

Regression (SS3859A/SS9859A) Course Outline for Fall 2021

1. Course Information

Course Information

Course Name Regression (SS3859A/SS9859A)

Lecture Hours Monday, Wednesday, Friday 1:30 – 2:30 PM (B&GS-0153)

Tutorial Hours Monday 2:30 – 3:30 PM

(Note: Tutorial hours will be used for two midterm tests.)

List of Prerequisites

A minimum mark of 60% in 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

Dr. Hyukjun (Jay) Gweon

Office: WSC 211

E-mail: hgweon@uwo.ca

Phone: 519-661-2111 x87792

Office hours: Wednesday 2:30 – 3:30 pm

Students must use their Western (@uwo.ca) email addresses when contacting their instructors.

Office hours are held in-person.

3. Course Syllabus, Schedule, Delivery Mode

Simple and Multiple linear regression models their use to model data using computing including model specification and assumptions, inference and estimation, use of indicator variables, regression diagnostics, model building and selection. Introduction to forecasting and time series.

Upon successful completion of this course, students will be able to:

- Demonstrate understanding of the key concepts of linear regression.
- Use R for the statistical methods and data analysis covered in this course.
- Build and evaluate regression models and apply remedial measures as needed.
- Interpret and discuss the analysis results in a broader scientific context.

Table of Contents and Schedule

Below is the tentative weekly schedule.

Week	Dates	Topic
1	Sept 6 – 12	Basics of R, Review of hypothesis testing
2	Sept 13 – 19	SLR - LS estimation, MLE, Decomposition of Variation
3	Sept 20 – 26	Sampling Distribution, CI and PI for beta Testing, Multiple Linear Regression (MLR) – estimation
4	Sept 27 – Oct 3	MLR – Inference, Nested model
5	Oct 4 – 10	Categorical Variables, Interaction
6	Oct 11 – 17	Thanksgiving, Model diagnostics
7	Oct 18 – 24	Unusual points – Outlier, Leverage, Influence Transformation
8	Oct 25 – Oct 31	Transformation, Collinearity Variable selection - Measures
9	Nov 1 – 7	Reading Week
10	Nov 8 – 14	Variable selection algorithms Shrinkage methods
11	Nov 15 – 21	Logistic regression – estimation, inference, prediction
12	Nov 22 – 28	Logistic regression Other classification methods Regression for time series data
13	Nov 29 – Dec 5	Regression for time series data Random Walk AR(1), smoothing
14	Dec 6 – 8	Trend, Seasonality Summary

Contingency plan for an in-person class pivoting to 100% online learning

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will **not** change. Any remaining assessments will also be conducted online as determined by the course instructor.

4. Course Materials

The instructor will use his own course notes and R examples.

Textbooks (recommended, **not required**):

(a) Introduction to Regression Modeling by B. Abraham and J. Ledolter

(b) Regression Modeling with Actuarial and Financial Applications by Jed Frees

Software: We will use **R** for this course. Laptop or personal computer with R/RStudio installed is highly recommended.

Students are responsible for checking the course OWL site (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class.

All course material will be posted to OWL: <http://owl.uwo.ca>.

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

5. Methods of Evaluation

The overall course grade will be calculated as listed below:

SS3859A		SS9859A	
Assignments	20%	Assignments	20%
Midterm Tests	40%	Midterm Tests	30%
Final Exam	40%	Data Analysis Project	20%
		Final Exam	30%

Assignments

There will be **four homework assignments** (each is worth 5%) during the course. You will be asked to use R to solve most of homework problems. You are required to submit all R codes with the answers.

Midterm Tests

There will be **two written tests** that cover the course material. The dates of the tests are **Oct 4th (Midterm 1)** and **Nov 15th (Midterm 2)**. Each midterm test will be worth **20% (SS3859A) or 15% (SS9859A)** of your final grade. The topics covered for each test will be announced later.

Data Analysis Project (SS9859A students only)

The project will consist of a group data analysis (at most two students in each group). Students are required to use R for the regression analysis and submit a project report. Detailed instructions will be announced later.

Final Exam

The date of the final exam will be set by the university.

Notes

- All tests are closed book, but a two-sided cheating sheet will be allowed.
- In assignments and tests, there may be additional questions for SS9859A students.

Accommodated Evaluations

- Late assessments without illness self-reports will not be accepted.
- Late assessments with illness self-reports should be submitted within 24 hours of submission of the last illness self-report.
- There are **no make-up exams** for midterms. The weight of a missed midterm exam (with an illness self-report) will be transferred to the final exam. The student must contact the instructor to confirm the weight transfer.

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.

6. University Accreditation Program

This course is accredited under the Canadian Institute of Actuaries (CIA) University Accreditation Program (UAP) for the 2021-22 academic year. Achievement of the established exemption grade in this course may qualify a student from exemptions from writing certain preliminary exams.

Please see the following link for full details:

<http://www.cia-ica.ca/membership/university-accreditation-program---home>

In addition to the university's internal policies on conduct, including academic misconduct, candidates pursuing credits for writing professional examinations shall also be subject to the Code of Conduct and Ethics for Candidates in the CIA Education System and the associated Policy on Conduct and Ethics for Candidates in the CIA Education System.

This course with a minimum mark of 80%, along with Data Science 3000B (minimum mark of 80%), can give you an exemption for the SRM exam.

7. Student Absences

Academic Consideration for Student Absences

Students who experience an extenuating circumstance (illness, injury or other extenuating circumstance) sufficiently significant to temporarily render them unable to meet academic requirements may submit a request for academic consideration through the following routes:

- (i) **(Undergraduate students only)** Submitting a Self-Reported Absence (SRA) form provided that the conditions for submission are met. To be eligible for a Self-Reported Absence:
 - an absence must be no more than 48 hours
 - the assessments must be worth no more than 30% of the student's final grade
 - no more than two SRAs may be submitted during the Fall/Winter term
- (ii) For medical absences, submitting a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner to the Academic Counselling office of their Faculty of Registration.
- (iii) Submitting appropriate documentation for non-medical absences to the Academic Counselling office in their Faculty of Registration.

Note that in all cases, students are required to contact (by email) their instructors within 24 hours of the end of the period covered. The instructor will confirm the SRA report by responding to the email within 1 week.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For the policy on Academic Consideration for Student Absences – Undergraduate Students in First Entry Programs, see:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf

and for the Student Medical Certificate (SMC), see:

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

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>.

Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (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" (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under Special Examinations).

8. Accommodation and Accessibility

Accommodation Policies

Students with disabilities work with Accessible Education (formerly SSD), 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](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf),

9. Academic Policies

The website for Registrarial Services is <http://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 his/her official university address is attended to in a timely manner.

For all exams, students are allowed to use non-programmable calculators.

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:

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

10. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling 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/>.

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 (519) 661-2147 if you have any questions regarding accommodations. Students who are in emotional/mental distress should refer to Mental Health@Western (<http://www.health.uwo.ca/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>.