# MATH*1172*WAB: Calculus II

## Winter 2023

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**Lectures:** MW 15:30-17:00
**Labs:** W 17:00-18:00

**Lecture Room:** GEOR K325
**Lab Room:** GEOR A248

**Instructor:** Dr. George Hutchinson
**Office Hours:** M 11:00-12:00
T 11:00-12:00

**E-mail:** ghutchi1@lakeheadu.ca
**Office:** Portable Office #2
(Beside H Building)

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## Course Summary

Areas of study include: Applications of Integrals; One-To-One Functions and Inverses; Logarithmic, exponential, power, and Inverse Trigonometric Functions; Techniques of Integration; Limits of Sequences; Indeterminate Forms; Improper Integrals; Infinite Series; Tests For Convergence; Taylor Series; Power Series

*See page 3-4 for a more detailed schedule of topics that we will be covering.*

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## Course Materials

**Website:** This course uses a D2L (Courselink) site, on which grades and important course information will be posted. You are expected to check this website regularly for announcements and course materials.
(The website can be found at www.mycourselink.lakeheadu.ca.)

**Required Textbook & Supplementary Material:** There is no required textbook for this course. The course notes will be the primary source of information. Students who desire supplementary material are encouraged to use the two (free!) online textbooks that are available at the following URLs:

http://www.apexcalculus.com/downloads/ - Apex Calculus, Version 3 by Gregory Hartman

https://openstax.org/details/books/calculus-volume-2 - Calculus Vol. 2 by Herman and Strang

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## Descriptions of Course Components

**Lecture:** While attendance is not technically mandatory, you are strongly encouraged to come to lecture. As there is no textbook for this course, lectures will be the primary source of material, and there will often be important information regarding assignments and tests conveyed in lecture.

**NOTE:** *Prior to each lecture, I will upload a document consisting of partially completed notes for that class. You are expected to bring these notes to lecture, and we will fill them in together.*

**Lab:** While the purpose of the lectures is to introduce new material and discuss mathematical theory, it is in the lab that we will apply the lecture material to solve problems. The notes from these sessions should prove invaluable to you as you work through your online assignments and study for your tests and exam.

**Assignments:** There will be one online WeBWork assignment each week, except for Week 08 and Week 09. While there is a total of 11 assignments, only your best 10 assignments will be graded. A link to WeBWorK can be found on our course website, under "Content".

**NOTE:** *I am dropping your lowest assignment mark to account for one missed assignment. If more than one assignment must be missed for a legitimate reason (e.g. Illness), the weight of the assignment(s) will be added to the final exam.*

**Term Tests:** There will be two Term Tests, written during Lecture. These are scheduled for **January 30th** and **March 08th.** Test #1 will cover Weeks 1-3, and Test #2 will cover Weeks 1-9, with a strong emphasis on Weeks 4-9.

**NOTE:** *If a term test is missed for a legitimate reason (e.g. Illness), the weight of the test will be added to the final exam.*

**Final Exam:** There will be a cumulative final exam, date and time of which will be announced as soon as it is scheduled.

## Course Schedule:

*We will adhere to the following schedule to the best of our abilities. It may be subject to minor changes due to unforeseen delays and/or expedition.*

| Week | Topics Covered | Evaluation |
|---|---|---|
| **W1**<br>Jan. 09 – Jan. 13 | **L'Hôpital's Rule:** Indeterminate Forms and L'Hôpital's Rule; Cauchy's Mean Value Theorem and the proof of L'Hôpital's rule | WeBWorK Assignment 1<br>(Active Jan. 13 – Jan. 19) |
| **W2**<br>Jan. 16 – Jan. 20 | **Integration of Essential Functions:** Inverse Trigonometric Functions and Integration; Hyperbolic functions | WeBWorK Assignment 2<br>(Active Jan. 20 – Jan 26) |
| **W3**<br>Jan. 23 – Jan. 27 | **Integration of Essential Functions:** Differentiating and Integrating Hyperbolic Functions; Inverse Hyperbolic Functions and Integration | WeBWorK Assignment 3<br>(Active Jan. 27 – Feb. 02) |
| **W4**<br>Jan. 30 – Feb. 03 | **Techniques of Integration:** Integration By Parts | **Term Test #1: In class Jan. 30**<br><br>WeBWorK Assignment 4<br>(Active Feb. 03-Feb. 09) |
| **W5**<br>Feb. 06 – Feb. 10 | **Techniques of Integration:** Integrating Trigonometric Products; Trigonometric Substitution | WeBWorK Assignment 5<br>(Active Feb. 10 – Feb. 16) |

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|---|---|---|
| **W6**<br>Feb. 13 – Feb. 17 | **<u>Techniques of Integration:</u>**<br>Integration by Partial Fractions; Improper Integrals<br><br>**<u>Applications of Integration:</u>**<br>Probability Density Functions and Mean (Expected Value) of a Continuous function | WeBWorK Assignment 6<br>(Active Feb. 17 – Feb. 23) |
| **W7**<br>Feb. 20 – Feb. 24<br>**(No class Feb. 20 due to Family Day)** | **<u>Applications of Integration:</u>**<br>Volumes – Method of Rings and Method of Shells | WeBWorK Assignment 7<br>(Active Feb. 24-Mar. 07) |
| **W8**<br>Feb. 27 – Mar. 03 | **WINTER STUDY WEEK**<br>**ENJOY THE BREAK!** | None |
| **W9**<br>Mar. 06 – Mar. 10 | **<u>Applications of Integration:</u>**<br>Arclength | **Term Test #2: In class Mar. 08**<br><br>(No Assignment This Week) |
| **W10**<br>Mar. 13 – Mar. 17 | **<u>Sequences and Series:</u>**<br>Introduction to sequences; Limiting behaviour of Infinite Sequences; Introduction to Series; Convergence/Divergence of Geometric Series; The Harmonic Series; Telescoping Series; p-series; Integral Test; | WeBWorK Assignment 8<br>(Active Mar. 17 – Mar. 23) |
| **W11**<br>Mar. 20 – Mar. 24 | **<u>Sequences and Series:</u>**<br>(Limit) Comparison Test; Alternating Series Test; Ratio Test; Root Test; Power Series; Radius of Convergence; Interval of Convergence | WeBWorK Assignment 9<br>(Active Mar. 24 – Mar. 30) |

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|---|---|---|
| **W12**<br>Mar. 27 – Mar. 31 | **<u>Sequences and Series:</u>**<br>Maclaurin Series; Taylor Series; Applications of Taylor/Maclaurin Series | WeBWorK Assignment 10<br>(Active Mar. 31 – Apr. 06) |
| **W13**<br>Apr. 03 – Apr. 07 | **<u>Sequences and Series:</u>**<br>Bounding the Error on Taylor Series Approximations | WeBWorK Assignment 11<br>(Active Apr. 07 – Apr. 11) |
| **W14**<br>Apr. 10 – Apr. 14 | Review for the Final Exam | None |

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## Evaluation

Your final grade will be comprised of the following components, weighed as indicated:

**20%** Weekly Assignments (Best 10 out of 11)

**20%** Term Test 1

**20%** Term Test 2

**40%** Final Exam

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## Course Learning Outcomes:

Upon successful completion of this course, the student will have demonstrated the ability to:

- Identify Indeterminate forms and apply L'Hôpital's Rule appropriately.
- Understand hyperbolic functions and be able to compute integrals involving Hyperbolic Functions and their inverses.
- Employ a wide variety of Integration Techniques.
- Use Integration Techniques to calculate volumes and surface areas for solids of revolution, arclength and centres of mass
- Use a variety of tests to identify if a given series converges, and identify the radii of convergence of a given Power Series
- Construct the Maclaurin/Taylor Series of a given function

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## Lakehead-Georgian Policies

**Academic and Student Code of Conduct Policies:**

- Academic and student policies and procedures for those enrolled in the Lakehead-Georgian programs can be found on the Lakehead-Georgian Student Portal.
- All Lakehead-Georgian programs will follow the Lakehead Regulations as list in the Lakehead University Academic Calendar (http://csdc.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&loaduseredits=False).The University Regulations include but are not limited to Registration, Examinations, Reappraisals and Academic Appeals, Special Examinations, Academic Misconduct, Withdrawal, and Timely Feedback. Additional Faculty Regulations may also apply. Please review the Academic Calendar.
- The Lakehead University Student Code of Conduct - Academic Integrity (https://www.lakeheadu.ca/students/student-life/student-conduct) will apply to all Lakehead-Georgian students regardless of campus of study.
- The Lakehead University Student Code of Conduct - Appeals (https://www.lakeheadu.ca/students/student-life/student-conduct) will apply to all Lakehead-Georgian students regardless of campus of study.
- The Georgian College Student Code of Conduct (http://www.georgiancollege.ca/student-code-of-conduct/) will apply to the Lakehead-Georgian students studying at the Barrie campus. Additional campus policies of Sexual Violence Procedure and Protocol (https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/sexual-violence), Alcohol, Drugs and Tobacco (https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/alcohol-drugs-and-tobacco), and Information Technology Acceptable Use Procedure (http://www.georgiancollege.ca/wp-content/uploads/2-117IT-acceptable-use.pdf)also apply.
- The Lakehead University Student Code of Conduct – Non-Academic (https://www.lakeheadu.ca/students/student-life/student-conduct) will apply to the Lakehead-Georgian students studying at the Orillia campus.

**Plagiarism and academic dishonesty:** A breach of Academic Integrity is a serious offence. The principle of Academic Integrity, particularly of doing one's own work, documenting properly (including use of quotation marks, appropriate paraphrasing and referencing/citation), collaborating appropriately, and avoiding misrepresentation, is a core principle in university study. Students should view the Student Code of Conduct -Academic Integrity (https://www.lakeheadu.ca/students/student-life/student-conduct) for a full description of academic offences, procedures when Academic Integrity breaches are suspected and sanctions for breaches of Academic Integrity.

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## Student Services and Support

**Student Advisors** (https://georgiancollege.sharepoint.com/sites/student/Student-Services/StudentAdvisors/SitePages/Home.aspx)

- Help students build both academic and personal resilience so that they can flourish at Georgian and beyond
- Provide individual, group and web-based advising sessions
- Are housed within the academic areas
- To book an appointment with your advisor go to the **Student Portal (preferred)** or call **705-728-1968 Ext. 1307**

**Library** (http://library.georgiancollege.ca/main)

Customer Service

- Off campus access

Research help

- Help finding books, articles and credible sources.
- Using specialty databases.
- Creating a search strategy.

**Academic Success** (https://library.georgiancollege.ca/help/contact-academic-success)

**Writing Centre** (http://library.georgiancollege.ca/writing_centre)

- Improve your writing.
- Help with citing sources and laying out your paper.

**Math Centre** (http://library.georgiancollege.ca/math_centre)

- Make sense of math questions.
- Understand concepts and develop skills.

**Tutors** (http://library.georgiancollege.ca/tutoring)

- Further understand course content.
- Build your study practices.

**Accessibility Services** (https://www.georgiancollege.ca/student-life/student-services/accessibility-services/)

If you are a student experiencing a disability who may require academic accommodations and have not yet registered with Accessibility Services, please contact their office at 705-722-1523, email studentsuccess@georgiancollege.ca, or visit their offices in B110. You must be registered with Accessibility Services to access academic accommodations. Support for those students whose success at college may be affected by a disability include:

- Ongoing support from our Accessibility Advisors including arranging a confidential psychoeducational assessment where required
- Training in the use of specialized computer technology
- Classroom and test accommodations

**Testing Services** (http://www.georgiancollege.ca/student-life/student-services/testing/)

- Accommodated testing
- Missed/Makeup testing
- Proctoring services are also available for external and Ontario Learn exams

**Counselling** (http://www.georgiancollege.ca/student-life/student-services/counselling/)

- Free, confidential counselling is available to all students
- Walk in counselling is available on a daily basis Monday to Friday

**Career Success** (http://www.georgiancollege.ca/student-life/student-services/co-op-and-career-services/)

Career assessments and exploring options

- Job search workshops
- Labour market information
- Resume/cover letter help
- Interview practice
- Graduate employment information
    - Links to job postings and online resource

## Campus Safety and Security Syllabus Addendum

**Emergency Evacuation (https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/fire)**

- Evacuate buildings when a fire alarm is activated or an official announcement is given. Review evacuation guidelines. (https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/fire)
- Students requiring assistance in emergency situations must inform their faculty during the first week of class.
- Familiarize yourself with all fire exit doors of classrooms and buildings you may occupy.
- Do not re-enter a building until instructions are given by the Fire Department or college personnel.

**Lockdown (https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/lockdown)**

- Lockdown is initiated when there is a potential or actual violent incident on campus that could result in a serious injury or threat to life.
- Students can download the new Safe@Georgian app to stay updated on Campus Safety and Security information including lockdown.
- Familiarize yourself with the College Lockdown procedure (https://www.georgiancollege.ca/wp-content/uploads/Lockdown.pdf)
- Lockdown tests occur each semester.

**Resources:**

- Get Out, Hide, Fight Lockdown Video (http://youtu.be/JA8cckMbVDk)
- Lockdown quick reference sheet (http://www.georgiancollege.ca/wp-content/uploads/COM-15-416_LockdownProcedure_Signage_FVR3_print.pdf)

- Lockdown Model – Get Out, Hide, Fight: Lockdown Tools and Tactics and FAQs.

**Unscheduled Campus Closure (https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/campus-closures)**

**Resources:**

- How to find out if your campus is closed (http://www.georgiancollege.ca/about-georgian/campus-safety-services/#how-to-find-out-if-your-campus-is-closed)
- Unscheduled Campus Closure Procedure (https://www.georgiancollege.ca/wp-content/uploads/2-102Unscheduled-college-closure-2018.02.10.pdf)

**Timing of Closures/Notification:**

| Closure | Decision | Communication / Notification* | Notes |
|---|---|---|---|
| **College has made the decision to close a campus or location in the morning:** | 6:00 a.m. | By 6:30 a.m. | If re-opening for noon or evening classes is being considered, this will be mentioned in the message |
| **College closes a campus(s) in the morning and expects to re-open by 12:00 noon** | 9:30 a.m. | By 10:00 a.m. | Only affects classes beginning at 12 noon or later |
| **Closure expected to continue past 12:00 noon** | 9:30 a.m. | By 10:00 a.m. | |
| **College intends to re-open for evening classes which commence at 5 p.m. or later** | 2:30 p.m. | By 3:00 p.m. | |
| **College intends to NOT re-open for evening classes:** | 2:30 p.m. | By 3:00 p.m. | |

****Notification will be made via:***

- Georgian social media (Facebook, Twitter)
- Safe@Georgian app
- Georgian website (homepage)
- Recorded message when you call into Barrie campus at 705-728-1968
- Student or employee portal
- Georgian email account
- Radio and television announcements through local and regional media

Note: We only announce the names of campuses that are closed. If your campus is not named in a closure, it's open.

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