

AM4815/9505b (Winter 2023) Course Outline

1. Course Information

AM4815b/9505b --- Partial Differential Equations II (Winter 2023).
Lecture (001): Mon-Wed-Fri, 3:30-4::30pm; in-person in room TC-202.

Prerequisites: AM3815 --- Partial Differential Equations I

Unless you have either the prerequisites 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

Instructors	Email	Office	Phone	Office Hours
Dr. Xingfu ZOU	xzou@uwo.ca	MC284	88781	Thursdays 9:30-11:00 for AM 9505; Thursdays 11:00-12:30 for AM4815, all in MC284

Extra meeting times other than the office hours can be scheduled by appointment. **Students must use their Western (@uwo.ca) email addresses when contacting their me by email.**

3. Course Syllabus, Schedule, Delivery Mode

Course topics: This is the first time that the two courses AM4815 (undergraduate) and AM9505 (graduate) are combined. Previously, AM4815 focuses on the Green's functions under various scenarios of the domain and boundary conditions, and their applications to **linear inhomogeneous** PDEs, while AM9505 intends to offer an introduction to **nonlinear** PDEs for graduate students in applied mathematics. Considering the nature of combination of two totally different courses, my plan is a combination of the the syllabuses of the two courses with carefully chosen adoption and abandonment in the two syllabuses. They include:

Green functions for some common second order linear nonhomogeneous DEs under various boundary scenarios; nonlinear reaction diffusion equations, existence of solutions and their long time dynamics (steady state solutions and their stability, pattern formation, traveling waves); and first order PDEs and the method of characteristics.

Course oucomes: Students are expected to be able to (i) understand the notion of Green functions in various situation and their role in expressing and explaining solutions, know how to find Green function for not too complicated DEs; (ii) the notion of steady state solution to R-D equations and their role in

determining the long time behaviour of the solutions, (iii) how to employ the method of characteristics to solve a not too complicated first order PDE.

Delivery mode: classes and exams will all be in-person.

Classes begin: January 9, 2023
Spring Reading Week: February 18-26, 2023
Classes end: April 10, 2023
Exam period: April 12-30, 2023

4. Course Materials

Textbook: Due to the nature of combination of two totally different courses, no single text can be specified and the materials will be chosen from more than one texts. Below are the two text book on which, the lectured will be mainly based:

- (A) Richard Haberman, Applied Partial Differential Equations, 5th edition, Pearson, 2013.
(B) John David Logan, An Introduction to Nonlinear Partial Differential Equations, John Willy & Sons, 2nd Ed, 2008.

Some materials not included in these two books may also be adopted/added in lectures and will be testable in the midterm or final exam. As such, skipping classes may result in disadvantageous consequences.

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 materials 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:

Assignment	15 %	
Midterm Test	35 %.	Monday February 27, 7:00-9:00pm (room to be announced later)
Final Exam	50 %	To be determined the registrar's office

For assignments, problems will be assigned, and completed assignments will be collected and marked partially and selectively only though. Due times for handing in assignments will be strictly followed. Group study and discussion when working on assignments (and preparing for exams) are encouraged, but copy-each-other in completing assignments is absolutely not allowed. Copying from other sources in your assignments is also not permitted. When a copying case is identified, penalty will be implemented.

Midterm and final, will be in-person and close-book. No notes and electronic devices, including calculators and cell phones, are allowed.

Note: This is a course for senior and graduate students, therefore **good presentations** (e.g., neat, logic and rigorous mathematical arguments and computations) of your answers to the problems in assignments, test and exam are encouraged and required. When marking the assignments, the test and the exam, this factor will be considered.

6. Student Absences

If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

Assessments worth less than 10% of the overall course grade:

If you miss the deadline of an assignment due to an unexpected incidence that can be convincingly justified, I may consider either extending the deadline to a reasonable new one, or allocating the weight of that assignment to the rest if it is too late from the deadline.

Assessments for work totally 10% or more of the overall course grade:

If you **miss a midterm**, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible. For further information, please consult the University's medical illness policy at

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

The Student Medical Certificate is available at

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

If your Academic Counselling Office approves your request, you can be accommodated either by writing a make-up to be held on the next day Tuesday February 28; or by re-allocating the weight to the final exam (cumulative), making the final worth 85%.

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), which will be scheduled later (usually in the first week of May).

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](#)).

Note: missed work can *only* be excused through one of the mechanisms above. Being asked not to attend an in-person course requirement due to potential COVID-19 symptoms is **not** sufficient on its own.

7. Accommodation and Accessibility

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>.

Accommodation Policies:

Students with disabilities are encouraged to contact Accessible Education, 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.

8. 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 their official university address is attended to in a timely manner.

In both midterm and final examinations, no electronic devices are allowed. For assignments, while discussions between students are encouraged, copying other people's assignments is not allowed ! If a copying case is identified, penalty will be implemented.

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.

In the event of a COVID-19 resurgence during the course, the midterm and/or final examination in this course may have to 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>.

Note: use of online proctoring for in-person courses requires approval from the Dean's Office.

9. 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/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

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

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Additional student-run support services are offered by the USC, <https://westernusc.ca/services/>.