

**Course Outline: Fall 2015**  
**Applied Mathematics 2402a - Ordinary Differential Equations**

**Instructor:** Lindi Wahl, (519) 661-2111 x88795, MC 267  
**TA:** Alina Nadeem, anadeem4@uwo.ca

**Lectures:** 12:30 - 1:30pm, WSC55

**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. There will be a TA available during that hour to give you extra help. 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 10 minutes late and seats are still available. Tutorials start Sept 17.

**Textbook:** *Elementary Differential Equations*, Boyce and DiPrima, 10th edition, is required. A copy will be available for 2 hour loan at the Taylor reserves desk. The Student Solutions Manual for this text is also available but not actually very helpful (often not much more than final answer). A copy of the Solutions Manual for the Taylor reserve desk has been requested.

<b>Evaluation:</b> Assignments (weekly, 9-10 in total)	10%
Midterm Examination (Fri. Nov 6, 7:00pm - 9:00pm)	40%
Final Examination (December exam period)	50%

**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, and in fact the failure rate is around 15%. Practice problems will be assigned for every lecture, and it is recommended that you book fixed times in your weekly schedule when you will work on AM2402a practice problems.

**Taking notes:** There are no published lecture notes for this course. Pedagogical research has shown that taking handwritten notes during class is the very best way to "absorb" a lecture. The instructor's "notes" are not a good record of the information presented on the board in class. 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 some 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 previously written down.** 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 without any notes, 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% of the assignment component of the course. In general, "too similar" means assignments that appear to be copied one from another, including line breaks, exact wording, and unusual typographical errors repeated on both papers.

**Assignment logistics:** Assignments will be posted to OWL weekly, on Friday at the latest, and will be due one week later, on Fridays at 12:30pm. You can hand your assignment in by slipping it into the drop box in Applied Math (see OWL for details) at any time before Friday at 12:30pm. 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 12:30pm, or **at the start of class** on Mondays. The late penalty is -15%. Marked assignments will be available for pick-up during the tutorial sessions. 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 25**. The lowest assignment grade for each student will be dropped. There are absolutely 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:** We will use the standard Faculty of Science policy and standard science calculators on the midterm and final. The policy is: "The Sharp EL-510R(B) or Sharp EL-510RN(B) are the only calculator models permitted during exams. All other brands and Sharp models will be confiscated. Proctors and instructors for tests and 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! The sharing or exchanging of calculators during tests or exams is strictly forbidden. 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. TA e-mail addresses are also in that file. You may e-mail the TAs to arrange a meeting if you have course conflicts during their office hours. Private tutors are also available; search for the "Tutor Referral Service" or "Private Tutor List" at Western.

**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.

**Need to miss the midterm or final?** Course instructors in the Faculty of Science are not allowed to approve academic accommodation for course requirements that are worth more than 10% of any final grade. **Therefore, permission to write a make-up, for either the midterm or the final, must be obtained from the Academic Counsellors in your faculty.** Talk to the counsellors first. After you talk to them, they will e-mail the permission to your instructor. Then contact your instructor to find out the date/time for the make-up.

**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 at the end of this course outline.

**Support Services:** 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/mental\\_health](http://www.health.uwo.ca/mental_health)) 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>.

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

**Accessibility:** 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 Services for Students with Disabilities (SSD) at 661-2111 ext. 82147 if you have questions regarding accommodation.

### **Code of Student Conduct**

To foster a supportive and enriching academic environment that is conducive to learning and free inquiry, Western has a Code of Student Conduct (<http://www.uwo.ca/univsec/pdf/board/code.pdf>).

You can expect your instructor to promote this environment and also respect each student's unique views and opinions. Because Western is also a part of your environment, we expect the

same from you. Activities that disturb another student's right to this environment will not be tolerated; these include talking in class about matters irrelevant to the course and using electronic devices inappropriately. You can also expect your instructor to come prepared, on time, and eager to help you learn. In turn, we expect that you will come prepared, on time, and ready to learn.

**Academic Dishonesty:** Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this website:

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf). Computer-marked, multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

**Illness when writing exams:** It is Faculty of Science policy that a student who chooses to write a test or exam deems themselves fit enough to do so, and the student must accept the mark obtained. Claims of medical, physical, or emotional distress after the fact will not be considered. In AM2402s, there is no opportunity for a reweight of the other course components after the test or exam has been written. Arguing "I did not want to write a heavily weighted final" is not a valid reason for writing the midterm test while ill. If you are ill, obtain medical documentation (see below) and do not write.

**Missed Course Components:** If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or supporting documentation to the **Academic Counselling Office of your home faculty** as soon as possible.

If you are a science student, the Academic Counselling Office of the Faculty of Science is located in WSC 191, and can be contacted at 519-661-3040 or [scibmsac@uwo.ca](mailto:scibmsac@uwo.ca). Their website is [http://www.uwo.ca/sci/undergrad/academic\\_counselling/index.html](http://www.uwo.ca/sci/undergrad/academic_counselling/index.html).

A student requiring academic accommodation due to illness must use the Student Medical Certificate ([https://studentservices.uwo.ca/secure/medical\\_document.pdf](https://studentservices.uwo.ca/secure/medical_document.pdf)) when visiting an off-campus medical facility.

For further information, please consult the university's medical illness policy at [http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/accommodation\\_medical.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf).

**Missed Midterm or Final Exam:** If you miss the midterm, and **if your faculty's Academic Counselling Office has approved your circumstances**, then you may write the makeup midterm which will be available during the week after the midterm. If you are unable to write the make-up, the weight of the midterm will be shifted to the Final Exam. There are no other possibilities or re-weightings. In particular, to remain fair to other students, it will **not** be possible to shift more weight onto the assignment component of the course.

If you miss the Final Exam, contact your faculty's Academic Counselling Office as soon as possible. They will assess your eligibility to write the Special Exam (the name given by the university to a makeup Final Exam) in January of 2015. You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (see [http://www.registrar.uwo.ca/examinations/exam\\_schedule.html](http://www.registrar.uwo.ca/examinations/exam_schedule.html)).

### **Equal Opportunity and Evaluation Policy**

The university is committed to academic integrity and has high ethical and moral standards. All students will be treated equally and evaluated using the criteria presented in this course outline and their respective weights. The evaluation criteria are based strictly on actual achievement, not on effort. Claims of an excellent academic history, of attendance in the course components, or of personal issues (family, relationship, financial, etc.) cannot be used to justify a higher grade in the course because they are not criteria for evaluation. There is no extra work available for

extra credit or to “make up” another grade. We do not offer any extra assignments, essays, problem sets, or other work of any kind to any student.

The requirement for a higher grade in order to, for example, maintain a scholarship, enter a program, or obtain a higher GPA for various reasons, is not a justifiable reason for increasing your grade. If we increased or “bumped” your grade (i.e. gave you a grade that you did not legitimately earn), it would be unfair to the other students and also a great disservice to the scholarships and programs who are evaluating all students on the basis of their grades. This means, for example, if you receive 58% in the course **we will not "bump" your grade** to a 60%; you will simply need to take the course again (some people have taken this course 3 times!).

## How to reach us when you need more information

A document under "Resources" on the OWL course site will list up-to-date TA and instructor contact info, office hours, office room numbers etc.

Type of question/issue	Examples	What to do	What not to do
questions about course material	<ul style="list-style-type: none"> <li>- I need help with Q1.1</li> <li>- the solution to Q4.3 is wrong in the manual</li> <li>- I'm lost and need help with Chap. 8!</li> <li>- is method A the same as method B I learned in another course?</li> </ul>	<ul style="list-style-type: none"> <li>- talk in person with the TA at the tutorial</li> <li>- attend office hours</li> <li>- e-mail the TA if it is a quick question</li> </ul>	<ul style="list-style-type: none"> <li>- please don't ask a complicated math question by e-mail (be kind to your TA!)</li> </ul>
questions about assignments	<ul style="list-style-type: none"> <li>- is there a typo in Q2 of the assignment?</li> <li>- my grade on OWL isn't the same as my grade on paper</li> <li>- can I use this other method I know to do the assignment?</li> <li>- it's Friday at 3:40 and I forgot to hand in my assignment at the start of class</li> </ul>	<ul style="list-style-type: none"> <li>- e-mail the TA or speak to them in person</li> </ul>	<ul style="list-style-type: none"> <li>- please don't ask a question about the logistics and late policies that are covered in this outline</li> </ul>
personal, administrative issues	<ul style="list-style-type: none"> <li>- I have a disability</li> <li>- I need special permission to be signed into the course</li> <li>- I have been granted permission by the Dean to miss the midterm</li> <li>- I am a Mustang athlete and need accommodation for tournaments</li> </ul>	<ul style="list-style-type: none"> <li>- speak to your instructor in person, ideally during office hours</li> <li>- you can e-mail your instructor or catch them after class if this is a personal issue but it requires only a quick answer</li> </ul>	<ul style="list-style-type: none"> <li>- don't panic!</li> </ul>
requests for grade increases, "extra work", re-weightings	<ul style="list-style-type: none"> <li>- I would like my assignments to be worth 20% of the course grade because I didn't do well on the midterm.</li> </ul>	<ul style="list-style-type: none"> <li>- re-read the policies in this course outline, and then hit the books in time for the final, because this request will not be considered!</li> </ul>	<ul style="list-style-type: none"> <li>... you also might want to make use of study support resources on campus (see "Support Services" paragraph)</li> </ul>
questions that have answers in this course outline	<ul style="list-style-type: none"> <li>- what should I do if commencement is the night of the midterm?</li> <li>- can I do the assignments using Excel?</li> </ul>	<ul style="list-style-type: none"> <li>- re-read the course outline!</li> </ul>	