

Course Outline: Fall 2021
Applied Mathematics 2402a - Ordinary Differential Equations

Instructor: Prof. Lindi Wahl, lwahl@uwo.ca, MC 267

TA: to be determined

Lectures: M/W/F 2:30 – 3:30pm, FNB-3210

Summary: An introduction to first order differential equations, linear second and higher order differential equations with applications, complex numbers including Euler's formula, series solutions, Bessel and Legendre equations, existence and uniqueness, introduction to systems of linear differential equations. 3 lecture hours, 1 laboratory hour, 0.5 course.

Prerequisite(s): A minimum mark of 60% in Calculus 1301A/B, or a minimum mark of 55% in Calculus 1501A/B or Applied Mathematics 1413, or special permission.

Pre-or Corequisite(s): Mathematics 1600A/B or the former Linear Algebra 1600A/B. (A corequisite means you can take the two courses simultaneously.)

Tutorials: Everyone in the class has one assigned tutorial hour. **Tutorials will run on certain weeks only; they will be announced on OWL.** These tutorials are held in computer labs, in case you need help doing the computational components of the course. **Attendance at tutorials is not required.** You are welcome to attend a tutorial that is not your assigned tutorial if you arrive a few minutes late and seats are still available.

Textbook: *Elementary Differential Equations with Boundary Value Problems*, by William Trench (2013) is required. This is a free online textbook; a copy is available on OWL. The Student Solutions Manual for this text is also freely available. This is the first time we are using this free textbook in the course and feedback on the textbook would be welcome!

Evaluation: Assignments (weekly, 9-10 in total)	20%
Midterm Examination	35%
Weds Oct 27, 7:00pm – 9:00pm	
Make-up Midterm	
Fri Oct 29, 3:30–5:30pm (a different exam with different questions)	
Final Examination (3 hours, December exam period)	45%

The most important paragraph: The material in this course is really fun and challenging, but it builds very quickly. It is not possible to pass this course by cramming. Practice problems will be assigned for every lecture, and it is recommended that you book fixed times in your weekly schedule to do them.

Taking notes: There are no published lecture notes for this course. Pedagogical research has shown that taking handwritten notes during class is the best way to

"absorb" a lecture. If you miss a lecture, please get the notes from a friend or colleague in the class.

Working together: Working in pairs or groups, talking about problem solving strategies and studying together is encouraged. The purpose of the assignments in AM2402a is **not** assessment; *the purpose of the assignments is to give you extra incentive to keep up with the course work.* You are encouraged to work together on the assignments. However, after discussing how to solve the problem or working out a solution together on paper, **each student individually must write up their final solution, without looking at anything written down together.** That is, go away without any of the notes from working together, and make sure you can reproduce the solution independently. Even though your final solution was written independently, please write "Worked with Jane Doe" on the top of your assignment, so that the TA will understand if two people seem to use the same highly unusual approach. If the TA judges two or more assignments to be too similar to one another, students involved will lose 1/10 of the assignment component of the course (i.e. 2% of the final course grade). In general, "too similar" means assignments that appear to be copied one from another.

Assignment logistics: Assignments will be posted to OWL weekly, on Friday at the latest, and will be due one week later, on Fridays at 2:30pm. You can hand your assignment in by slipping it into the physical drop box in Middlesex College (see OWL for details) at any time before Friday at 2:30pm. If you bring your assignment to me **at the start of class** on Friday, I will also deliver it to the drop box for you. Late assignments can be handed in over the weekend to the dropbox, until Monday 2:30pm, or **at the start of class** on Mondays. The late penalty is -15%. Marked assignments will be available for pick-up during the TA office hours. If you believe there was an error in the way your assignment was marked, staple an explanatory note to the assignment and drop it into the dropbox again (e.g. "Please have a second look at Q3; I think my method was non-standard but correct except for one typo.").

The first assignment will be due on **Friday September 24**. The lowest assignment grade for each student will be dropped. There are no make-up assignments or extra work to make up for missed assignments.

Software: Some assignment questions will involve computation. Software packages and help in using these packages will be available in the tutorial sessions. However the use of particular software packages on the assignments will **not** be required; **you can use any computer program you like** to complete these assignments.

Hardware: A non-programmable, non-networked scientific calculator may be allowed on the midterm and final; if so, this will be announced on OWL ahead of these exams. Proctors for exams do not lend calculators. It is your responsibility to bring the correct calculator and to ensure that it is in proper working order. It's not a bad idea to bring a spare calculator of the same model! Aside from the specified calculator, no other electronic devices (phones, iPods, etc.) may be in your possession during exams, even for timekeeping purposes.

Extra help: There will be many hours each week during which you can obtain one-on-

one extra help on course material. These include the tutorials, the TA office hours and the instructor office hours. A document listing all times and locations for one-on-one extra help will be available under "Resources" on OWL. You may also e-mail the TA to arrange a meeting if you have course conflicts during TA office hours. Private tutors are also available; search for the "Tutor Referral Service" or "Private Tutor List" at Western, or talk to the instructor or the TA.

Examinations: A detailed list of chapters and sections which will be covered on the midterm will be posted to OWL. All material covered up to the end of the course will be considered testable on the final exam. The exams will weight each topic in the course approximately as weighted in the lectures. The practice problems assigned at each lecture are the best guide to material that is testable. These questions change from one year to the next, and are not available in advance. However before the midterm and final, a comprehensive list of assigned practice problems will be posted on OWL. Copies of previous exams, both with and without solutions, will also be posted on OWL for study purposes.

Communication: When communicating with you, will use the lectures, the tutorials, and the course website on OWL. In particular, OWL will be used to post assignments, grades, course material (under "Resources") and important announcements. Please also check your official UWO e-mail for announcements regarding this course. For communicating with us, please see the table below.

How to reach us when you need more information

The course welcome page on OWL will list up-to-date TA and instructor contact info, office hours, office room numbers etc.

Type of question/issue	Examples	What to do	Extra tips
questions about course material	<ul style="list-style-type: none"> - I need help with Q1.1 - the solution to Q4.3 is wrong in the manual - I'm lost and need help with Chap. 8! - is method A the same as method B I learned in another course? 	<ul style="list-style-type: none"> - come to office hours and talk to me! - talk in person with the TA at the tutorial - e-mail the TA if it is a quick question 	<ul style="list-style-type: none"> - please don't ask a complicated math question by e-mail (be kind to your TA!)
questions about assignments	<ul style="list-style-type: none"> - is there a typo in Q2 of the assignment? - my grade on OWL isn't the same as my grade on paper - can I use this other method I know to do the assignment? - it's Friday at 3:40 and I forgot to hand in my assignment at the start of class 	<ul style="list-style-type: none"> - e-mail the TA or speak to them in person - ask it during class if it's a question other students may be asking - catch me after class if it's a quick question 	<ul style="list-style-type: none"> - please don't waste time with questions about policies that are covered in this outline
personal, administrative issues	<ul style="list-style-type: none"> - I have a disability - I need special permission to be signed into the course - I have been granted permission by the Dean to miss the midterm 	<ul style="list-style-type: none"> - come speak to me in person, probably during office hours - you can e-mail me or catch me after class if 	<ul style="list-style-type: none"> - don't panic!

	- I am a Mustang athlete and need accommodation for tournaments	this is a personal issue but it requires only a quick answer	
requests for grade increases, "extra work", or re-weightings	- I would like my assignments to be worth 40% of the course grade because I didn't do well on the midterm.	- to be fair to all students in the course, requests for personal re-weightings will not be considered	... you might want to make use of study support resources on campus (see "Support Services" paragraph)
questions about which software to use	- can I do the assignments using Excel?	- yes, you can use any software that you like	

Faculty of Science and Western Policies

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.

OWL

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. 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.

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) 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 their instructors within 24 hours of the end of the period covered, unless otherwise instructed in the course outline.

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](#)).

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),

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.

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.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com

(<http://www.turnitin.com>).

In the event of a health lock-down, 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 acknowledge that you will be required to provide **personal information** (including some biometric data) and 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>.

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.

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/>.

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

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>.