

Course Outline: NMM 3415a

“Advanced Applied Mathematics for Electrical Engineering”

1. Course Information

Course Information

Numerical and Mathematical Methods 3415a, “Advanced Applied Mathematics for Electrical Engineering”

List of Prerequisites

NMM 2270a/b and NMM 2276a/b
(or the former Applied Mathematics 2270a/b and 2276a/b)

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 if you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

Instructors	Email	Office	Phone	Office Hours
Prof. Blaine A. Chronik	bchronik@uwo.ca		x86455	By appointment

Students must use their Western (@uwo.ca) email addresses when contacting their instructors

3. Course Syllabus, Schedule, Delivery Mode

Western Academic Calendar description:

Topics Include: introduction to complex analysis; complex integration; boundary value problems; separation of variables; Fourier series and transform methods of solution for PDE's, applications to electrical engineering.

Learning Outcomes (preliminary, subject to change):

Identify a partial differential equation (PDE) boundary-value problem (BVP).

Identify a separable PDE.

Identify specific PDEs: the heat/diffusion equation, the wave equation, and Laplace's equation.

Solve problems involving the 1D heat/diffusion equation.

Solve problems involving the 1D wave equation.
Solve problems involving Laplace's equation in 2D.
Identify and solve non-homogeneous BVPs.
Utilize a Fourier Series to solve BVPs.
Identify and utilize general orthogonal series expansions for solution of BVPs.
Identify and solve BVPs (heat and wave equations) in 2D.
Identify and solve BVPs in non-cartesian coordinates (polar, cylindrical, and spherical coordinates).
Apply Fourier Transform methods for solution of BVPs.
Identify and apply basic arithmetic operations using complex numbers.
Identify and execute simple functions of a complex variable.
Identify and evaluate complex contour integrals.
Identify and apply the Cauchy-Goursat theorem for complex contour integration.
Identify the Residue Theorem and apply for evaluation of complex and real integrals.

Delivery Mode and Schedule:

In person lectures (weekly)
No tutorials.

Key Sessional Dates (all 2024):

Classes begin: 5 September (first class for NMM 3415a: 6 September)
National Day for Truth and Reconciliation: Monday 30 September (no classes).
Fall Reading Week: 12 - 20 October (including Thanksgiving, Oct. 14th)
Last day of classes, Fall term: 6 December.
Study days (no classes, no exams): 7-8 December
Exam period: 9 – 22 December.

Contingency plan for in-person class moving 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, affected 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.

4. Course Materials

Textbook (required): "Advanced Engineering Mathematics, 7th Edition", D.G. Zill.

This is the same textbook/edition used in NMM 3415a, 2276b, and 2270a for the past several years. The content is very similar to the 6th edition of the same textbook, and students are welcome to use the 6th edition if they have it; however, all responsibilities regarding identifying and navigating any differences between the two editions (particularly in context of problems and/or problem numbers) are that of the student.

All additional course material will be posted to OWL: <http://westernu.brightspace.com>

All students are responsible for checking the course OWL site (<http://westernu.brightspace.com>) 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 you need assistance with the course OWL site, they can seek support on the OWL Brightspace Help page (brightspacehelp.uwo.ca). Alternatively, you can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

There are no specific technical requirements for the course other than a computer and internet connection with which to access the OWL site.

5. Methods of Evaluation

Grading Scheme and Assessment Dates:

The overall course grade will be calculated as listed below:

Assignments	10 %
Midterm Test	35 %
Final Exam	55 %

Please note: The Department of Physics and Astronomy may, in exceptional cases, adjust the final course marks in order to conform to Departmental policy.

Only the top (i.e., highest grade) 5 assignments will be used to calculate the 10% assignment contribution to the overall course grade. Each assignment will be worth 2% of the total course grade.

The midterm will cover all course material introduced up to the date of the midterm.

Final exam date: TBD (set by Registrar, between 9 and 22 December 2024)

Final exam made-up date: January 2024 (exact date TBD)

The final exam will be cumulative, covering all material within the scope of the course.

No calculators, cell phones, or other electronic devices are permitted during the midterm and final exams. If you are found to have a cell phone with you while writing the midterm or final exam, it will be treated as a Scholastic Offence.

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,

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/

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

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 (Assignments):

Of the 6 assignments, only the top 5 will be included in the grade calculation; therefore, you are obviously allowed to miss any single assignment without penalty. An extension of 48 hours (with no penalty) will be allowed for any assignment. Assignments will not be accepted if submitted more than 48 hours after the due date. If any additional assignments are missed (regardless of the reason), their weighting (2% per assignment) will be added to the final exam. For example, if all assignments are missed, the final exam will have a 65% weighting for calculation of the final course grade. No special permission or notification is required in order to miss an assignment. If an assignment is missed, the weight will automatically be transferred to the final exam.

Assessments worth 10% or more of the overall course grade (Midterm and Final):

If you miss work totalling 10% or more of the final course grade (i.e., if you miss the midterm or final exam), you must request Academic Consideration in order to write the make-up exam(s).

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/

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

Special notes regarding Absences from the Midterm Examination:

If you cannot write the scheduled midterm make-up exam, you must again request Academic Consideration within 48 hours after the make-up midterm date. If and only if the Academic Consideration is granted, the weight of the midterm will be added to the weight of the final exam (i.e., the final exam will be worth 90% of your course grade).

Special notes regarding Absences from the Final Examination:

When a student misses the Final Exam and their Academic Consideration has 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

Religious Accommodation

When conflicts 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 or 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>.

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.

Academic Policies

The website for Registrar Services is <https://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.

No electronic devices of any kind (including cell phones and calculators) will be permitted during the midterm or final exams.

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:

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

Support Services

Please visit the Science & Basic Medical Sciences Academic Advising 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.

Learning-skills counsellors at Learning Development and Success (<https://learning.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.

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/>.

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