Statistical Sciences 2141A Course Outline

1. Course Information

Course Information
Statistical Sciences 2141: Applied Statistics and Statistics for Engineers (Sections 001 & 003)
2024-2025 Fall Term

Lectures: Monday, Wednesday, Friday 1:30 - 2:30 pm
Location: MC 110

Tutorial: Wednesday 5:30 pm - 6:30 pm
Location: NSC-1

Constraints
RESTRICTED TO ELECTRICAL, COMPUTER, SOFTWARE, CIVIL AND MECHATRONICS
ENGINEERING STUDENTS, SCIENCE STUDENTS, CONCURRENT BUSINESS STUDENTS,
AND SCHOLARS ELECTIVES.

This course cannot be taken for credit in any module in Data Science, Statistics, Actuarial Science, or
Financial Modelling, other than the Minor in Applied Statistics or the Minor in Applied Financial
Modeling.

Requisites
0.5 course from Numerical and Mathematical Methods 1412A/B, Calculus 1000A/B, Calculus 1500A/B,
the former Applied Mathematics 1412A/B, plus 0.5 course from Numerical and Mathematical Methods
1414A/B, Calculus 1301A/B, Calculus 1501A/B, the former Applied Mathematics 1414A/B. The former
Applied Mathematics 1413 may also be used to meet this 1.0 course prerequisite.

Antirequisites
This course cannot be taken for credit in any module in Data Science, Statistics, Actuarial Science, or
Financial Modelling, other than the Minor in Applied Statistics or the Minor in Applied Financial
Modeling. All other courses in Introductory Statistics (except Statistical Sciences 1023A/B, Data
Science 1000A/B or the former Statistical Sciences 1024A/B): Biology 2244A/B, Economics 2122A/B,
Economics 2222A/B, Geography 2210A/B, Health Sciences 3801A/B, MOS 2242A/B, Psychology
2811A/B or the former Psychology 2810, Psychology 2801F/G or the former Psychology 2820E,
Psychology 2830A/B, Psychology 2850A/B, Psychology 2851A/B, Social Work 2207A/B, Sociology
2205A/B, Statistical Sciences 2035, Statistical Sciences 2143A/B, Statistical Sciences 2244A/B,
Statistical Sciences 2858A/B.

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.

2. Instructor Information

Instructor: Dr. Katsu Goda
E-mail: kgoda2@uwo.ca
Office: BGSB 1076
Office Hour: After each lecture
When contacting:
- Use only Western (@uwo.ca) email address
- Include the course code Stats 2141 into the subject line of your email so that I would know which class you belong to (I am teaching other classes too)

3. Course Syllabus, Schedule, Delivery Mode

An introduction to statistics with emphasis on the applied probability models used in Electrical and Civil Engineering and elsewhere. Topics covered include samples, probability, probability distributions, estimation (including comparison of means), correlation and regression.

Learning outcomes
Upon successful completion of this course, students will become familiar with:
- Techniques used in exploring, organizing, and describing data
- Producing data through surveys and experiments
- Basic concepts and uses of statistics
- Basic concepts of probability and distributions
- Statistical inference, including confidence intervals and tests of hypotheses
- Pitfalls and controversies

Classes begin: September 5th, 2024
Reading Week: October 12th – 20
Classes end: December 6th, 2024
Exam period: December 9th – 22nd, 2024

4. Course Materials

Required textbook:
Applied Statistics and Probability for Engineers, 7th Edition by Douglas C. Montgomery, George C. Runger. https://www.wiley.com/en-us/Applied+Statistics+and+Probability+for+Engineers%2C+7th+Edition-p-9781119400363

Course schedule (this may change, depending on the progress of the lectures)

Week	Topics
Week 0 (Sept. 2 -)	Course briefing, Chapter 1 (The Role of Statistics in Engineering)
Week 1 (Sept. 9 -)	Chapter 2 (Probability)
Week 2 (Sept. 16 -)	Chapter 3 (Discrete Random Variables and Probability Distributions)
Week 3 (Sept. 23 -)	Chapter 4 (Continuous Random Variables and Probability Distributions)

Week 4 (Sept. 30 -)	Chapter 5 (Joint Probability Distributions for Two Random Variables); **Test 1 (October 5th)**
Week 5 (Oct. 7 -)	Chapter 5 (Joint Probability Distributions for Two Random Variables)
Fall reading week (October 12th to 20th, 2024)	
Week 6 (Oct. 21 -)	Chapter 6 (The Role of Statistics in Engineering)
Week 7 (Oct. 28 -)	Chapter 7 (Point Estimation of Parameters and Sampling Distributions)
Week 8 (Nov. 4 -)	Chapter 8 (Statistical Intervals for a Single Sample); **Test 2 (November 9th)**
Week 9 (Nov. 11 -)	Chapter 9 (Tests of Hypotheses for a Single Sample)
Week 10 (Nov. 18 -)	Chapter 10 (Statistical Inference for Two Samples)
Week 11 (Nov. 25 -)	Chapter 11 (Simple Linear Regression and Correlation)
Week 12 (Dec. 2 -)	Chapter 13 (Design and Analysis of Single-Factor Experiments)
Final Exam (December 9th to 22nd, 2024)	

All course material will be posted to OWL: https://westernu.brightspace.com/

Students are responsible for checking the course OWL site (https://westernu.brightspace.com/) regularly for news and updates. This is the primary method by which information will be disseminated to all students in the class.

If students need assistance with the course OWL site, they can seek support on the OWL Brightspace Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Technical Requirements
A list of technical requirements for the course (e.g., stable internet connection, computer with working microphone and/or webcam, other hardware or software specifications).

5. Methods of Evaluation

Grading Scheme and Assessment Dates
There will be two cumulative multiple-choice/short answer tests (Tests 1 and 2). Test 1 is worth **20%** and Test 2 is worth **30%**.
Test 1 is scheduled on **Saturday, October 5th, 2024, 17:30 to 18:30 pm**.
Test 2 is scheduled on **Saturday, November 9th, 2024, 17:30 to 18:30 pm**.

The final exam, which is worth **50%**, will be a three-hour cumulative multiple-choice/short answer examination. It will be scheduled by the Registrar Office during the examination period.

The overall course grade will be calculated as listed below:
- Tests 1 and 2: 20 + 30 = 50%
- Final Exam: 50%

All the assessments (Tests 1 and 2, and the Final Exam) will be **closed book**. Non-programmable hand-held calculators will be allowed.

Accommodated evaluations

There will be **no make-ups** for Tests 1 and 2. If you miss any of the two tests due to a legitimate reason (to be determined by counsellors) or using self-reported absence (note: self-reported absence can be used once during the course; in other words, two tests cannot be missed using self-reported absence), the following will apply:

- If Test 1 is missed, 20% will be appended to the final exam, thus making it worth $20 + 50 = 70\%$.
- If Test 2 is missed, 30% will be appended to the final exam, thus making it worth $30 + 50 = 80\%$.
- In the case of two missed tests, $20 + 30 = 50\%$ will be appended to the final exam, thus making it worth $20 + 30 + 50 = 100\%$.
- If you miss the final exam due to a legitimate reason (to be determined by counsellors), you will have a chance to write a make-up final exam in January 2025. The self-reported absence is not applicable to the final exam and the councilors' approval must be obtained for the missed final exam.

Rounding of marks statement

Across the Sciences Undergraduate Education programs, we strive to maintain high standards that reflect the effort that both students and faculty put into the teaching and learning experience during this course. All students will be treated equally and evaluated based only on their actual achievement. Final grades on this course, irrespective of the number of decimal places used in marking individual assignments and tests, will be calculated to one decimal place and rounded to the nearest integer, e.g., 74.4 becomes 74, and 74.5 becomes 75. **Marks WILL NOT be bumped to the next grade or GPA**, e.g. a 79 will NOT be bumped up to an 80, an 84 WILL NOT be bumped up to an 85, etc. The mark attained is the mark you achieved, and the mark assigned; requests for mark "bumping" will be denied.

General information about missed coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs* posted on the Academic Calendar: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf,

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult Accessible Education.

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage:
https://registrar.uwo.ca/academics/academic_considerations/
All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- Examinations scheduled during official examination periods (Defined by policy)

- Midterm tests (Defined by policy)

6. Additional Statements

Religious Accommodation
When conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible but not later than two weeks prior to the writing or the examination (or one week prior to the writing of the test).

Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays:

> https://www.edi.uwo.ca.

Accommodation Policies
Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

> https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf.

Academic Policies
The website for Registrar Services is https://www.registrar.uwo.ca/.

In accordance with policy,

> https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

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 their official university address is attended to in a timely manner.

In the tests and exam, non-programmable hand-held calculators will be allowed.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

> https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Support Services
Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic-related matters: https://www.uwo.ca/sci/counselling/.

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

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced

sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

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 Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Learning-skills counsellors at Learning Development and Success (https://learning.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.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: https://www.uwo.ca/se/digital/.

Additional student-run support services are offered by the USC, https://westernusc.ca/services/.