MTH 251
Calculus I: Differential Calculus
Southwestern Oregon Community College
Fall 2021
MW 10:00 AM-11:50 AM; Sitkum 1
F 10:00 AM-10:50 AM; Sitkum 1

Instructor: Benjamin Holt
Email: benjamin.holt@socc.edu
Office Hours: MW 9-10 am and TR 1-2 pm in Sitkum 2C, or by appointment. If you prefer to ZOOM in to office hours, please let me know and I will be happy to set it up.

Textbook: Calculus, Volume 1, Edwin Herman, Gilbert Strang, ISBN 978-1-947172-13-5 (The electronic version is freely available on the course website. Printed copies are available in the campus bookstore for the cost of printing.)

Calculus I, Differential Calculus: Pre-calculus concepts and principles; limits and their properties, continuous functions; derivatives and their properties; the chain rule implicit differentiation; relative extrema, the first and second derivative tests; applications involving rectilinear motion of a particle and optimization of functions. This course covers the standard differential calculus topics required for engineering, mathematics, and science majors.

Required Outcomes: Upon completion of the course the learner will be able to:

1. Explain the significance and usefulness of limits and the concept of the derivative of a function as an instantaneous rate of change.
2. Recognize indeterminate forms and apply l'Hôpital's Rule to resolve the indeterminate form.
3. Explain the relationship between derivatives and intervals of increase, decrease, concavity, extrema, and the first and second derivative tests.
4. Evaluate limits and derivatives of functions by analytical methods.
5. Utilize differential calculus to analyze a continuous function and sketch its graph, with particular emphasis on intervals of increase, decrease, extrema, and concavity.
6. Utilize differential calculus concepts in application problems.
7. Utilize a systematic analysis approach to obtain solutions to unfamiliar problems with confidence.

Office Hours & Email. Every MTWR from I have set aside an hour to meet with all of you EITHER in Sitkum 2C OR on ZOOM. During this time you may also get a hold of me via email if you prefer: `benjamin.holt@socc.edu`.

My turn-around time for email is 24 to 48 hours on weekdays. I will not be answering emails during the weekend.

I really do hope that you will take advantage of this time. Working with you is the best part of my job! :D

In-Class Lectures & Supplemental Video Lectures. In addition to the in-class lectures and collaborative sessions, there is a video for each topic outlining the points covered in the course textbook. If you cannot make it to class, I encourage you to watch the videos and attempt some of the homework right away before visiting office hours. You may find the videos here:

`https://holt.blue/MTH_251/lecture_videos.html`

The schedule of topics this course will cover is on the last page of the syllabus.

Collaborative Help Sessions. Over the course of the term there will be seven *Collaborative Help Sessions* to help you with homework and to answer any other questions you have about the course. It may be a simple question-and-answer session, or it may be collaborative activities that I have planned. These help sessions are all scheduled for Friday, and you may find the dates in the course schedule on the last page of this syllabus.

Assessing Course Progress

The next series of items will be used to assess student success in achieving course outcomes.

myOpenMath Homework: There will be a homework assignment for each section we cover in this course. Each assignment is completed online using a free service called myOpenMath:

`https://www.myopenmath.com`

You will need to go to myOpenMath and create an account by clicking on the link "Register as a new student" on the right-hand side of the page. You will be asked to provide some basic information.

You will also need to provide a course ID and Enrollment Key which I have either provided or will provide to you through myLakerLink (eLearning).

Once you are registered, you will be able to access course assignments either through myOpenMath itself, or through myLakerLink. The first assignment is an introductory assignment which will get you familiar with myOpenMath.

The due dates for all assignments are given in the course schedule on the last page of this syllabus and are also on myLakerLink.

Each assignment grade is a percentage. Your average of these percentages is your homework grade. Your homework grade is worth 15% of the course grade.

Hometown Data Modeling Project: Students are required to complete a data modeling project using data from their hometown. The components of the project are:

1. Find population and average-high-temperature data about your hometown.
2. Do analysis on your data by fitting curves to the data.
3. Apply calculus techniques on these curves to draw conclusions.

Part I: Get Your Data, Fit Your Models. You may may get your population and temperature data from any credible source. You may use wikipedia as long as you cite the sources which they used to write the article about your hometown. Once you have your data, you will fit curves to them and analyze them using calculus techniques.

Part II: Write Your Report. Your report must also have a title page with all of the appropriate information such as title, your name, etc. The report must also be typewritten and all graphs and accompanying figures must be made electronically with a statistical software program. All mathematical notation should also be typewritten. For details on how to write your report, please visit `http://holt.blue/MTH_251/project.html`

An example of a written project can be found here:

`http://holt.blue/MTH_251/Projects/hometown.pdf`

The hometown data modeling project is worth 10% of the course grade and is due on Wednesday, 11/17.

Exams: There will be three exams over the course of the term covering material up to each exam. Every exam will consist of 4 true/false quiz questions (5 points each) and 4 homework style problems (20 points each) drawn randomly from our test question bank which consists of problems very similar or identical to those in the myOpenMath homework.

Every exam you take in this class will generated from

`http://holt.blue/MTH_251/exam.html`

and there you may generate as many practice exams as you like.

If for reasons beyond your control (you must submit proof[1]) you will be absent on the day of an exam, you must let me know BEFORE THE EXAM so we can discuss options. If you can't provide proof and you don't let me know before the exam, you forfeit the opportunity to take the exam for full credit. Unjustified make-up exams are worth 80% of full credit (a reduction of 2 full letter grades). All make-up exams must be taken BEFORE the next exam.

Final Exam: The final exam will be NOT be cumulative and will have the same format and weight as the other 2 exams (4 quiz questions and 4 homework style questions randomly drawn from the entire test bank). The final exam will given ONLY on the day that is scheduled by the college: **Monday, November 22nd, 10:00AM - 11:50AM**.

Calculators & Technology: For the exam you may use the TI 30XIIS calculator. If there is another calculator that you would like to use, you need to get permission with me beforehand. You MAY NOT use any online resources during the exam.

Course Grade: Your course grade is determined by the following items and their associated weights:

Homework	myOpenMath Assignment for each section, 100 pts each	15%
Project	Hometown Data Modeling Project	10%
Exam I	Functions & Limits (Chapters 1 & 2)	25%
Exam II	Derivatives (Chapter 3)	25%
Exam III	Applications of Derivatives (Chapter 4)	25%

Your final course grade is determined by the formula

$$15\left(\frac{\text{HW Points}}{\text{Total \# HW Points}}\right)+10\left(\frac{\text{\# Project Points}}{\text{100 Points}}\right)+75\left(\frac{\text{Exam Points Earned}}{\text{300 Points}}\right)$$

The letter grade equivalents to the above course grade are:

$90 \leq$ Course Grade < 100	A
$80 \leq$ Course Grade < 90	B
$70 \leq$ Course Grade < 80	C
$60 \leq$ Course Grade < 70	D
Course Grade < 60	F

Grades on myLakerLink: Your grades for each graded item will be posted into the eLearning Course Management System which is accessed through myLakerLink. Only you will be able to access your grades. This will allow you to not only assess your grade as the

[1] Doctor's note, jury service certificate, etc. Notes from parents and travel arrangements are not accepted.

semester progresses, it will also allow you to check that I have entered your scores correctly in my grade book.

Tutoring: In addition to office hours I highly recommend that you visit the tutoring center on the 3rd floor of the Tioga building. There are tutors there waiting to help you!

Also, tutoring services are FREEEEEEEEEEEEEEEEEEEE!!!!!

Accommodations: If you have accommodations through Educational Support Programs & Services (ESPS) and would like to use them for a any part of this course, you are welcome to do so and you will have my full support.

Classroom Conduct: While it is true that this course is highly interactive and your participation is highly encouraged and is a key part of this course, it is explicitly forbidden to converse with other students when it is not appropriate. These situations include, but are not limited to, when I am lecturing and when students are presenting solutions to the class. Audible communication is disruptive and distracting not only myself, but to your fellow students as well. Please respect the time and money your fellow students have invested in this class.

IF COURSES ARE MOVED TO AN ONLINE FORMAT. In the case that courses are moved into an online format there will be two changes that we will make:

1. All in-person lectures will be replaced by lecture videos which are already online. You will be expected to watch each video on the day a topic is scheduled.

2. Exams will be proctored by me via ZOOM. On exam day we will still meet at the time and date specified on the last day of the syllabus, but the meeting will be held over ZOOM instead. In this case, I will provide ample instructions for how to take your exam.

All other course procedures will remain the same. For example, doing the online homework will remain unaffected.

SWOCC Policies and Guideliness

Course Hours Southwestern's Credit Hour Administrative Policy (APP 8191) stipulates that credit-bearing courses, regardless of delivery method, are scheduled and conducted in compliance with the definition of the credit hour as set forth in Section 600.2 and 600.24 of the Code of Federal Regulations and the NWCCU Policy on Credit Hour. For this reason, students are expected to complete a minimum of two hours of out-of-class student work per credit hour each week for the quarter.

Children in the Classroom: Children represent a disruptive element for the classroom.

They also increase the risk of accidents occurring in the laboratory. For those reasons, children should not be brought to either the classroom or the laboratory.

Classroom Behavior: Instructors have the responsibility to set and maintain standards of classroom behavior appropriate to the discipline and method of teaching. Students may not engage in any activity which the instructor deems disruptive or counterproductive to the goals of the class. Students are required to keep cell phones, beepers, and pagers off during class lectures, unless there is permission in advance from the instructor. Instructors have the right to remove offending students from class. Repetition of the offense may result in expulsion from the course.

Academic Honesty: Cheating, plagiarism, and other acts of academic dishonesty are regarded as serious offenses. Instructors have the responsibility to submit, in a written report to the Dean of Students any such incident that cannot be resolved between the instructor and student. The policy of the Board of Education of Southwestern Oregon Community College on Student Rights, Student Code of Conduct, and Student Grievance Procedure outlines penalties ranging from admonition to expulsion from the class or college. In the policy, academic plagiarism is defined as: The intentional submission for evaluation to a college instructor or administrator of material based, in significant part, on work done by someone other than the submitter without reasonable written indication to the evaluator of the materials true source. Academic cheating is defined as The intentional submission for evaluation to a college instructor or administrator of material based, in part, on a source or sources forbidden by generally accepted standards or by regulation established by the evaluator and disclosed in a reasonable manner. The complete policy, student rights and responsibilities, penalties, and recourse through the Grievance Procedure can be found in the Student Handbook

`https://www.socc.edu/images/studentlife/Student_Handbook_2017-18.pdf`

`http://www.socc.edu/studentlife/pgs/bmdoc/socc-hb.pdf`

Academic Ethics and Confidentiality: It is the responsibility of everyone engaged in the learning experience to respect the rights and feelings of their fellow learners. Information gathered in the classroom and from on-line discussions and exercises is to be considered confidential. At the same time, students must recognize that the instructor and the College cannot guarantee the confidentiality of what the student may choose to disclose. Students must use their own discretion when engaging in classroom discussion.

Student Conduct:

Opt #1: Students must read and be familiar with the Code of Conduct as published in the Student Handbook, policies and procedures as outlined in campus publications, Southwestern Oregon policies.

Opt. #2: Students in this (or any) program of study should be especially aware of the severe consequences of plagiarism. Students that submit work that is not their own will be dealt with quickly and severely. It will be the recommendation of the faculty to remove such students from the College.

Opt. #3: Students that have a concern regarding any inappropriate conduct should bring it to the attention of their instructor, advisor, or Department Chair immediately. Inappropriate conduct situations will be reviewed immediately.

Opt. #4: Students taking this course should be aware of the potential diversity of the artistic perception of the participants - particularly as applicable to violence, artistic statements, and nudity. Please keep your material and remarks professional and appropriate and be sensitive to individuals that have views different than your own.

Americans with Disability Act Disability Accommodation Statement: Southwestern recognizes the contribution that a diverse student body brings to the educational experience. If you have a documented dis- ability that may require assistance, inform your instructor and then contact the Disability Services Office for coordination of your academic accommodations. To ensure that your instructor is aware of your request, you are required to set up an appointment to talk with them sometime during the first two weeks of the term. The Disability Services Office is located on the Southwestern campus in Student Support Services, Stensland Hall. Please call the following number for more information (541) 888-7405.

Equal Opportunity: It is the policy of the College that no one shall be excluded from participation, denied benefits, or be subjected to discrimination or harassment in any activity of the College community because of race, religion, color, sex, national origin, political affiliation, marital status, parental status, veteran status, disability, age or sexual orientation. Equal educational opportunity includes: admission, recruitment, extra- curricular programs and activities, housing, facilities, access to course offerings, counseling and testing, financial assistance, employment, health and insurance services, and athletics. Inquiries these regulations should be directed to the College's Equal Opportunity Officer and/or Title IX Coordinator:

Tim Dailey, Title IX Coordinator, Email: tdailey@socc.edu, Phone: (541) 888-7439

Affirmative Action: Inquiries regarding application of these and other regulations should be directed to the Colleges Affirmative Action Officer and/or Title IX Coordinator:

Tim Dailey, Title IX Coordinator, Email: tdailey@socc.edu, Phone: (541) 888-7439

Notice of Non-Discrimination: Students, their families, employees and potential em-

ployees of the Southwestern Oregon Community College District are hereby notified that Southwestern Oregon Community College does not discriminate on the basis of race, color, gender, sexual orientation, marital status, religion, national origin, age, disability status, gender identity, or protected veterans in employment, education, or activities as set forth in compliance with federal and state statutes and regulations. Any persons having inquiries concerning Southwestern's compliance with Title II, Title IV, Title VI, Title VII, Title IX and/or Section 504 or wish to make a complaint may contact the Colleges Affirmative Action Officer:

Jeff Whitey
Interim Vice President of Administrative Services
Southwestern Oregon Community College
1988 Newmark Ave., Tioga Hall, Room 511
Coos Bay, OR 97420
(541) 888-7402

Southwestern Oregon Community College offers the following career and technical education programs for all students regardless of race, color, gender, sexual orientation, marital status, religion, national origin, age, disability status, gender identity or protected veteran status, including those with limited English proficiency: Business, Office Technology, Computer Technology, Childhood Education, Criminal Justice, Culinary, Fire Sciences, Health Sciences, and Welding and Fabrication. Persons seeking further information concerning the vocational education offerings and specific pre-requisite criteria should contact:

Ali Mageehon
Vice President of Instruction and Student Services
Southwestern Oregon Community College
1988 Newmark Ave., Tioga Hall, Room 506
Coos Bay, OR 97420
(541) 888-7417
ali.mageehon@socc.edu

Class Cancellations (Faculty Absence): Notices of class cancellations at SWOCC are made through an automated system called RAVE. Notices of class cancellations due to faculty absence will be sent to through the following devices: Voicemail to cell phone, text to cell phone, and email to college email account. To receive these important notices, please update your cell phone, telephone and email contact information through myLakerLink, click on the Student Information tab, then Rave User Portlet.

The policies outlined in this syllabus are subject to change with prior notice.

Course Schedule

Day	Section	Topic	Due 11:55 pm
M 9/13		Course Introduction	
	1.1	Review of Functions	
W 9/15	1.2	Basic Classes of Functions	myOpenMath Intro Assignment
	1.3	Trigonometric Functions	
F 9/17		*Collaborative Help Session*	
M 9/20	1.4	Inverse Functions	Sections 1.1, 1.2, 1.3
	1.5	Exponential and Logarithmic Functions	
W 9/22	2.1	A Preview of Calculus	
	2.2	The Limit of a Function	
F 9/24		*Collaborative Help Session*	
M 9/27	2.3	The Limit of a Function	Section 1.4, 1.5, 2.1, 2.2
	2.4	Continuity	
W 9/29	2.5	The Precise Definition of a Limit	
F 10/1		*Collaborative Help Session*	
M 10/4	3.1	Defining the Derivative	Sections 2.3, 2.4, 2.5
	3.2	The Derivative as a Function	
W 10/6	3.3	Differentiation Rules	
	3.4	Derivatives as Rates of Change	
F 10/8		**Guide for Exam I**	
M 10/11		**Exam I: Chapters 1 & 2**	
W 10/13	3.5	Derivatives of Trigonometric Functions	
	3.6	The Chain Rule	
F 10/15		*Collaborative Help Session*	
M 10/18	3.7	Derivatives of Inverse Functions	Sections 3.1, 3.2, 3.3, 3.4, 3.5
	3.8	Implicit Differentiation	
W 10/20	3.9	Derivatives of Exponential and Logarithmic Functions	
F 10/22		*Collaborative Help Session*	
M 10/25	4.1	Related Rates	Sections 3.6, 3.7, 3.8, 3.9
W 10/27	4.2	Linear Approximations and Differentials	
	4.3	Maxima and Minima	
F 10/29		**Guide for Exam II**	
M 11/1		**Exam II: Chapter 3**	
W 11/3	4.4	The Mean Value Theorem	
	4.5	Derivatives and the Shape of a Graph	
F 11/5		*Collaborative Help Session*	
M 11/8	4.6	Limits at Infinity and Asymptotes	Sections 4.1, 4.2, 4.3, 4.4
W 11/10	4.7	Applied Optimization	
F 11/12		*Collaborative Help Session*	
M 11/15	4.8	L'Hôpital's Rule	Sections 4.5, 4.6, 4.7
W 11/17	4.9	Newton's Method	Hometown Data Modeling Project
	4.10	Antiderivatives	
F 11/19		**Guide for Exam III**	
M 11/22		**Exam III: Chapter 4 (10 am to 11:50 am)**	Sections 4.8, 4.9, 4.10