

## AM4815b/9505b Course Outline --- January-April 2026

### 1. Course Information

#### Course Information

AM4815a --- Partial Differential Equation II (Winter 2026)

Prerequisites: AM3815 --- Partial Differential Equations I or equivalent

Unless you have either the prerequisites for this course or written special permission from the Department of Mathematics to enroll in it, you may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on your academic record. This decision may not be appealed.

### 2. Instructor Information

Instructors	Email	Office	Phone	Office Hours
Dr. Xingfu ZOU	xzou@uwo.ca			Time: TBA

Students must use their Western (@uwo.ca) email addresses when contacting the instructor by email. For office hours, two hours per week will be determined after discussing with the class to maximize the accessibility. Extra meeting times other than the office hours can be scheduled by appointment.

### 3. Course Syllabus, Schedule, Delivery Mode

Course topics: This is a cross listed course and is a combination of the two courses AM4815 (undergraduate) and AM9505 (graduate). Previously, AM4815 focused on Green's functions under various scenarios of the domain and boundary conditions, and their applications to **linear inhomogeneous** PDEs, while AM9505 intended 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 naturally a combination of 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 (R-D) 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.*

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

equations and their role in determining the long time behaviour of the solutions and know how to analyse a given R-D equation/system in terms of these topics; (iii) know how to employ the method of characteristics to solve some linear and quasi-linear first order PDEs.

Classes and exams will all be in-person. Approximately (first) 6 weeks will be on Green functions for linear nonhomogeneous DEs, followed by one week on linear and quasi-linear first order PDEs, and the rest on the nonlinear R-D equations.

### **Relevant Key Sessional Dates**

Classes begin: 5 January 2026

Spring Reading Week: 14 – 9 February 2026

Classes end: 9 April 2026

Exam period: 12-30 April 2026

## **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 source. For the first part of the course on Greens functions and linear and quasi-linear first order PDEs, the materials will be mainly from the following two text books:

(A) Richard Haberman, *Applied Partial Differential Equations*, 5th edition, Pearson, 2013. Students are welcome to purchase second-hand copies of this textbook. Prices vary online, from \$69.10 CAN at [biblio.com](http://biblio.com) to \$85.55CAN at [AbeBooks.com](http://AbeBooks.com). This is the same text book used for AM3815a.

(B) John David Logan, *An Introduction to Nonlinear Partial Differential Equations*, John Willy & Sons, 2<sup>nd</sup> 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.

For the second part of the course --- the topics on nonlinear reaction diffusions, the materials will be mainly from my personal notes which will be gradually posted in OWL as the course proceeds.

Students are responsible for checking the course OWL site (<https://westernu.brightspace.com/>) regularly for announcements 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 Brightspace 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**

### **Grading Scheme and Assessment Dates**

The overall course grade will be calculated as listed below:

Class involvement	6%
Midterm Test 1	27% (Tuesday, February 10, 7:00-9:00pm)
Midterm Test 1	27% (Tuesday, March 10, 7:00-9:00pm)
Final Exam	40% (to be determined by the registrar's office)

Exercises will be assigned but will not be marked, meaning that they are mainly for the purpose of practise.

**Class involvement:** In addition to attendance, the small size of this class allows us to incorporate some mandatory class involvements for this course, including asking students to derive a formula, to find a mistake, to explain a notion, to review a known topic and/or method from preceding courses., or to summarize the results on the topic.

**Midterm 1** is expected to cover the materials of the first three weeks; and **Midterm 2** is expected to cover the materials of weeks 4-6 (not counting the reading week).

The **Final exam** will be cumulative in contents, meaning that all materials in the whole semester may possibly be included in the final exam, although more weight will be given to the materials taught after Midterm 2. Roughly estimating, 30% of the questions in the final could also appear in the two midterms.

### **General information about missed coursework**

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs*, posted on the Academic Calendar:  
[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/academic\\_consideration\\_Sep24.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf),

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage:

[https://registrar.uwo.ca/academics/academic\\_considerations/](https://registrar.uwo.ca/academics/academic_considerations/)

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- Final Examinations scheduled during official examination periods (Defined by policy)
- Midterm Test (Designated by the instructor as the one assessment that always requires documentation when requesting Academic Consideration)

When a student mistakenly submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

## **Evaluation Scheme for Missed Assessments**

If a student misses a **midterm**, they need to follow the procedure stated above to request for Academic Consideration. If their request is approved, they can either write a make-up within 48 hours, or allocate the 27% weight of the missed midterm to the other midterm and the final exam which will be cumulative, in the following proportions: 9% to the other midterm and 18% to the final.

When a student misses the Final Exam and their Academic Considerations been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under Special Examinations), especially for those who miss multiple final exams within one examination period.

## **6. Additional Statements**

### **6.1 Religious Accommodation**

When conflicts arise with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible, but not later than two weeks prior to the writing of the examination (or one week prior to the writing of the test).

Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays - <https://www.edi.uwo.ca>

### **6.2 Academic 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](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf).

### **6.3 General Academic Policies**

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

**Use of @uwo.ca email:** In accordance with policy, [https://www.uwo.ca/univsec/pdf/policies\\_procedures/section1/mapp113.pdf](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 email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

**Requests for Relief** (formally known as “appeals”)

Policy on Request for Relief from Academic Decision:

[https://uwo.ca/univsec//pdf/academic\\_policies/appeals/requests\\_for\\_relief\\_from\\_academic\\_decisions.pdf](https://uwo.ca/univsec//pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf)

Procedures on Request for Relief from Academic Decision (Undergraduate):

[https://uwo.ca/univsec//pdf/academic\\_policies/appeals/undergrad\\_requests\\_for\\_relief\\_procedure.pdf](https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf)

Procedures on Request for Relief from Academic Decision (Graduate):

[https://uwo.ca/univsec//pdf/academic\\_policies/appeals/graduate\\_requests\\_for\\_relief\\_procedure.pdf](https://uwo.ca/univsec//pdf/academic_policies/appeals/graduate_requests_for_relief_procedure.pdf)

## 6.4 Scholastic Offences

Policy on Scholastic Offences:

[https://uwo.ca/univsec//pdf/academic\\_policies/appeals/scholastic\\_offences.pdf](https://uwo.ca/univsec//pdf/academic_policies/appeals/scholastic_offences.pdf)

Procedures on Scholastic Offences:

[https://uwo.ca/univsec//pdf/academic\\_policies/appeals/undergrad\\_scholastic\\_offence\\_procedure.pdf](https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf)

## Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the possession of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, and wireless earbuds or headphones.

Unless explicitly stated otherwise in advance by the instructor, *the presence of any such device at your desk, on your purse/pocket,, or within reach during an assessment will be treated as a scholastic offence, even if the device is not in use.*

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is your responsibility to review and comply with these expectations.

## Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations.

Using such tools for content generation, code writing, problem solving, translation, or summarization, will be treated as a **scholastic offence**.

## 6.5 Support Services

Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, requests for relief, 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](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](mailto: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. If you have any questions regarding accommodations, you may also wish to contact Accessible Education at

[http://academicsupport.uwo.ca/accessible\\_education/index.html](http://academicsupport.uwo.ca/accessible_education/index.html)

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