

Mathematics 9514 Course Outline

1. Course Information

Course Information:

Mathematics 9514 Introduction to Differentiable Topology, Winter 2025-26;

List of Prerequisites:

Real Analysis, General Topology, Linear Algebra. Please consult the instructor for further details.

2. Instructor Information

Instructors	Email	Office	Phone	Office Hours
Prof. Rasul Shafikov	shafikov@uwo.ca			TBA

Students must use their Western (@uwo.ca) email addresses when contacting their instructors and should include the course number in the subject line.

Office Hours will be held in person.

3. Course Syllabus, Schedule, Delivery Mode

This is a foundational course that bridges several areas: analysis, geometry, and topology. We will start with smooth structures on manifolds. We then discuss jet spaces and approximation. One of the central topics will be discussion of transversality and the proof of the Transversality theorem. This important result appears in various geometric constructions in many different areas of mathematics. Further topics include vector bundles, tubular neighbourhoods, degrees of maps, Euler Characteristic, etc. If time permits, we'll discuss the basics of Morse theory.

The course is run in the form of traditional in-person lectures.

Relevant Key Sessional Dates:

Classes begin: January 5, 2026

Spring Reading Week: February 14 – 22, 2026

Classes end: April 9, 2026

Exam period: April 12 – 30, 2026

4. Course Materials

Textbook and Other Learning Materials

Recommended textbook: Differential Topology by Morris Hirsch, Springer GTM 33.

Cost: Springer Link e-book \$69.99 USD; softcover \$89.95 USD; hardcover: \$89.95 USD. The link: <https://link.springer.com/book/10.1007/978-1-4684-9449-5>

Other textbooks to consider: Stable Mappings and Their Singularities by M. Golubitsky and V. Guillemin, Springer GTM 14. Link: <https://link.springer.com/book/10.1007/978-1-4615-7904-5>

Differential Topology by V. Guillemin and A. Pollak. AMS Chelsea, link: <https://bookstore.ams.org/chel-370-h>

There are many other textbooks that cover similar material. These can be used for cross-referencing and tangent reading.

Course related material will be posted to OWL: <https://westernu.brightspace.com/>

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

Technical Requirements

It is essential to have access to Brightspace.

5. Methods of Evaluation

Grading Scheme and Assessment Dates

The overall course grade will be calculated as listed below:

Assignments (1-2) = 40%

In-class Presentation = 60%

Homework Assignments

There will be 1 or 2 written assignments given. Students are encouraged to discuss the problems in group(s) or with the instructor during the office hours. The final writeup, however, should be individual of each student. There will be a 3% mark added for homework typed in LaTeX.

In-class Presentations

There will be 30-min in-class presentations given by every registered student at the end of the semester. The topic should be related to the course material and should be chosen in consultation with the instructor. The criteria for evaluation: understanding of the material, engagement during the presentation, ability to answer question.

Use of Generative AI Tools

Students can use generative AI (such as ChatGPT, Copilot, Gemini) as a learning tool. However, AI should not be used for completing written assignments, unless otherwise specified in the assignment.

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://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.

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:

- Examinations scheduled during official examination periods (Defined by policy)
- In-class tests (Defined by policy)

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

Homework: Students are expected to submit all assignments by the deadline. Should extenuating circumstances arise, students do not need to request Academic Consideration, and they are permitted to submit their assignment up to 48 hours past the deadline without a late penalty. Should students submit

their assessment beyond 48 hours past the deadline, a late penalty of 15% per day will be applied, although assignments submitted more than one week past the deadline will not be accepted.

In-class Presentation: The presentation will be scheduled during the class time during the last week of classes. These can be rescheduled if needed.

6. Additional Statements

6.1 Religious Accommodation

When a recognized religious holiday or observance conflicts with an examination, test, or other scheduled academic obligation, students must request accommodation via the University's Student Absence Portal (SAP). This request should identify the conflict and specify which course component(s) (e.g. test, midterm, exam) are affected.

Students are encouraged to submit the SAP request as early as possible, but no later than two weeks before any examination, or one week before any mid-term test or quiz, to allow sufficient time for adjustment.

The SAP request serves as official notification to both the course instructor and the Academic Advising Office, in accordance with University policy:

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

The Faculty of Science considers religious accommodations as scheduling conflicts. Instructors should provide either a make-up exam or an earlier sitting of the same exam to accommodate the student.

For more information on recognized religious holidays, please visit the Diversity Calendar posted on the Equity, Diversity & Inclusion website - <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

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, 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

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

https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf

6.4 Scholastic Offences

Policy on Scholastic Offences:

https://uwo.ca/univsec//pdf/academic_policies/appeals/scholastic_offences.pdf

Procedures on Scholastic Offences (Undergraduate):

https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf

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—when not explicitly allowed—will be treated as a **scholastic offence**.

If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is your responsibility to seek clarification before using any AI tools in academic work.

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 (GBSV) and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced GBSV (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.