Vector Analysis

MATH 3012 - Fall 2022

Instructor: Dr. Serhii Myroshnychenko (smyroshn@lakeheadu.ca)

Schedule:

- ✓ Lectures: Tuesday, Thursday 11:00 – 12:30 EST at **M339**.
- ✓ Labs: Friday 11:00 – 12:00 EST at **A248**.
- ✓ Office hours: Monday 18:00 – 19:00, Wednesday 16:00 – 17:00 EST or by appointment at **F118E** or via Zoom.

Recommended textbook:

- *Calculus: Early transcendental Functions* by Larson, Edwards, Brooks/Cole.
- *Multivariable Calculus* by James Stewart, Brooks/Cole.

Important dates:

- First Day of Classes: **September 6th**.
- Fall Study Week: **October 24th – October 28th**.
- Midterm: **October 28th**.
- Last Day of Classes: **December 6th**.
- Final: **TBD**.

Exams: There will be one midterm exam during the **lab hour**. The final exam will be scheduled by the registrar's office. The exams will be closed book with no calculators or other aids allowed.

Grade: Please note that **no** alternate grading scheme will be used in this course.

Written Homework	20%
Online Assignments (WeBWorK)	20%
Midterm	20%
Final	30%
Quizzes	10%

Homework: Written HW is assigned **every three weeks**. Online assignments are assigned **weekly**.

Lab Hour: No new material will be covered in the labs. The lab will reinforce concepts through examples, as well as provide students with the opportunity to ask questions about the content given in class or assignment problems. Though the lab is not mandatory, it is very beneficial to attend and **required to take quizzes**.

Course Policies:

1. Late written HW assignments will be **accepted and reviewed, but not graded.** There will be **no** make-up exams. If you miss the midterm for a legitimate reason which you can document (e.g. doctor's note), the weight of the midterm will be *transferred* to the final exam. The documented proof of absence should be provided no later than 3 days after the is scheduled.

2. All electronic devices (phones etc.) are prohibited during the exams. In case when such a device is detected during the exam (**activated or not**), it would be treated as an **academic misconduct** situation.

Accommodations: Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all their academic activities. If you think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as soon as possible. For more information please visit:

https://www.lakeheadu.ca/students/student-life/student-services/accessibility/

Awards and scholarships for current/returning students:

https://www.lakeheadu.ca/studentcentral/financing-budgeting/scholarships-for-current-returning

Any questions? Feel free to reach out to the instructor by e-mail or ``in-person'' with any questions, concerns, comments you might have. Also, check-out the following useful page for several related student resources:

https://www.lakeheadu.ca/students/student-life/student-conduct/resources

Tentative schedule

Week	Topics
1	Useful properties of Taylor series. Quadrics. Equations of lines and planes.
2	Cylindrical and spherical coordinates. Paths, curves, motion in space. Arc-length.
3	Real valued functions of several variables. Limits and continuity.
4	Partial derivatives. Gradient and directional derivatives. Optimization problems. Method of Lagrange multipliers.
5	Vector fields. Divergence and curl.
6	Double and triple integrals. Cylindrical and spherical coordinates.
7	Change of variables in double and triple integrals. Jacobian.
8	Integrals in spherical and cylindrical coordinates. Applications to mass calculations.
9	Line integrals. Surfaces.
10	Area of a surface, integrals of scalar functions over surfaces, surface integrals of vector fields.
11	Green's theorem. Conservative vector fields.
12	Stokes's theorem. The Divergence theorem.