1. Course: STAT 505, Time Series Analysis - Winter 2024

Lecture 01 : TR 15:30 - 16:45 in MS 319

Instructor: Dr Gemai Chen  
Email: cheg@ucalgary.ca  
Phone: 220-3961  
Office: MS 518  
Hours: 2:00 - 3:00 Tuesdays and Thursdays

To account for any necessary transition to remote learning for the current semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

In Person Delivery Details:

Time series modelling is more of an art than a prescribed procedure. The only way to do well is to master the theory and work with lots of real data.

Course Site:

D2L: STAT 505 L01-(Winter 2024)-Time Series Analysis

Note: Students must use their U of C account for all course correspondence.

Equity Diversity & Inclusion:

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

2. Requisites:

See section 3.5.C in the Faculty of Science section of the online Calendar.

Prerequisite(s):

Statistics 429.

3. Grading:

The University policy on grading and related matters is described in F.1 and F.2 of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

<table>
<thead>
<tr>
<th>Course Component</th>
<th>Weight</th>
<th>Due Date (duration for exams)</th>
<th>Modality for exams</th>
<th>Location for exams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>0%</td>
<td>Ongoing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midterm Test 1</td>
<td>20%</td>
<td>Feb 15 2024 at 03:30 pm (75 Minutes)</td>
<td>in-person</td>
<td>In Class</td>
</tr>
<tr>
<td>Midterm Test 2</td>
<td>20%</td>
<td>Mar 26 2024 at 03:30 pm (75 Minutes)</td>
<td>in-person</td>
<td>In Class</td>
</tr>
<tr>
<td>Project¹</td>
<td>60%</td>
<td>Apr 09 2024</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ A written project report in PDF format and an oral presentation for each team constitute the project. The report due time is 11:30AM (please note that it is AM, not PM) on April 9, 2024. Use D2L to submit your report.

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

<table>
<thead>
<tr>
<th>Percentage Grade</th>
<th>A+</th>
<th>A</th>
<th>A-</th>
<th>B+</th>
<th>B</th>
<th>B-</th>
<th>C+</th>
<th>C</th>
<th>C-</th>
<th>D+</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum % Required</td>
<td>93 %</td>
<td>88 %</td>
<td>83 %</td>
<td>78%</td>
<td>73%</td>
<td>68 %</td>
<td>63 %</td>
<td>58 %</td>
<td>55%</td>
<td>52 %</td>
<td>48 %</td>
</tr>
</tbody>
</table>

2024-01-03
The University of Calgary offers a flexible grade option, Credit Granted (CG) to support student’s breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade

4. Missed Components Of Term Work:

In the event that a student legitimately fails to submit any online or in-person assessment on time (e.g. due to illness, domestic affliction, etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date, or possible exemption and reweighing of components. Absences not reported within 48 hours will not be accommodated. Students may be asked to provide supporting documentation (Section M.1) for an excused absence, See FAQ.

If an excused absence is approved, options for how the missed assessment is dealt with is at the discretion of the coordinator or course instructor. Some options such as an exemption and pro-rating among the components of the course may not be a viable option based on the design of this course.

5. Scheduled Out-of-Class Activities:

There are no scheduled out of class activities for this course.

6. Course Materials:

Recommended Textbook(s):


In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC ELearning online website.

7. Examination Policy:

The two Midterm Tests are in-person and closed-book examinations scheduled by the instructor as given in the above table. For the tests, a calculator and a self-prepared letter-size sheet of course summary can be used (the sheet can be two-sided but no examples or worked out solutions are allowed on the sheet). For the team project, every student is expected to contribute actively and a team project report in PDF format is to be submitted by each team using D2L.

Students should also read the Calendar, Section G, on Examinations.

8. Approved Mandatory And Optional Course Supplemental Fees:

There are no mandatory or optional course supplemental fees for this course.

9. Writing Across The Curriculum Statement:

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section E.2 of the University Calendar.

10. Human Studies Statement:

Students will not participate as subjects or researchers in human studies.

See also Section E.5 of the University Calendar.

11. Reappraisal Of Grades:

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are
not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See Section I.3 of the University Calendar.

a. **Term Work:** The student should present their rationale a s effectively and as fully as possible to the Course coordinator/instructor within ten business days of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections I.1 and I.2 of the University Calendar.

b. **Final Exam:** The student shall submit the request to Enrolment Services. See Section I.3 of the University Calendar.

text...
used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or non-academic misconduct, in addition to any other remedies available at law.

i. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see Legal Services website.

j. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction (USRI) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.

**Course Outcomes:**

- describe and verify mathematical considerations for analyzing time series, including concepts of white noise, stationarity, autocovariance, autocorrelation
- apply various techniques of time series models, including the seasonal autoregressive moving average (SARIMA) models, regression with ARMA models
- apply various techniques for the modeling: including parameter estimation, assumption verification, and residual sequence diagnosis
- verify the properties of linear predictor operator, and apply various linear forecasting techniques
- describe and apply techniques of selected additional topics, such as spectral analysis, state space models, ARCH and GARCH, multivariate time series, principle component analysis, process control, and other topics.
- Use R or SAS to construct time series models and conduct analysis