MATH*1171 FAB: Calculus I

Fall 2021

Lectures: MW 10:00-11:30   **Lecture Room:** N/A (Zoom)
    Labs: F   10:00-11:00   **Lab Room:** N/A (Zoom)

Instructor: Dr. George Hutchinson   **E-mail:** ghutchi1@lakeheadu.ca
Office Hours: TBA   **Office:**   N/A (Zoom)

Course Summary

This course will cover the main topics of differential calculus, as well as introductory integral calculus. Areas of study include: Basic properties of the real number system; limits and continuity of functions; derivatives and differentiation formulas; applications of derivatives; anti-derivatives; definite integrals; indefinite integrals; The Fundamental Theorem of Calculus; u-substitution.

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

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 materials that you will need to bring to lecture.
(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-1 - Calculus Vol. 1 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, the lecture notes are the primary source of material. Further, 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 complete 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 active from Tuesday to Monday each week, except for Week 6, Week 8, and Week 14. While there is a total of 11 assignments, only your best 10 assignments will be graded.

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 which you can document (e.g. doctor's note), the weight of the assignment(s) will be added to the final exam. **Under no circumstances will late assignments be accepted!***

Term Tests: There will be two Term Tests, written during Lecture. These are scheduled for **October 13th** and **November 15th** . Test #1 will cover Weeks 1-5, and Test #2 will cover Weeks 1-10, with a strong emphasis on weeks 6-10.

NOTE: *If a term test is missed for a legitimate reason which you can document (e.g. doctor's note), 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.

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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 Sept 06 – Sept 10 (Classes begin Sept 07)	**Functions:** Basic Definitions and Properties; Algebra of Functions; Function Composition	WebWork Assignment 1 active September 08- September 14
W2 Sept 13 – Sept 17	**Functions:** One-to-one Functions and Function Inversion; Discussion of Essential Functions	WebWork Assignment 2 active September 14 - September 20
W3 Sept 20 – Sept 24	**Limits:** Introduction to Limits; Piecewise Functions and One-sided Limits; Limits at Infinity	WebWork Assignment 3 active Sept. 21 - Sept. 27
W4 Sept 27 – Oct 01	**Limits:** Formal Definition of a Limit; Limit Theorems; Limits of Trigonometric Functions	WebWork Assignment 4 active Sept. 28 – Oct. 04
W5 Oct 04 – Oct 08	**Continuity:** Definition; Continuity Theorems; Removable vs. Essential Discontinuities, Intermediate Value Theorem and Extreme Value Theorem.	WebWork Assignment 5 active Oct. 05 - Oct. 11
W6 Oct 11 – Oct 15 (No classes Oct. 11th due to Thanksgiving)	**None (due to Thanksgiving and Term Test #1)**	**Term Test #1: In class Oct. 13**

W7 Oct 18 – Oct 22	**Derivatives:** Definition and properties; Differentiability vs. Continuity; Derivative Rules; Differentiation of Essential Functions; Implicit Differentiation; Higher Order Derivatives	WebWork Assignment 6 active Oct. 19 - Oct. 25
W8 Oct 25 – Oct 29	**STUDY WEEK** **ENJOY THE BREAK!**	None
W9 Nov 01 – Nov 05	**Derivatives:** Logarithmic Differentiation; Differentiating the Inverse of a Function **Applications of the Derivative:** Logarithmic Differentiation; Rate of Change in Life Sciences; Related Rates; Exponential Growth and Decay; Fermat's Theorem and Optimization Problems	WebWork Assignment 7 active Nov. 02 - Nov. 08
W10 Nov 08 – Nov 12	**Applications of the Derivative:** Rolle's Theorem; Mean Value Theorem; Monotonicity and Extrema; Concavity and Points of Inflection, Curve Sketching	WebWork Assignment 8 active Nov. 09 - Nov. 15
W11 Nov 15 – Nov 19	**Integration:** Indefinite Integrals; The Chain Rule in Reverse; u-Substitution; Integration Theorems and Properties	**Term Test #2: In class Nov. 15** WebWork Assignment 9 active Nov. 17 - Nov. 23

W12 Nov 22 – Nov 26	**Integration:** Integration of Essential Functions; Riemann Sums; The Fundamental Theorem of Calculus	WebWork Assignment 10 active Nov. 23 - Nov. 29
W13 Nov 29 – Dec 03	**Integration:** Area Between Curves **Review:** Review for Exam	WebWork Assignment 11 active Nov. 30 - Dec 06
W14 Dec 06 – Dec 10 (Classes end December 07)	Review for 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:

- Manipulate functions and identify many important properties of a given function.
- Understand and be able to compute limits.
- Compute derivatives of functions and apply these derivatives to solve problems.
- Identify key points of a given function and sketch at an accurate graph.
- Understand and be able to compute indefinite and definite integrals.
- Apply the fundamental theorem of calculus to calculate the area between two given curves.

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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.lakheadu.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) (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) (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 <u>in the morning</u>:	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 <u>expects to re-open by 12:00 noon</u>	9:30 a.m.	By 10:00 a.m.	Only affects classes beginning at 12 noon or later
Closure expected to continue <u>past 12:00 noon</u>	9:30 a.m.	By 10:00 a.m.	
College intends to <u>re-open for evening classes</u> which commence at 5 p.m. or later	2:30 p.m.	By 3:00 p.m.	
College intends to <u>NOT re-open for evening classes</u>:	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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