Western University
London, Canada
Departments of Applied Mathematics and Mathematics

Applied Mathematics 3815A – Partial Differential Equations I

Fall 2020

INSTRUCTOR: D. J. Jeffrey, Department of Applied Mathematics.
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Basic Course Information

Class times: M W F 1:30pm – 2:30pm on line, through OWL

All of the remote learning sessions for this course will be recorded. The data captured during these recordings may include your image, voice recordings, chat logs and personal identifiers (name displayed on the screen). The recordings will be used for educational purposes related to this course, including evaluations. The recordings may be disclosed to other individuals participating in the course for their private or group study purposes. Please contact the instructor if you have any concerns related to session recordings.

Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

Required Text: **J. David Logan – "Applied Partial Differential Equations" 3rd edition, Springer (2015).**

Note: this text is available for free as an e-book from Western Libraries.

Prerequisite(s): (i) Mathematics 1600A/B; Applied Mathematics 2402A; Calculus 2303A/B or Calculus 2503A/B; or (ii) Calculus 2402A/B and Statistical Sciences 2503A/B. In each course a minimum mark of 60% is required.

Unless you have either the requisites 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.

Course Syllabus

Description

Boundary value problems for Laplace, heat, and wave equations; derivation of equations; separation of variables; Fourier series; Sturm-Liouville Theory; eigenfunction expansions; cylindrical and spherical problems; Legendre and Bessel functions; spherical harmonics; Fourier and Laplace transforms.

Expectations

By the end of the course a successful student will be able to:

- recognize different categories of linear partial differential equations or PDEs (hyperbolic, parabolic, elliptic), and connect each to the phenomena it is intended to model;
- classify and solve PDEs using standard techniques (e.g. separation of variables, eigenfunction expansions, transforms, method of characteristics);

- solve PDEs in Cartesian coordinates, polar coordinates, cylindrical polar coordinates, and spherical polar coordinates; identify and solve problems whose solution is facilitated by a coordinate change;

- interpret solutions to a PDE, as well as initial and boundary conditions associated with a PDE, in terms of the phenomenon being modelled.
  Students are expected to have read the appropriate sections from the textbook and to have completed practice problems recommended in class.

  Students are expected to use help resources available to them when problems arise. It is often better to tackle difficult material when problems with understanding occur. Putting off questions until exam time is an ill-advised study strategy. Students that work at a consistent pace throughout the term and make a consistent effort to understand material tend to achieve better results.

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Evaluation

Tests and examinations in this course will be conducted using the remote proctoring service, such as Proctortrack. 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**. More information about this remote proctoring service is available in the Online Proctoring Guidelines at the following link: https://www.uwo.ca/univsec/pdf/onlineproctorguidelines.pdf

Your final grade will be calculated as follows:

Midterm Exam	**20 %**
Final Exam	**50 %**
Quizzes	**30 %**

Midterm Exam

At the midterm you will write a two-hour exam-style test. Date TBA. Proctoring software may be used.

Final Examination
The Final Examination will be three hours and will be cumulative. The date and time and location of the final exam will be announced by the Registrar's Office. Students seeking a make-up exam for any reason must secure approval from the appropriate dean (see addenda). Proctoring software may be used.

Quizzes
There will be 2 quizzes administered online, dates TBA.

All quizzes and exams will be open book.

Accommodation and Accessibility

If you are unable to meet a course requirement due to illness or other serious circumstances, you must seek approval for the absence as soon as possible. Approval can be granted either through a self-reporting of absence or via the Dean's Office/Academic Counselling unit of your Home Faculty. If you are a Science student, the Academic Counselling Office of the Faculty of Science is located in NCB 280, and can be contacted at scibmsac@uwo.ca.

For further information, please consult the university's policy on academic consideration for student absences:
https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf.

If you miss the Final Exam, please contact your faculty's Academic Counselling Office as soon as you are able to do so. They will assess your eligibility to write the Special Exam (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” (see http://www.registrar.uwo.ca/examinations/exam_schedule.html).

Academic Policies

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

In accordance with policy, http://www.uwo.ca/its/identity/activatenonstudent.html, 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.

No electronic devices will be permitted during any quizzes or exams in this course.

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.

Support Services

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 Student Accessibility Services (SAS) at 661-2147 if you have any questions regarding accommodations.

The policy on Accommodation for Students with Disabilities can be found here: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic%20Accommodation_disabilities.pdf

The policy on Accommodation for Religious Holidays can be found here: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

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) 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.