so-good days may coincide with a test or assignment deadline. The evaluation scheme, therefore, is set up to place higher value on your best work. Because this structure is already in place, I do not re-weight assessments, nor accept additional/revised work, to accommodate poor performance and/or non-relieved absences. For reference, I also do not ‘bump’ individual grades (e.g. to meet program cut-offs), nor force grades to follow a particular distribution (e.g. Normal curve).

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**POLICIES AND SUPPORTS**

**Looking for policies, support, or resources?**
The website for Registrarial Services is [http://www.registrar.uwo.ca](http://www.registrar.uwo.ca)

**Submit your own work.**
Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this website: [http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf).

**Eyes on your own test.**
Computer-marked, multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

**Sick or unable to complete course requirements?**
If you are unable to meet a course requirement due to illness or other serious circumstances, you must seek approval for the absence as soon as possible. Approval can be granted either through a self-reporting of absence or via the Dean’s Office/Academic Counselling unit of your Home Faculty. If you are a Science student, the Academic Counselling Office of the Faculty of Science is located in NCB 280, and can be contacted at scibmsac@uwo.ca. For further information, please consult the university’s policy on academic consideration for student absences: [https://tinyurl.com/AcademicConsiderations](https://tinyurl.com/AcademicConsiderations)

**Use your UWO email.**
In accordance with policy, [http://www.uwo.ca/its/identity/activatenonstudent.html](http://www.uwo.ca/its/identity/activatenonstudent.html), the centrally administered e-mail account provided to students will be considered the individual’s official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely man-

**Missed the Final Exam? Heavy exam load?**
If you miss the Final Exam, please contact your faculty’s Academic Counselling Office as soon as you are able to do so. They will assess your eligibility to write the Special Exam (the name given by the university to a makeup Final Exam). You may also be eligible to write the Special Exam if you are in a “Multiple Exam Situation” (see [http://www.registrar.uwo.ca/examinations/exam_schedule.html](http://www.registrar.uwo.ca/examinations/exam_schedule.html))

**What’s Gradescope?**
This course will use Gradescope, an online collaborative grading and analytic platform. For information on their privacy policy, please visit their [website](http://www.turnitin.com).

**Respect one another.**
The Department of Statistical and Actuarial Sciences has adopted a "Mutual Expectations" policy governing the classroom environment and all work submitted by students. The full text of the policy can be found at: [http://www.uwo.ca/stats/undergraduate/mutual-expectations.html](http://www.uwo.ca/stats/undergraduate/mutual-expectations.html). In summary, the policy was developed under the premise that all interactions between students and faculty should be governed by the principles of courtesy, respect and honesty.

**DID YOU KNOW?**
It is Faculty of Science policy that a student who chooses to write a test or exam deems themselves fit enough to do so, and the student must accept the mark obtained. Claims of medical, physical, or emotional distress after the fact will not be considered.

**We use Turnitin.**
All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com ([http://www.turnitin.com](http://www.turnitin.com)).
Clicker Responsibility. We subscribe to and use clicker software produced by iClicker (https://www.iclicker.com/) because it is the platform supported by Western’s Technology Services (WTS) and is free to registered students. If using a clicker, you are responsible for bringing your own device for use as a clicker and setting up your iClicker account correctly. The instructor is not responsible (i.e. no academic relief/consideration will be made) for WiFi failure/inconsistencies; the grading scheme is set up to account for these issues.

Clicker Academic Record. Your clicker use will be recorded in lecture and will become part of your academic record. As such, your clicker record will be afforded the same degree of security, confidentiality, and transparency that is customary for test marks, etc.

Research. Your clicker data will not be used for any non-academic or research purpose without your consent. For any research study in which you are invited to participate, you will be provided with a Letter of Information with an opportunity to give or withhold consent. Such research will not replace the usual end of term Student Questionnaire given by the University.

Academic Integrity. Use of a clicker associated with an identity other than your own is an academic offense. Granting permission for someone else to submit answers on your behalf is an academic offence. In a test, lab, lecture, or tutorial, possession of a device associated with the identity of another student for the purpose of clicker participation, will be interpreted as intent to commit an academic offense and will be reported as such.

Senate definitions of grades
For your reference, the Senate definition for meaning of letter grades is:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Grade range (%)</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>90 – 100</td>
<td>One could scarcely expect better from a student at this level.</td>
</tr>
<tr>
<td>A</td>
<td>80 – 89</td>
<td>Superior work which is clearly above average.</td>
</tr>
<tr>
<td>B</td>
<td>70 – 79</td>
<td>Good work, meeting all requirements, and eminently satisfactory.</td>
</tr>
<tr>
<td>C</td>
<td>60 – 69</td>
<td>Competent work, meeting requirements.</td>
</tr>
<tr>
<td>D</td>
<td>50 – 59</td>
<td>Fair work, minimally acceptable.</td>
</tr>
<tr>
<td>F</td>
<td>Below 50</td>
<td>Fail.</td>
</tr>
</tbody>
</table>

Need an alternate format?
Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 ext. 82147 for any specific question regarding accommodation.

Need support with disabilities?
The policy on Accommodation for Students with Disabilities can be found here: www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_disabilities.pdf

Help with learning strategies?
Learning-skills counsellors at the Student Development Centre (http://www.sdc.uwo.ca) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Have a religious conflict?
The policy on Accommodation for Religious Holidays can be found here: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

In mental/emotional distress?
Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.uwo.ca/uwocom/mentalhealth/) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, http://westernusc.ca/services.
### COURSE OUTLINE

This schedule is tentative; we occasionally get a little ahead/behind on course topics. Consequently, the timing of Activities and Quizzes will be adjusted to match our progression through the course (and occasionally, quizzes are added/removed). Importantly, the weeks for labs and the Assignment due dates may get bumped (to be later...never earlier) depending on our progression.

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Topic(s)</th>
<th>Graded components</th>
<th>Required ‘Reading’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept 9 &amp; 10</td>
<td>PPDAC: a scientific inquiry framework (“Problem”)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sept 11 &amp; 12</td>
<td>Sampling design considerations (“Plan”) - part A</td>
<td>Activity: Taking a sample</td>
<td>Ch 6, p146–155 plus videos on OWL</td>
</tr>
<tr>
<td></td>
<td><em>Independent Study:</em> Sampling Designs (“Plan”)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labs</td>
<td><em>None...don’t stress. We’ll get you ready in week 2.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sept 16 &amp; 17</td>
<td>Sampling design considerations (“Plan”) - part B</td>
<td>Quiz 1—Sampling</td>
<td>Ch 6, p141–144, p. 155-159</td>
</tr>
<tr>
<td></td>
<td><em>Independent Study:</em> Study Designs (“Plan”)</td>
<td></td>
<td>Ch 7, p168–178 plus videos on OWL</td>
</tr>
<tr>
<td>Labs</td>
<td>Introduction to lab component of 2244 and R Tutorial (importing data &amp; using R script files)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sept 23 &amp; 24</td>
<td>Study design considerations (“Plan”) - part B</td>
<td></td>
<td>Ch 1, p4–28 (except “Time Series”) and Ch 2 (all sections)</td>
</tr>
<tr>
<td></td>
<td><em>Independent Study:</em> Graphical &amp; numerical summaries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sept 25 &amp; 26</td>
<td>Planning ahead: Sampling variability (“Plan”)</td>
<td>Quiz 3—Online R Module 1</td>
<td></td>
</tr>
<tr>
<td>Labs</td>
<td><em>none</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sept 30 &amp; Oct 1</td>
<td>Summarizing &amp; Exploring Data (“Data”) - part A</td>
<td>Quiz 4—Summarizing &amp; Exploring Data</td>
<td></td>
</tr>
<tr>
<td>Oct 2 &amp; 3</td>
<td>Summarizing &amp; Exploring Data (“Data”) - part B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labs</td>
<td>Assignment 1 work/help period and R Tutorial (sub-setting and reporting code)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 7 &amp; 8</td>
<td>Probability Models &amp; Vocabulary (foundations)</td>
<td>Planning a Study (Assignment 1) due Monday</td>
<td>Ch 9, p222–224注: Ch 10, p258–264 is not required, but should be for students interested in health-related fields</td>
</tr>
<tr>
<td></td>
<td><strong>Quiz 5 — Online R Module 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labs</td>
<td><em>none</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 14 &amp; 15</td>
<td><em>Independent Study:</em> Probability models: Binomial (foundations)</td>
<td>Quiz 7—Binomial distributions</td>
<td>Ch 12, p299–301</td>
</tr>
<tr>
<td>Thanksgiving</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 16 &amp; 17</td>
<td>Sampling distributions (foundations)</td>
<td>Activity: Sampling distributions of sample means Quiz 8—Sampling distributions</td>
<td>Ch 13, p324–329</td>
</tr>
<tr>
<td>Labs</td>
<td>Assignment 2 work/help period and R tutorial (customizing figures)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecture</td>
<td>Topic(s)</td>
<td>Graded components</td>
<td>Required ‘Reading’</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Oct 21 &amp; 22</td>
<td>Understanding confidence intervals (foundations)</td>
<td><strong>Summarizing &amp; Exploring Data (Assignment 2) due Monday</strong></td>
<td>Ch 14, p347–352</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Activity: Understanding confidence</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Quiz 9—Introduction to confidence intervals</strong></td>
<td></td>
</tr>
<tr>
<td>Labs</td>
<td>none</td>
<td></td>
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<tr>
<td>Sat, Oct 26</td>
<td><strong>Test 1: 7:00–8:30 pm; see OWL Gradebook for your assigned room</strong></td>
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<tr>
<td>Oct 23 &amp; 24</td>
<td>t confidence interval for the mean (&quot;Analysis&quot;)</td>
<td>Quiz 10—t confidence intervals</td>
<td>Ch 15, p376–379 &amp; Ch 17, p417–420</td>
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<tr>
<td>Labs</td>
<td>none</td>
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<tr>
<td>Nov 4–10</td>
<td><strong>Reading week</strong></td>
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<tr>
<td>Nov 11 &amp; 12</td>
<td>Large sample test for the proportion (&quot;Analysis&quot;)</td>
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<td>Nov 13 &amp; 14</td>
<td>t-test for the mean (&quot;Analysis&quot;)</td>
<td>Quiz 13—Online R modules 3 &amp; 4</td>
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<tr>
<td>Labs</td>
<td>none</td>
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<tr>
<td>Sat, Nov 16</td>
<td><strong>Test 2: 10:00–12:00 noon; see OWL Gradebook for your assigned room</strong></td>
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<tr>
<td>Nov 18 &amp; 19</td>
<td>t procedures for difference between means (&quot;Analysis&quot;)</td>
<td>Quiz 14—t procedures for difference between means</td>
<td>Ch 18, p445–449</td>
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<tr>
<td></td>
<td><strong>Independent Study: Large sample procedures for difference between proportions (&quot;Analysis&quot;)</strong></td>
<td></td>
<td>Ch 20, p495–500, p504–507</td>
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<tr>
<td>Nov 20 &amp; 21</td>
<td>Uncertainties in hypothesis testing (&quot;Analysis&quot;)</td>
<td>Quiz 15—Online R modules 5 &amp; 6</td>
<td>Ch 15: p383–395</td>
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<td></td>
<td><strong>Independent Study: Correlation (&quot;Analysis&quot;)</strong></td>
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<td>Ch 3 (all sections)</td>
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<tr>
<td>Labs</td>
<td>Assignment 3 work/help period and R tutorial (examples of conducting inference)</td>
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<tr>
<td>Nov 25 &amp; 26</td>
<td>Linear Regression (&quot;Analysis&quot;) - part A</td>
<td><strong>Analysing Data and Writing Conclusions (Assignment 3) due Monday</strong></td>
<td>Ch 4, p93–101, p107–115</td>
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<td><strong>Quiz 16—Regression</strong></td>
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<tr>
<td>Nov 27 &amp; 28</td>
<td>Linear Regression (&quot;Analysis&quot;) - part B</td>
<td>Quiz 17—Online R Modules 7 &amp; 8</td>
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<tr>
<td>Labs</td>
<td>Assignment 4 work/help period</td>
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<td>Dec 2 &amp; 3</td>
<td>One-factor ANOVA &amp; follow-up (&quot;Analysis&quot;) - part A</td>
<td>Quiz 18—One-factor ANOVA</td>
<td>Ch 24, p605–611</td>
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<tr>
<td>Dec 4 &amp; 5</td>
<td>One-factor ANOVA &amp; follow-up (&quot;Analysis&quot;) - part B</td>
<td><strong>Analysing Data and Writing Conclusions, part 2 (Assignment 4) due Thursday</strong></td>
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<td><strong>Activity: Reflection</strong></td>
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<td>Dec 8–19</td>
<td><strong>Final Exam Period (do not book travel during this time until exam schedule is finalized on October 4, 2019)</strong></td>
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