MATH 180 : Calculus A : Spring 2019  (5 credits)
CLASS:  MWF 11-11:50am,  CST 103
LAB:  Tuesday 2:30pm,  CST 103

Instructor  Anand L. Pardhanani  Email: pardhan@earlham.edu
CST 210  Phone: 765-983-1683

Office hours  The following hours are tentative - I'll finalize office hours after the 1st week
M: 2:30-3:30pm.  T: 10-11am.  Th: 9-10am.

Open door policy: I keep my posted office hours to a bare minimum, to avoid being locked into a rigid schedule all semester. However, I am happy to assist students well beyond my office hours. Students are encouraged to just drop by whenever needed. Anytime my office door is open you're welcome to stop by and check whether I am available. Also, please do not hesitate to make an appointment if my posted office hours don't work for you.

Class website  http://www.earlham.edu/~pardhan/courses/calculus/
The website is a central component of this class, and you are responsible for regularly checking it for announcements, homework assignments, labs, and supplementary handouts. I prepare for class with the assumption that students have reviewed the website and followed through on posted instructions.

Textbook

Tutoring & help resources
No one succeeds in math without stumbling and needing help from time to time. Seeking timely help is smart, responsible, and the key to success in this class. You have at least 3 options here

- Your professor: My office hours are specifically set aside to help you with this class. I encourage you to visit as often as you need, throughout the semester.
- Your classmates: Get acquainted with them early and form study groups.
- Peer tutoring: Math/Science center, Lilly Library, day/times TBA.

Course content & description
The simplest way to describe calculus is: Cool, beautiful, and useful! It is cool because of the depth of insights it gives with relatively little effort. It is beautiful by its very nature. And it is useful because it is applicable across the board, in virtually every discipline -- science, medicine, business, fine arts, sports, political analysis, social activism, engineering, and more!

This course is an introduction to the foundations of calculus and its applications. The focus is on functions of one variable, with particular emphasis on the notion of limits, derivatives and differential calculus. Main topics include limits, continuity, the derivative, methods of finding derivatives, applications of derivatives, and basic integration concepts. We will cover Chapters 2-5 of the textbook. This course also includes a lab component, which is designed to explore applications and to enhance conceptualization.

Students will be expected to attain proficiency on the above topics at 3 distinct levels:
(i) Conceptual understanding of major ideas;
(ii) Computational & problem solving skills; and
(iii) Self-confidence and appreciation of how to use these ideas in their own fields of interest.
This class fulfills the Quantitative and the Abstract Reasoning components of Earlham's General Education requirements.

Course credits
This course is worth 5 credits. Three of these credits correspond to the 3 lecture hours each week. The remaining 2 credits are based on the weekly labs. As with other science courses at Earlham, each lab credit corresponds to 3 hours of work. Thus, each Calculus lab will require about 6 hours, on average, to complete.

Student learning outcomes
Upon successful completion of this course, students will be able to

1. Understand deeply what the derivative is, the range of insights it offers, and how to utilize it in a variety of settings.
2. Use derivative concepts to solve various application problems, and construct simple mathematical models for real-world applications.
3. Understand the mathematical definition of key concepts such as limit, derivative and integral.
5. Use technology as an integral part of the process of formulating and solving problems.
6. Work together productively, and learn cooperatively with other students.

Prerequisites
Proficiency in the algebra & geometry of functions upto the precalculus level is expected. Students must score at least 75 on Earlham's Quantitative Skills Assessment (QANS).

Assessment & grading policy
In my approach to grading, correct process and method receive far more credit than correct answers. I always ask you to show all your work, and I grade all of your work!

Your final grade will be based on combined performance on: (1) homework, (2) labs and classwork, (3) weekly quizzes, (4) three exams during the semester, and (5) a comprehensive final exam. Each will contribute the following proportions:

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<thead>
<tr>
<th></th>
<th>Homework</th>
<th>Lab &amp; classwork</th>
<th>Quizzes</th>
<th>Three exams</th>
<th>Final exam</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>10%</td>
<td>15%</td>
<td>15%</td>
<td>15% + 15% + 15% = 45%</td>
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I will replace your lowest exam grade with your final exam, if it improves your overall grade. In other words, this applies if your lowest performance is not on the final. Please be aware that, from previous experience, roughly half the students tend to have their lowest performance on the final.

Letter grade boundaries for this course are not set in advance. They will be determined at the end of the semester based on overall class performance. At a minimum, the following standard scale for letter grades will be honored:

A+: 97.0-100; A: 93.0-96.9; A-: 90.0-92.9;
B+: 87.0-89.9; B: 83.0-86.9; B-: 80.0-82.9;
C+: 77.0-79.9; C: 73.0-76.9; C-: 70.0-72.9;
D+: 67.0-69.9; D: 63.0-66.9; D-: 60.0-62.9; F: below 60.
NOTE that you must also satisfy the following requirements to receive a grade of C- or better:
  * Take all the exams (3 during the semester, plus the final).
  * Complete at least 75% of the labs, and turn in 75% of the assigned homework.
  * Take at least 75% of the weekly quizzes.

Quizzes & exams

**Quizzes:** There will be short quizzes every week. The quizzes will be based on readings, homework, classwork and/or other assigned tasks, and require no extra effort beyond staying current with the class, doing homework on time and understanding the material. I will drop your lowest quiz grade in computing your average.

**Exams:** There will be three in-class exams during the semester, plus a comprehensive final exam at the end of the semester. The tentative dates of the in-class exams are:


**Final exam:** The final exam date and time is set by the registrar's office. According to their calendar, the final exam will be held **Wednesday, May 8, in CST 103 at 4:30 pm.** The final exam date and time is **not negotiable.** Please arrange any travel plans accordingly.

Lab sessions

The goal of calculus labs, just like labs in other disciplines, is to learn through focused, hands-on exploration. On lab days you will work mostly in pairs or groups, and have opportunities to discover and apply key calculus concepts. There will be follow-up reports to turn in -- some may be individual and others may be group reports.

Classwork

The goal of classwork is to learn through thinking and doing problems in class. You will frequently work on these assignments in pairs or groups, and have opportunities to develop deeper understanding and/or more comfort with topics covered in that class. Classwork will sometimes be turned in for grading. Other times it will be just for your practice.

Homework assignments

**Note:** All assignments will be posted on the class website - they will not be handed out in class.

**Reading:** These will be assigned for each day of class, to be completed **before class on that day.** Reading ahead is a critical element for learning the material in this course. The time you invest in reading pays off in two different ways. One, your performance improves because you understand the material better, you ask questions, and attain a higher comprehension level. Two, you understand the material faster, so you spend **less time** later reviewing elementary ideas and introductory material when preparing for quizzes and exams.

**Problem sets:** Homework problems will be assigned from the textbook for each section that we cover. In general, each week there will be two sets of problems -- one set is for your practice, and the other set is to be turned in for grading. I will drop your lowest homework grade when computing your average.

I strongly advise you to complete all assigned homework by the indicated due dates, including the practice problems. The quizzes are designed with the assumption that you have done all the assigned work.

Important dates

* Last day to add this course: January 22.
* Last day to drop: April 5.
* Date of final exam: May 8.

**NOTE:** Last drop date applies to Earlham students only. Students registered through IU-East or
other institutions must follow the dates and rules of their own institution.

**Academic integrity**
The College trusts students who enroll at Earlham to be honest seekers of truth and knowledge. This trust is extended to all students by other students and by teachers, and is manifested in a variety of forms. Exams are rarely proctored. Unlike many colleges and universities, Earlham does not ask students to sign an oath affirming that they did not cheat on an assignment, since this would imply that people are either inherently dishonest, or will be honest only when they explicitly swear to it.

Students must be mindful that, although Earlham encourages cooperative and collaborative, rather than competitive, modes of learning, one's work must still be one's own, unless explicitly assigned to a group. Giving or receiving aid inappropriately on assignments and tests, or plagiarizing by using another person's words or ideas without credit, constitutes a serious breach of our trust in one another and in the integrity of the search for truth.

Those who believe they have witnessed violations of academic integrity should feel the obligation to speak about this to the suspected offender. The witness also should feel obligated to report the suspected offender to the instructor if the person fails to offer a satisfactory explanation and refuses to report him or herself.

Penalties for violations of academic integrity range from failing assignments or tests to suspension or expulsion from the College.

**Attendance**
Attending every class throughout the semester is expected. Besides the obvious benefits of regular attendance, most classes will involve graded activities such as quizzes, labs and/or other assignments. In general, there will be no makeups if a student misses such activities. Note, however, that most graded class activities do drop a reasonable number of lowest scores to accommodate for excused or unforeseen absences.

**Excused absences**
In the simplest terms, excused absences seldom happen! And when they do, you either know the details well ahead of time, or the absence is due to an illness or emergency.

In an illness or emergency, the requirements for an excused absence are: (1) I am notified of your absence in writing or via email, with verifiable evidence, within a reasonable timeframe of your absence. (2) The expected duration of your absence is communicated to me.

If your absence is due to participation in a College-sponsored event, such as athletics or other official event, you must notify me in writing or via email, with verifiable evidence, at least one week before your absence. In particular, if your absence may result in your missing a test, quiz or assignment deadline, please read the section below on "Athletics & Extracurricular Activities."

If your absence is due to participation in, or observance of, a religious holy day you must notify me in writing, or via email, at least one week before your absence.

Other absences may be considered excused if they satisfy the following conditions: (1) You have notified me in writing, or via email, at least 1 week ahead. (2) You have shown me documentation in support of your plans/reasons. (3) Your reasons justify the absence (as determined by me).

**Makeups**
- **Homework assignments:** Past-due assignments will not be accepted.
- **Quizzes, classwork, labs:** There will be no makeup for missing these, regardless of reason.
- **Exams:** Make-up exams will not be given except in cases of documented emergency.
Participation in, or travel for, a College-sponsored event constitutes an excused absence only if you notify me in writing (or by email) at least one week prior to each absence.

I will not offer any makeup exams or quizzes for College-sponsored absences. If your travel schedule requires missing an exam or quiz, I will arrange for you to take the exam before you travel, or for a faculty/staff member traveling with you to administer the exam during your trip. To avail of this option, you must notify me, in person, at least one week before your date of absence (preferably 2 weeks).

Assignment & homework due dates are firm -- no exceptions for extracurricular conflicts! If you have to miss class on a date when something is due, turn it in before your absence.

Athletics & extracurricular activities

I welcome and support student participation in athletics and other extracurricular programs at the College. However, I expect any such participation to prioritize your curricular responsibilities and academic success. Therefore, in this class, the same rules and yardsticks apply to all students, regardless of your participation in athletics or other events. In particular, I would like to emphasize the following policies regarding class attendance, exams, and due dates:

1. Participation in, or travel for, a College-sponsored event constitutes an excused absence only if you notify me in writing (or by email) at least one week prior to each absence.
2. I will not offer any makeup exams or quizzes for College-sponsored absences. If your travel schedule requires missing an exam or quiz, I will arrange for you to take the exam before you travel, or for a faculty/staff member traveling with you to administer the exam during your trip. To avail of this option, you must notify me, in person, at least one week before your date of absence (preferably 2 weeks).
3. Assignment & homework due dates are firm -- no exceptions for extracurricular conflicts! If you have to miss class on a date when something is due, turn it in before your absence.

Academic accommodations

Students with a documented disability (e.g., physical, learning, psychiatric, visual, hearing, etc.) who need to arrange reasonable classroom accommodations must request accommodation memos from the Academic Enrichment Center (main floor of Lilly Library) and contact their instructors each semester. For greater success, students are strongly encouraged to visit the Academic Enrichment Center within the first two weeks of each semester to begin the process. For further details, please visit https://www.earlham.edu/academic-enrichment-center/disability-services/

Other sources of help

1. The Academic Enrichment Center: The Academic Enrichment Center (AEC), located in Lilly Library, provides assistance with study habits and skills as well as a peer tutoring service. The AEC is staffed by trained peer tutors for either pre-arranged group tutoring sessions (provided for many math, science and social science courses) or one-on-one tutoring sessions for other courses. Peer tutoring is a free service offered to all Earlham students. Please visit http://www.earlham.edu/academic-enrichment-center/peer-tutoring/ for more information.

2. The Earlham Writing Center: The Writing Center is dedicated to providing students with advice and resources about writing. Students can meet one-on-one with trained consultants who will contribute feedback to writers at any stage of the writing process: brainstorming, drafting, researching, revising, and polishing. This is a free, walk-in service on the main level of Lilly Library. In addition to dropping by, students may also schedule an appointment in advance using the online scheduler found at: http://www.earlham.edu/writing-center/. If you have questions, please contact The Writing Center at writingcenter@earlham.edu.