# Statistical Sciences 2503B Course Outline

# 1. Course Information

Course Information

**Course name:** SS2503B Winter 2022, Advanced Mathematics for Statistical Applications

**Lecture hours:**

Emails: Students MUST use their Western (@uwo.ca) email address and include SS2503 in the subject line.

# 3. Course Syllabus, Schedule, Delivery Mode

Modeling deterministic systems with differential equations: first and second order ODEs, systems of linear differential equations. Laplace transforms and moment generating functions. Modeling stochastic systems with Markov chains: discrete and continuous time chains, Chapman-Kolmogorov equations, ergodic theorems.

## Learning outcomes
Upon successful completion of this course, students will be able to:
> Solve a variety of first order ODEs and second order linear ODEs.
> Apply differential equations to model deterministic dynamical systems.
> Calculate the Laplace transform and moment generating function.
> Use Laplace transform to solve ODEs.
> Solve basic systems of linear differential equations.
> Apply Markov chains to model stochastic dynamical systems.

## Key dates
> Jan 10: first day of classes
> Feb 19–27: Reading Week
> Apr 8: last day of classes
> Apr 9: study day
> Apr 10–30: final exams (excluding Apr 15–17 for Easter and Passover)

## Course delivery and assessment with respect to the COVID-19 pandemic
Although the intent is for this course to be delivered in person to the extent possible, the changing COVID-19 landscape may necessitate some or all of the course to be delivered online. Affected lectures will be posted on OWL for students to view. The grading scheme will not change. Any assessments affected will be conducted online as determined by the course instructor.

When deemed necessary, tests and examinations in this course will be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledging that you will be required to provide personal information (including some biometric data) and that the session will be recorded. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at:
https://remoteproctoring.uwo.ca

Late assignments without a Self-Reported Absence will be subject to a late penalty of 20% per day or portion thereof, and assignments that are submitted 5 or more days late will not be graded.

Late assignments with a Self-Reported Absence should be submitted within 24 hours of submission of the last self-report, after which they will be subject to a late penalty of 20% per day or portion thereof, and assignments that are submitted 5 or more days late will not be graded.

An assignment cannot be submitted after it has been returned to the class. The weight of a legitimately missed assignment will be transferred to the 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 then 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; requd

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 Absence – 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 655(li1 0 2a granted) normally will be the scheduled date for the final exam the next time course is offered The maximum coure  1-4( 0 [(gran)-5(t)-4(e)8(d)-4() )] TJ  ET  Q  q  0.00000912 0 612 792 re  W*134.15 3

# 8. Academic Policies

support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year round through individual counselling.

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