

The University of Western Ontario
Department of Statistical and Actuarial Sciences
STATISTICAL SCIENCE 2035 – 2018-19

Instructor	Sec	Day/Time	Location	email	Office/Phone (519-661-2111)
Mr. Joe Raaymakers	001	MWF 9:30-10:30	WSC 55	jraaymakers@stats.uwo.ca	WSC 107
Mr. Steve Kopp	002	MWF 1:30-2:30	HSB 40	kopp@stats.uwo.ca	WSC 284 x86288
Mr. Vincent Glavine	570	T - 6:30-8:00 Th- 6:30-8:00	Wemple 166 (Kings)	vglavine@uwo.ca	

Prerequisite(s):

You need one full course in first year University level math. Such as: Applied Mathematics 1413, Statistical Sciences 1024A/B, Calculus 1000A/B or 1100A/B, Calculus 1301A/B or 1501A/B, Mathematics 1600A/B or the former Linear Algebra 1600A/B, Mathematics 1225A/B, 1228A/B, 1229A/B,

Anti-requisite(s):

All other courses or half courses in Introductory Statistics except Statistical Sciences 1023A/B and Statistical Sciences 1024A/B. (This means that you can take Stats 2035 if you took Stats 1024A/B in a prior year, BUT you cannot take Stats 2035 and 1024A/B at the SAME time)

Students are advised that they are responsible to ensure that they possess the necessary prerequisites (or have written special permission) and that de-registration may occur at any time if they lack the prerequisite or have taken an anti-requisite course.

Textbook

“Business Statistics for Contemporary Decision Making” (2nd Canadian edition) by Black, Chakrapani, Castillo (Wiley)

- Binder ready, 3-hole punched, shrink-wrapped = \$128.95 (includes access to Wiley Plus)
- Wiley Plus access only with e-book = \$91.80; e-book only (no Wiley Plus) = \$76

Textbook Website – “WileyPlus”

The 2nd edition of the textbook comes with an access code that gives you access to a companion website. Although access to this website is NOT a requirement for the course (nor will there be any marks allocated to anything you do on this website), you are encouraged to visit the website as it will be set up to provide you with practice problems/quizzes to help test your knowledge of material presented in class. It will also contain an e-book version of the text for quick reference, solutions manual and other visual aids (such as videos, office hour videos, applets, demonstration problems, animations and learning activities) to help in your understanding of the material.

Course Objectives

The course is designed to give some basic statistical tools to help you understand the concept of “data variability”. These tools will allow you to analyze this variability so that you can draw conclusions from your data. The course will also give some insight into:

- What statistical methods and tests should be used in analyzing data
- How to use those methods and tests and where do they come from
- What are the underlying assumptions of your chosen statistical test and what happens if those assumptions are not correct

In addition to using statistical methods and tests to analyze data, the first one-third of the course will also discuss the concepts of probability and how probability can be used to model certain phenomena that occur in the sciences, social sciences and business world. The course will discuss different types of probability models (discrete and continuous) and show you how they can be used to predict future events.

Course Outline (with “approximate” length of time for each chapter):

Chapter	Topics
1 – Introduction (1 week)	Sections 1.1 to 1.4 – Statistical concepts; variables and data; data measurement
2 – Charts and Graphs (1 week)	Sections 2.1 to 2.4 – Frequency distributions; graphing categorical data; graphing measurement data; charts and graphs for two variables
3 – Descriptive Statistics (1.5 weeks)	Sections 3.1 to 3.5 – measures of centre and spread; shapes of distributions; boxplots
4 – Probability (2.5 weeks)	Sections 4.1 to 4.8 – introduction; unions and intersections; addition and multiplication laws; conditional probability; Bayes rule
5 – Discrete Distributions (2 weeks)	Sections 5.1 to 5.5 – General discrete distributions; Binomial, Poisson and Hypergeometric distributions
6 – Continuous Distributions (2 weeks)	Sections 6.1 to 6.4 – General continuous distributions; uniform and exponential distributions; Normal distribution; normal approximation to the binomial
7 – Sampling and Sampling Distributions (1 week)	Sections 7.1 to 7.3 – Sampling techniques; sampling distributions of the sample mean and of the sample proportion
8 – Inference: Estimation for Single Populations (2 weeks)	Sections 8.1 to 8.5 – Confidence intervals for a population mean, a population proportion and a population variance; estimating the sample size
9 – Inference: Hypothesis Testing for Single Populations (2 weeks)	Sections 9.1 to 9.5 (We are not covering section 9.6) – Hypothesis testing about a population mean, a population proportion and a population variance; Type I and II errors
10 – Inference About Two Populations (2 weeks)	Sections 10.1 to 10.5 – Confidence intervals and Hypothesis testing about two populations means, proportions or population variances
11 – ANOVA and Design of Experiments (1 week)	Sections 11.1 to 11.4 (We are not covering section 11.5) – One factor ANOVA; Randomized block design; Multiple comparison tests
12 – Correlation and Simple Regression Analysis (2 weeks)	Sections 12.1 to 12.8, and 12.10 (We are not covering section 12.9) – Correlation and Simple Regression topics
13 – Multiple Regression Analysis (1.5 weeks)	Sections 13.1 to 13.4 (may do parts of section 13.5) – Multiple regression models and topics
14 – Building Multiple Regression Models (0.5 week)	Only cover section 14.2 – bringing in categorical variables into a multiple regression model
16 – Analysis of Categorical Data (1 week)	Sections 16.1 and 16.2 – Goodness of fit tests; Tests of independence of two categorical variables
15 – Time Series Forecasting and Index Numbers (1 week) (TIME PERMITTING)	Section 15.6 ***We will only cover this material if time permits

Midterm Exams (2.5 hour exams)

1. Exam 1: **Friday, November 16, 2018 -- 7 pm to 9:30 pm** (Topics TBA)
2. Exam 2: **Friday, February 8, 2019 -- 7 pm to 9:30 pm** (Topics TBA)

Each exam will cover only material since the start of classes (for Exam 1) or since the first exam (for Exam 2). Each exam will only consist of multiple choice questions. A formula page will be provided with each exam.

NOTE: There will be NO exam scheduled during the December exam period

Final Exam

Scheduled for the final exam period. The final exam will be a 2.5-hour exam covering material ONLY since Midterm Exam #2. It will NOT cover the whole year, but only the last one third of the material. It will consist of multiple-choice questions. A formula page will be provided.

Cellular phones, iPods, and other similar technology are *not* permitted in the exam room.

This means that cellular phones, iPods, and other similar technology **cannot** be used as a timekeeper/clock, calculator, or for any other purpose

You will also need a non-programmable calculator for all exams/in-class tests.

In-class Quizzes (for main campus sections 001 and 002)

There will be 8 (4 per term) short written answer question quizzes that will be given at the very start of class on the following **MONDAYS**:

1	October 1, 2018	5	January 28, 2019
2	October 22, 2018	6	March 4, 2019
3	November 12, 2018	7	March 18, 2019
4	December 3, 2018	8	April 1, 2019

- Quizzes will start right at the **start** of the class and you will have 15 minutes to complete the assigned questions – **do NOT be late for class on these dates; no extra time will be given**
- **The quizzes will be DIFFERENT for each section of the course (they are not common quizzes, so you MUST go to the classroom of your official section on the day of the quiz)**
- The quizzes will consist of 1 or 2 question (or perhaps one question with multiple parts) that will be based on material covered over the past 2-3 weeks of classes
- You will show ALL your work in solving the question (as part marks will be available)
- The quizzes will be out of 8 marks – you will get 2 out of 8 just for signing your name and handing in a blank answer (this is NOT 2-bonus marks; it just means everyone who shows up and hands in a quiz paper will receive a minimum mark of 2)
- Only your best 6 out of 8 quizzes will count in your final mark (so you can miss up to 2 quizzes for any reason and you do not need any medical documentation).

Evaluation

	Original	If you do poorly on one test		
Clicker Questions	5%	5%	5%	5%
Quizzes (best 6 out of 8)	11%	11%	11%	11%
Mid Term 1	28%	18%	33%	33%
Mid Term 2	28%	33%	18%	33%
Final Exam	28%	33%	33%	18%

The marking scheme that gives a student the higher final mark will be the one used for that student.

Statistics Help Centre

The help centre is a “drop in” centre and is located in Middlesex College (room number and hours will be posted on OWL once they are known). It will be staffed by TA’s from the Statistics department. It is usually open from 10:00 to 4:00, Monday to Friday (starting 3rd week of September). This is an excellent resource for one-on-one help.

Course OWL Web Page

The web page will contain various things throughout the year:

1. A copy of this course outline
2. Copies of tests and exams from the previous year (with solutions)
3. Solutions to the exercises in the 2nd edition of the textbook (as pdf files)
4. Weekly updates and information about the course that you need to know
5. **For some sections, daily class notes will be available (which will be incomplete – to be filled in during the classes).**
6. Marks of quizzes and tests as they are marked.

Clicker Participation

Clickers (or clicker technology on your smart phone/tablet/lap top) will be used frequently in lectures; be sure to bring yours to every class.

- In class, I may ask a variety of structured questions to which you may respond by pressing the appropriate button on your respective clicker. Individual responses are collected and displayed as a graph at the front of the room which can lead to further discussion. These responses may also be saved for future analysis. In this course, clickers will be used primarily to promote engagement during lecture. They will also provide you with credit and feedback on your lecture preparation and/or participation.
- We will not be using clickers for the first two weeks of classes in order for everyone to get settled in the course.
- That will be followed by a week of “practice” questions using the clicker technology. These questions will not count towards your final mark, but instead it will be a chance for all of us to see if the clicker technology is working properly and to iron out any “bugs” in the system.
- Then, about three weeks into the course, any clicker question given in class will count towards your final mark (see “Clicker MARKS” section for more detail)

The information below provides further details.

Clickers

- **Use your smart phone, tablet or lap top.**
- **You will have to sign up for an account; this can be done either through the course OWL site (under the “iClicker” folder) OR through the iClicker website**
- **Information on how to set up an account is given on the course OWL site under the “iClicker” folder.**

Clicker Responsibility

It is your responsibility to ensure that your cell phone/tablet/lap top system is functioning properly.

- If you have problems with the clicker system during a class, you may need to consult the ITS Help Desk at some point after class. It is NOT the duty of your instructor to fix any problems with your clicker.
- Note that students attending the same lecture simultaneously cannot effectively share a clicker; only one student's UserID will be recognized by the clicker software on a given day, and only that student will receive the record of participation.

Clicker MARKS

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

Clicker questions will be asked during most (but perhaps not all) lectures. You need only to answer 80% of the total clicker questions asked during the entire course to obtain a 5 (out of 5) on the clicker portion of your final mark. For any percentage (y) less than 80%, your clicker mark will decrease linearly using the formula:

$$\text{Clicker mark} = 6.25(y)$$

Examples: If you only answer 68% of all clicker questions, clicker mark = $6.25(0.68) = 4.25$ (out of 5). If you only answer 44% of all clicker questions, clicker mark = $6.67(0.44) = 2.75$.

Clicker participation only requires that you try; you do not have to get the questions correct to get this part of your course grade. Notice that you can miss up to 20% of the clicker questions (for any reason) without affecting your grade; this 'buffer' accounts for any technical problems that may arise as well as days on which you forgot your clicker or were late for class/left early. **Please note that no accommodation will be made for missed clicker participation or incorrectly programmed clicker IDs.**

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 Course Evaluation given by the University.

Classroom Environment

We have adopted a “Mutual Expectations” policy governing the classroom environment and all work submitted by students. [The full text of the policy can be found on the Statistical and Actuarial Science departmental web page, <http://www.uwo.ca/stats> or go directly to the web page: <https://www.uwo.ca/stats/undergraduate/mutual-expectations.html>].

In summary, all interactions between students and faculty should be governed by the principles of **courtesy, respect and honesty.**

Students are encouraged to ask questions in the class. But cell phones use should be limited to CLICKER questions only., Also any unnecessarily loud talking among students is to be discouraged. The goal is to reduce any behaviour by students that may disrupt other students

What Do You Do if You Miss a Course Requirement Due to Illness or Special Circumstances?

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or supporting documentation to the Academic Counselling Office of your home faculty as soon as possible and contact your instructor immediately. If you are a Social Science student, the Academic Counselling Office of the **Faculty of Social Science is located in SSC Room 2105** or can be contacted at ssaco@uwo.ca.

For in-class quizzes: There are NO make ups to any of the quizzes, so if you miss one (or two) it will be one of the two quizzes that will not count towards your final mark. If you miss a third quiz, it will count as a mark of ZERO. You do not need to get in contact with your Faculty or your instructor if you miss a quiz (or two).

For Midterms/Final Exam: If you miss an exam for a valid reason, you must go to your Faculty with proof as to why you missed the exam. A makeup exam date will be arranged for all students who missed the exam with a valid reason.

For further information, please consult the university’s medical illness policy at https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf

If you require academic accommodation due to illness, you should use the Student Medical Certificate when visiting an off-campus medical facility. The form can be found here: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

Or, request a Record's Release Form (located in the Dean's Office) for visits to Student Health Services.

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

Attendance

The department of Statistical and Actuarial Sciences views classroom attendance as a very important part of the learning process. You are expected to attend all classes. You are advised that excessive absenteeism may result in being debarred from the final examination.

Policy on e-mail communication

E-mail can be an efficient and effective way to communicate with your Professor, but it should be used very rarely, only to provide us with information or to ask a question that requires a very brief response. We do not wish to see emails that ask “What did I miss in class today?”. For more lengthy discussions, you should raise questions after class or during office hours, or make a separate appointment if necessary. Please remember that we will only read e-mails from your UWO student account. E-mails from other accounts (e.g. hotmail, yahoo, etc.) will not be read.

Please conduct yourselves professionally if you choose to e-mail your Professor.

Support Services

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

The policy on Accommodation for Students with Disabilities can be found here:

www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_disabilities.pdf

The policy on Accommodation for Religious Holidays can be found here:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

Learning-skills counsellors at the Student Development Centre 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: <http://www.sdc.uwo.ca>

Students who are in emotional/mental distress should refer to Mental Health@Western for a complete list of options about how to obtain help: http://www.health.uwo.ca/mental_health

Additional student-run support services are offered by the USC: <http://westernusc.ca/services>.

Accessibility

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