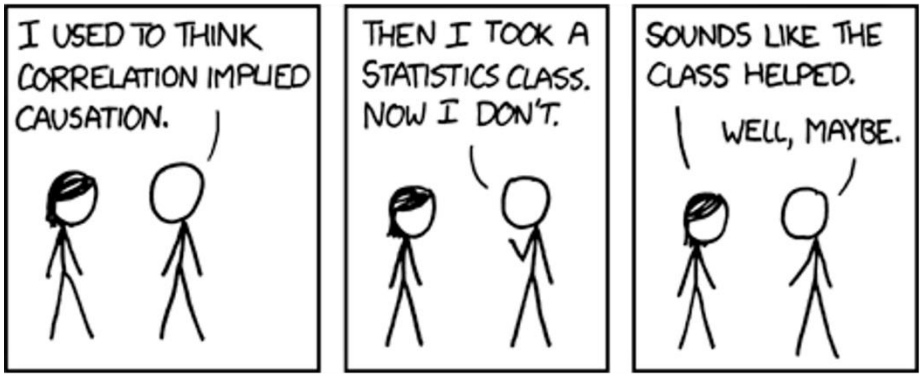


Is this the right statistics course for you?

Do you need to understand common statistical concepts when reading about someone else's research? **Then, yes!**

Do you need to plan your own study and analyse data? **Probably not…ask me about other options.**

Statistics 1023/2037

Statistical Concepts/Statistics for Health

CALENDAR DESCRIPTION

An examination of statistical issues aiming towards statistical literacy and appropriate interpretation of statistical information. Common misconceptions will be targeted. Assessment of the validity and treatment of results in popular and scientific media. Conceptual consideration of study design, numerical and graphical data summaries, probability, sampling variability, confidence intervals and hypothesis tests.

Prerequisites: none

Anti-requisites: Statistical Sciences 1023A/B and Statistical Sciences 2037A/B are anti-requisite for each other.

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.

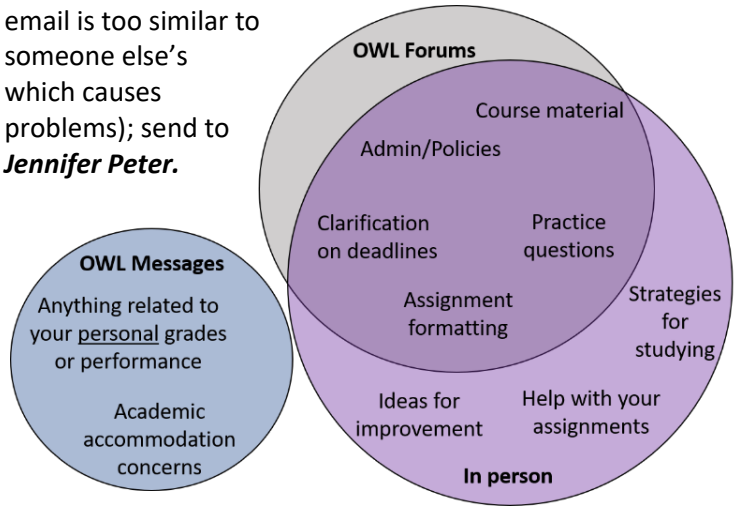
INSTRUCTOR DETAILS

Name: Jennifer Peter

Departments: Biology, *and*, Statistical & Actuarial Sciences

Drop-in hours:
Tues 10:00–11:30 am, WSC 207
No appointments needed…just 'drop-in'!

Contact: See the Venn diagram below for the best method of communication, based on your concern. 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.***



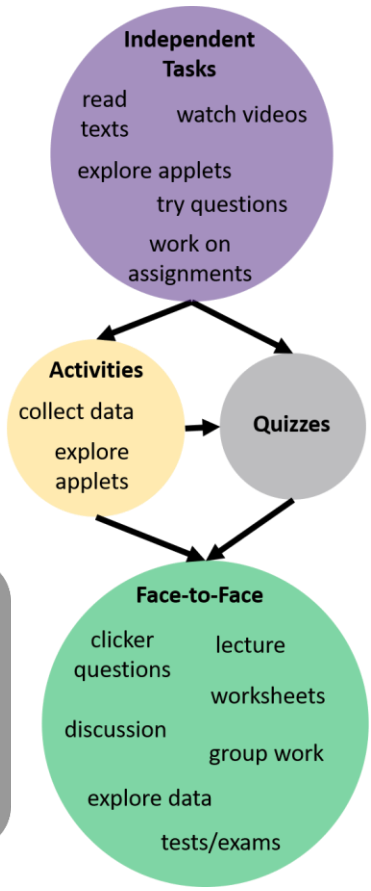
COURSE FORMAT

This course is ***blended***, with a mix of online and 'face-to-face' learning.

To be successful in the course, students should expect to complete independent study tasks (1–2 h) *plus* attend the face-to-face class each week.

Fall 2019

Face-to-Face:
Tues, 1:30-3:30 pm
SSC 2050
(listed as 'Tutorial' or 'Lab' in calendar)

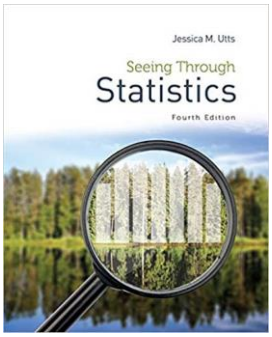


COURSE MATERIALS

Each student needs *access* to these materials 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, we will occasionally use articles, videos, and applets available freely online to supplement your learning.

Our OWL site, **Stats 1023A 002 FW19**, provides:

- Lecture slides and worksheets (PDF format)
- Content for independent study (lecture videos, readings, etc.)
- Assignment details
- Access to quizzes and activities
- Practice questions
- Communication tools



Textbook:
Utts, J. 2015. *Seeing through statistics.* 4th Edition, Cengage Learning.

There is an online portal, WebAssign, that provides ebook access + additional resources; this is the lowest price option ($75 + tax for one term subscription through the Campus Bookstore) other than second hand copies or library copies.

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 learners, we should endeavor to follow these mutual expectations:

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 and/or reproducing and/or distributing course materials (for free or for profit)

LEARNING OUTCOMES

As you embark on learning in this course, keep in mind that it is framed in terms of *statistical literacy*. That is, our goal is to develop a tool kit of knowledge and questions e can draw on to help evaluate the validity and trustworthiness of research results and information, e.g. in popular media. Consequently, by the end of the course, you should be able to:

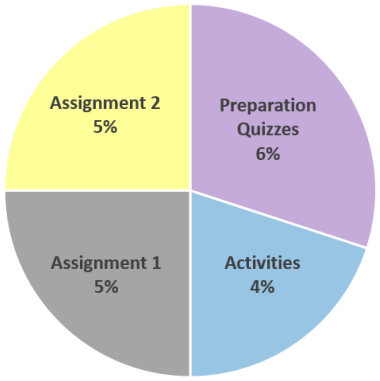
LO1: Correctly use and understand foundational vocabulary and/or concepts associated with statistics *(assessed by quizzes, activities, assignments, in-class assessments, and exams)*;
LO2: Interpret, create (with the aid of suitable applets/technology), and critically evaluate summaries of data *(assessed by quizzes, activities, assessments, and exams)*;
LO3: Understand the role of chance, randomness, and 'average' in the context of statistical research design and analysis *(assessed by quizzes, activities, assessments, and exams)*;
LO4: Describe, evaluate and critique the validity of statistical research designs and conclusions *(assessed by assignments, assessments, and exams)*;
LO5: Evaluate statistical information presented in media and society *(assessed by assignments, and exams)*.

EVALUATION SCHEME

The evaluation is set up to promote ***mastery of the material/skills*** listed above by the end of the course, and to provide o***pportunities to learn from mistakes***. The course evaluation is divided into a 'fixed distribution' and a 'flexible distribution'.

Fixed distribution (20%)

Each student's course grade will include the following four items, as weighted below in the pie graph.



Flexible distribution (80%)

There are **3** In-class assessments ("ICA"), and 2 Exams in the course. Their contribution to your course grade depends on your individual success on each of the items. The initial distribution is highlighted in the table below ("S1", in purple). Seven alternate distributions (S2 through S8) are also provided for the weights of the In-class Assessments. There are also two options (A or B) for the relative weights of the Midterm and Final Exams. Your final course grade will ***automatically*** be calculated under each of the following scenarios, for both options A and B (i.e. your final grade will be calculated 16 different ways!); whichever scenario gives you the highest final course grade will be used to submit your course grade.

	Item	S1	S2	S3	S4	S5	S6	S7	S8
	ICA 1	3%	0%	3%	3%	0%	0%	3%	0%
	ICA 2	3%	4.5%	0%	3%	0%	5%	0%	0%
	ICA 3	3%	4.5%	4.5%	0%	5%	0%	0%	0%
A	Midterm Exam	26%	26%	27.5%	26%	30%	27%	29%	32%
	Final Exam	45%	45%	45%	48%	45%	48%	48%	48%
B	Midterm Exam	13%	13%	13%	13%	15%	14%	15%	16%
	Final Exam	58%	58%	59.5%	61%	60%	61%	62%	64%

Why is this so complicated?!

The flexible distribution is organized so you have multiple opportunities to receive feedback and demonstrate mastery. If you discover your understanding of a concept is not complete, and/or you perform below your desired level of success on a particular component of the flexible distribution, you still have *future* opportunities (until the Final Exam) to regain some/all marks associated with these items. Because **all assessment items are cumulative**¸ the relative weighting of course material is (approximately) equivalent under each scenario.

GENERAL COMMENTS ON 1023/2037 GRADING

The assessment item weightings have been set to:

- ✓ recognize the workload of each item;
- ✓ highlight the relative importance to the learning outcomes;
- ✓ 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 maybe coincide with a required deadline or test date. The evaluation scheme, therefore, is set up to place higher value on your best performances. Because this structure is already in place and applied for every student, I do not re-weight assessments nor accept additional work to accommodate poor performance and/or absences (without approval for relief/consideration from Academic Counseling). For reference, I also do not bump grades (e.g. to meet program cut-offs), nor force grades to follow a particular distribution (e.g. Normal curve).

If you have extenuating personal/family/work circumstances that you think significantly impacted your performance for a particular component of the course, I encourage you to discuss the situation with your Academic Counselor to explore options for relief/consideration. I can also **help you locate and connect with support services** (for personal, financial, psychological, and/or academic reasons) available on-campus and/or in the local London community if needed; please reach out to me.

ASSESSMENT DESCRIPTIONS

ACTIVITIES

WHY? Collect data for discussion in class. Explore concepts in advance of class elaboration.

WHAT? Structure varies; instructions for each activity will be provided on OWL site. Often involves a survey and/or using an applet to collect some data.

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

GRADES. Points 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 5 categories (see table) to determine your final grade.

ACCOMMODATION? Built into the grading scheme (the 25% margins) and should cover occasional missed activity and/or technical problems. For more extenuating circumstances, please obtain relief/consideration from Academic Counseling.

% Points earned	Grade (/4%)
0	0
0 < % ≤ 25	1
25 < % ≤ 50	2
50 < % ≤ 75	3
75 < % ≤ 100	4

PREPARATION QUIZZES

WHY? Feedback on independent learning/preparatory work. Accountability for class preparation. Encourage regular engagement with course material.

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.

GRADES. Marked for correct answers. The percentage of quiz questions answered correctly across the entire term places you in one of 7 categories (see table) to determine your final grade.

ACCOMMODATION? Built into the grading scheme (i.e. the ~16% margins) and should cover occasional missed quizzes and/or technical problems. For more extenuating circumstances, please obtain relief/consideration from Academic Counseling.

% Questions correct	Grade (/6%)
0	0
0 < % ≤ 16	1
16 < % ≤ 32	2
32 < % ≤ 48	3
48 < % ≤ 64	4
64 < % ≤ 80	5
80 < % ≤ 100	6

MIDTERM and FINAL EXAM

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

WHAT? Multiple choice and/or short answer questions. Specific details will be posted to the OWL course site.

HOW? Using Scantron sheets during an in-person test (scheduled outside of regular Face-to-Face sessions). Non-programmable calculators permitted.

GRADES. Your mark on the exams is based on the number of correct answers submitted.

ACCOMMODATION? Students who miss either of the Midterm and/or Final Exam must obtain relief/consideration from Academic Counseling. See information on Academic Policies under the *Policies and Supports* section (starting on page 5).

IN-CLASS ASSESSMENTS ("ICAs")

WHY? Low-weight assessment of understanding, application, and integration of course material.

WHAT? 5 multiple choice questions each; exam conditions scheduled during Face-to-Face sessions. Non-programmable calculators permitted.

HOW? Using IFAT scratch cards that allow up to 3 attempts per question to select correct answer.

GRADES. Marked for correct answers. Each question is worth 3 points; each 'attempt' (after the 1st) reduces points earned by 1 for each question.

ACCOMMODATION? Part of the "Flexible Distribution"; weight from missed ICA(s) is automatically redistributed (see page 3). No 'official' relief/consideration is required from Academic Counseling.

ASSIGNMENTS

WHY? Assessment of your understanding and application of course material. Provide an opportunity to read, write about, and critique statistical research.

WHAT? Short essays (e.g. less than 2 pages) that describe and critique research originally presented in popular media.

HOW? To earn credit, assignments are submitted as a PDF file to **both** (1) "Assignments" on the OWL site and (2) Gradescope.

GRADES. Marked for correct/valid interpretation/ application of course concepts, and to a lesser degree on clarity, creativity, and format. Clarification on grading must be requested within one week of receiving assignment feedback.

ACCOMMODATION? If you are unable to submit an assignment by the deadline, send whatever you have completed by OWL message to me **at least 4 h *before* the deadline**. We can discuss small time extensions (e.g. 24 h) at that point, but requirements for longer extensions and/or missed assignments require obtaining relief/consideration through Academic Counseling.

SENATE DEFINITION OF GRADES

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

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

POLICIES AND SUPPORTS

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

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

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.

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)

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.

POLICIES AND SUPPORTS, continued.

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

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

Want 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.

REMEMBER: 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.

BE CAREFUL! 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.

PLEASE! Use your UWO email. In accordance with policy, 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 manner.

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. 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.

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).

We use Gradescope. This course will use **Gradescope**, an online collaborative grading and analytic platform. For information on their privacy policy, please visit their website.

CLICKER USE IN THIS COURSE

Clicker Responsibility. We subscribe to and use clicker software produced by iClicker (https://www.iclicker.com/) because it is the company supported by Western's Technology Services (WTS) and is free to registered students. If using a clicker, you responsible for bringing their own device for use as a clicker and setting up your iClicker account correctly. The instructor is not responsible (i.e. no relief/consideration will be made) for WiFi failure/inconsistencies; as clickers are NOT used for grades in this course, WiFi failure/inconsistencies will simply be an inconvenience.

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. While clicker participation does not count towards your grade in Stat 1023/2037, it is still good practice to understand acceptable use as it relates to academic integrity.

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/activities are added/removed). *IS* = Independent Study; *F2F* = Face-to-Face session

Week	***Topic(s)***	***Graded Components***	***Textbook Reading***
Sept 9–13	***IS:*** review the course syllabus ***F2F***: Introduction to course, statistics, and data	***Activity:*** How will you study for 1023/2037?	
Sept 16–20	***IS:*** Sampling & study designs ***F2F***: Selection bias, confounding, & principles of experimental design	***Activity:*** Taking a sample ***Quiz 1:*** Sampling strategies ***Quiz 2:*** Study designs	Required: Sections 4.6 and 5.3 Suggested: Sections 4.1 to 4.6, Chapter 5
Sept 23–27	***IS:*** Measurement characteristics ***F2F***: Issues in survey design	***Activity:*** Survey 1	Required: Section 3.5, p. 56-57, and p. 71 Suggested: Sections 3.1-3.5
Sept 30–Oct 4	***IS:*** Canadian research ethics principles ***F2F***: Issues with consent and equity	***Quiz 3:*** Research ethics **Oct 1 at 1:30 pm: In-class Assessment 1**	Suggested: Sections 26.1-26.2
Oct 7–11	***IS:*** Measures of shape, centre, & spread ***F2F***: Interpreting & evaluating numerical summaries	***Activity:*** Survey 2 ***Quiz 4:*** Numerical summaries **Oct 11 by 4:00 pm: Assignment 1 due**	Required: Section 7.2, p. 141-146 Suggested: Chapter 7
Oct 14–18	***IS:*** Graphical summaries ***F2F***: Interpreting & evaluating graphs	***Quiz 5:*** Graphical summaries	Required: Section 9.1 to 9.5
Oct 21–25	***IS:*** Correlation & Linear regression ***F2F***: Interpreting correlations & regressions	***Quiz 6:*** Correlation & linear regression **Oct 22 at 1:30 pm: In-Class Assessment 2**	Required: Sections 10.4 and 11.3 Suggested: Sections 10.3 and 10.4, 11.1 to 11.4
Oct 28–Nov 1	***IS:*** Two-way tables, risks, & odds ***F2F***: Interpreting risks & odds	***Activity:*** Survey 3 ***Quiz 7:*** Two-way tables	Suggested: Sections 12.1 to 12.3
Sat, Nov 2	***Midterm Test* (9:00 am to 11:00 am, you will be assigned a room through Gradebook on our OWL site)**		
Nov 4–8	***Reading week (no classes)***		
Nov 11–15	***IS:*** probability, Normal curves, and z-scores ***F2F***: Problems with probability; 69-95-99.7 rule	***Quiz 8:*** Probability and Normal distributions	Required: Sections 14.3, 14.4, 16.1 to 16.4, 16.6, 17.2, 17.3 Suggested: Chapter 8, Sections 14.1, 14.2, 14.4, 14.6, 16.1, 16.3. 16.4, 16.6, 17.2 to 17.5
Nov 18–22	***IS:*** Sampling variability & sampling distributions ***F2F***: properties of sampling distributions; confidence intervals	***Activity:*** Sampling distribution of sample means ***Quiz 9:*** Sampling variability **Nov 19 at 1:30 pm: In-Class Assessment 3**	Suggested: Chapter 19, p. 408-410, sections 19.3, 19.4, 20.1, 20.2, p. 438-439, 21.1, 21.4.
Nov 25–29	***IS:*** Hypothesis testing vocabulary and process ***F2F***: Understanding P-values, power, effect size, and type I/II errors	***Activity:*** Chips Ahoy! ***Quiz 10:*** Hypothesis testing	Suggested: Chapter 22, section 23.3, 24.1 to 24.4
Dec 2–5	***IS:*** Seven critical components for critiquing statistics in the media ***F2F***: Applying the seven critical components	***Activity:*** Reflection **Dec 5 by 4 pm: Assignment 2 due**	Required: Section 2.3 and 2.4 Suggested: Sections 2.1 to 2.4
Dec 8–19	***Final Exam period (do not schedule travel until the final exam schedule is posted (expected Oct 4)***		