MATH 1380

SYLLABUS Fall 2020

The University of Iowa
The College of Liberal Arts and Sciences
Department of Mathematics

Calculus and Matrix Algebra for Business MATH:1380:000A

Zoom code for Lecture: 12:30 - 1:20 MWF 941 8608 8992

Some of the policies relating to this course (such as the drop deadline) are governed by its administrative home, the College of Liberal Arts and Sciences, 120 Schaeffer Hall.

Prerequisites: MATH:1340 with a minimum grade of C- or MPT Level 3 score of 9 or higher or MATH:1020 with a minimum grade of C- or ALEKS score of 65 or higher or MATH:1440 with a minimum grade of C- or MATH:1005 with a minimum grade of C-

Approved GE: Quantitative or Formal Reasoning.

Instructor: Xiaoyi Zhang
Office hours: 10:30-12:00 MW, **Zoom Code for OH: 980 7833 6255** or by appointment
Phone: 319-335-0785
E-mail: xiaoyi-zhang@uiowa.edu
Website address:
TA: Anna Leinheiser 0231 2:00-2:50TTh https://uiowa.zoom.us/j/92870677211
Office Hour: TBA
Elise Askelsen 0331 3:30-4:20 TTh B70 PBSB
Office Hour: Tuesdays 2:00-3:00 PM https://uiowa.zoom.us/j/95296375601

Supervisor: For this course, see the DEO.
DEO Contact Information: Professor Weimin Han, 14 MLH, 319-335-0714, weimin-han@uiowa.edu

Description of Course:

This course includes the study of mathematical problems arising in management and economic sciences and is intended for those planning to major in business. Topics include an introduction to differential and integral calculus, linear equations, and matrices. Examples in business are used to motivate the mathematical presentations. Each week there are three lectures given by a faculty member; these are augmented by two meetings of a discussion section directed by a TA. Requirements usually include two 50 minutes midterm exams on the discussion sections and a final

exam, plus quizzes during discussion periods. All the quizzes and exams are online. Students are required to turn on camera while taking exam and submit their work instantly to their TA. Students are encouraged to use the Math Tutorial Laboratory for additional help.

Objectives and Goals of the Course:

The objectives for a student taking MATH:1380 are to have a solid understanding of basic concepts and applications of single variable differential and integral calculus and the ability to apply those ideas to applications in business, finance, and management.

MATH:1380 begins with a review of important pre-calculus topics including basic algebra, graphs, and important functions. We begin the principal topics of the course with limits of functions, and then proceed to the definition and interpretation of the derivative of a function. The course continues with techniques for computing derivatives which will be used to compute derivatives of specific types of functions including polynomial and rational functions, algebraic functions, and especially logarithmic and exponential functions. Following this, we study higher derivatives and learn how derivatives can be applied to graphing functions and optimization problems. Examples include optimization of profit, cost, and revenue, and elasticity of demand. The course continues with the definition of the definite integral of a function, which measures accumulated change. We will study the Fundamental Theorem of Calculus, and learn some basic techniques for evaluating definite integrals. Integrals will then be applied to topics in finance and economics including revenue streams and consumer and producer surplus. The final topic for MATH:1380 is linear algebra. We study systems of linear equations and their solutions, matrices and matrix operations including matrix multiplication and matrix inverses.

Required text: "*Calculus with Applications*", University of Iowa Custom 11th edition, ISBN 9781323404232 Note: This University of Iowa Custom Edition consists of chapters 2-8 from "*Calculus with Applications"*, 11th edition, by *Lial, Greenwell, and Ritchey.*

And an additional chapter from "*Finite Mathematics with Applications In the Management, Natural, and Social Sciences" by Lial, Hungerford, Holcomb, and Mullins*.

https://math.uiowa.edu/undergraduate-program/course-information/book-list

ICON direct textbook. The ICON Direct program will be used to provide required course materials via your ICON course site. Your U-Bill will be charged automatically by the Iowa Hawk Shop after your course has started, unless you opt out prior to the last day for tuition and fee reduction course deadline. Specific opt out information will be provided in the course syllabus and in the opt out tool.

Material to be covered: The Chapters are from the text above. ICON direct textbook

Chapter 1. Linear Functions: Slopes and Equations of Lines, Linear Functions and Applications
Chapter 2. Nonlinear Functions: Properties of Functions, Quadratic Functions, Translation and Reflection, Polynomial and Rational Functions, Exponential Functions, Logarithmic Functions
Chapter 3. The Derivative: Limits, Continuity, Rates of Change, Definition of the Derivative

Chapter 4. Calculating the Derivative: Techniques for Finding Derivatives, Derivatives of Products and Quotients, The Chain Rule, Derivatives of Exponential Functions, Derivatives of Logarithmic Functions
Chapter 5. Graphs and the Derivative: Increasing and Decreasing Functions, Relative Extrema, Higher Derivatives, Concavity, and the Second Derivative Test, Curve Sketching
Chapter 6. Applications of the Derivative: Absolute Extrema, Applications of Extrema, Business Applications: Economic Lot Size, Economic Order Quantity, Elasticity of Demand, Implicit Differentiation, Related Rates
Chapter 7. Integration: Anti-derivatives, Substitution, Area and the Definite Integral, The Fundamental Theorem of Calculus, Area Between Two Curves, Numerical Integration
Chapter 8. Further Techniques and Applications of Integration: Integration by Parts, Volume, Average Value, Continuous Money Flow, Improper Integrals
Supplementary Chapter: Systems of Linear Equations and Matrices:
Solution of Linear Systems, The Echelon Method, The Gauss-Jordan Method, Addition and Subtraction of Matrices, Multiplication of Matrices, Matrix Inverses, Input-Output Model.

Grading:

Norm-based grading is used in the course which is based on how others in each of the discussion section perform. The distribution of grades may be based on CLAS recommendations.

Grading System: Plus/minus grading will be used.
40% 2 midterms (October, 6 and November 10)
30% Final exam (date, time to be announced)
15% Quiz. About every week except exam weeks (around 10), first and last weeks of the semester
15% Homework, assigned weekly on mymathlab, and usually due midnight on Sundays.

Midterm exams:
Midterm 1: October 6, in each discussion section.
Midterm 2: November 10, in each discussion section.

All exams are comprehensive, unless specified otherwise.

A Word about the Date and Time of the Final Exam: The date and time of every final examination is announced by the Registrar generally by the fifth week of the classes. **No exams of any kind are allowed during the last week of classes.** All students should plan on being at the UI through the final examination period. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar's web site and will be shared with instructors and students. It is the student's responsibility to know the date, time, and place of the final exam.

Make-up policy:

As stated in CLAS webpage: https://clas.uiowa.edu/faculty/student-attendance-and-absences:

"University policy requires that students be permitted to make up examinations missed because of illness, mandatory religious obligations, authorized UI activities, or unavoidable circumstances. An unavoidable circumstance is defined as an event beyond the student's control and often involves a serious and unexpected hospitalization, a family tragedy, or a related incident. Such circumstances **do not include** attendance at a wedding, a family vacation, obligations related to work or other such matters. The instructor of a student participating in an authorized UI activity is sent a statement generally by email from the UI official in charge of the event before the absence occurs; this statement will include the specific date and time that the student will miss class. Activities related to employment, fraternities or sororities, or volunteer activities are not UI authorized activities."

Student Collaboration: Student collaboration is NOT permitted on exams. Any attempt to collaborate during exams will result in a 0 score on that test. In this class, students are allowed to talk with others about homework. However, do not share your solution with others or ask others to see their completed assignments since both are considered academic misconduct. In other words, you can discuss a problem with other students, but you write your solution alone. If you need help, please stop by during the office hours. Students are responsible for understanding this policy; if you have questions, ask for clarification

Other Course Policies:

1. Students are expected to attend all lectures, and do all of the homework regularly. Homework should be submitted on time through Mymathlab. No late homework submission will be accepted in any circumstances. Students are responsible for everything covered in the lectures, textbook and the prerequisites. Important announcements about changes (if necessary) to the syllabus, homework, exams, etc. will be done in the lectures or they will be e-mailed to your UI e-mail address.
2. There may be weekly quizzes. The format of the quiz depends on delivery mode of each section. Quizzes consist problems similar to those assigned as homework. Taking all quizzes and all exams (midterms and final) is mandatory. In the exams, you are expected to show all of your work in an organized and coherent fashion. In the long problems, all work must be shown, and giving only a final solution obtained by guessing or using a calculator may not earn full credit. Make-ups may be given for the exams missed due to unavoidable circumstances and compelling reasons which are documented in writing. If you have a conflict or a medical reason, discuss your situation with your lecturer as soon as possible.
3. There are two midterm exams during each discussion section. The midterm exams depend also on the delivery mode of each discussion section.
4. If in the middle of the lecture we encounter the internet problem, please wait in the zoom, usually the internet will be restored within 5 mins. In some unexpected severe weather condition when the internet is disconnected for a long time, recording of the lecture will be uploaded on ICON afterwards.
5. You are strongly encouraged to go to your lecturer's office hours as well as your TAs. Make an appointment, if you have a conflict with the listed office hours.
6. Cell phones must be turned off during the lectures and exams. During the exams, you cannot hold them in your hand, not keep them on your desk, chair, or anywhere easily accessible, and you cannot use it as a calculator. If the exam is taken online, the desk scan will be

performed before the exam. The items that are required to put on the table are: pen (pencil), eraser, scientific calculator, scratch paper and personal note.

Resources for Students:
Math Tutorial Lab: 125 MLH http://www.math.uiowa.edu/math-tutorial-lab
Students will find the Writing Center and the Speaking Center very useful for this course:
Writing Center: http://www.uiowa.edu/~writingc/
Speaking Center: http://clas.uiowa.edu/rhetoric/for-students/speaking-center
Supplemental Instructions: S 5:00-5:50pm, T 2:00-2:50 pm, W 2:30 - 3:20 am
https://tutor.uiowa.edu/find-help/supplemental-instruction/calculus-and-matrix-algebra-for-business-math1380/.

Notes to the Students:

1. All students in the College have specific rights and responsibilities. You have the right to adjudication of any complaints you have about classroom activities or instructor actions. Information on these procedures and your responsibilities is available in the Schedule of Courses and on-line in the College's Student Academic Handbook, (https://clas.uiowa.edu/students/handbook) In summary, first see the person you wish to complain about, and then see his/her immediate supervisor. The chain is: graduate or undergraduate assistants, then the primary instructor, then the Chairman of the Department of Mathematics, and then an appropriate Dean. The Department of Mathematics has offices in 14 MLH (MacLean Hall). To make an appointment to talk to the chairman of the department call 335-0714 or contact the departmental secretary in 14 MLH.
2. We would like to hear from anyone who has a disability which may require some modification of seating, testing, or other class requirements so that appropriate arrangements may be made. Please contact your lecturer during his office hours, in the beginning of the semester and far in advance of the exams. You should notify the Office of Student Disability Services, SDS and obtain the form(s) needed. The necessary modifications will be made available to you after the SDS processes and approves your request.
3. We are planning to use ICON for posting grades and other course material. Also, some announcements may be e-mailed through ICON to your UI e-mail. Check ICON and your UI e-mail regularly, and make sure that UI has your correct e-mail address.
4. This course plan may be modified during the semester. All changes will be announced in class in advance. It is solely the student's responsibility to be informed of such announced changes.

CLAS Teaching Policies & Resources
https://clas.uiowa.edu/faculty/teaching-policies-resources-syllabus-insert

Absences and Attendance

Students are responsible for attending class and for contributing to the learning environment of a course. Students are also responsible for knowing their course absence policies, which will vary by instructor. All absence policies, however, must uphold the UI policy related to student illness, mandatory religious obligations, including Holy Day obligations, unavoidable circumstances, or

University authorized activities (https://clas.uiowa.edu/students/handbook/attendance-absences). Students may use the CLAS absence form to aid communication with the instructor who will decide if the absence is excused or unexcused. The form is located on ICON within the top banner under "Student Tools."

Academic Integrity

All undergraduates enrolled in courses offered by CLAS have, in essence, agreed to the College's Code of Academic Honesty. Misconduct is reported to the College, resulting in suspension or other sanctions, with sanctions communicated with the student through UI email. Visit this page for information: (https://clas.uiowa.edu/students/handbook/academic-fraud-honor-code).

Accommodations for Disabilities

UI is committed to an educational experience that is accessible to all students. A student may request academic accommodations for a disability (such as mental health, attention, learning, vision, and physical or health-related condition) by registering with Student Disability Services (SDS). The student is then responsible for discussing specific accommodations with the instructor. More information is at https://sds.studentlife.uiowa.edu/.

Administrative Home of the Course

The College of Liberal Arts and Sciences (CLAS) is the administrative home of this course and governs its add/drop deadlines, the second-grade-only option, and related policies. Other colleges may have different policies. CLAS policies may be found here: https://clas.uiowa.edu/students/handbook.

Classroom Expectations

Students are expected to comply with University policies regarding appropriate classroom behavior as outlined in the Code of Student Life. This includes the policies and procedures that all students have agreed to regarding the Steps Forward for Fall 2020 in response to the COVID-19 pandemic. Particularly, all students are required to wear a face cover when in a UI building, including a classroom. In addition, the density of seats in classrooms has been reduced. In some instances, this will allow 6 feet or more of distance while other cases, it may be less. Regardless, wearing face coverings and maintaining as much distance as is possible are vital to slowing the spread of COVID-19. In the event that a student disrupts the classroom environment through their failure to comply with the reasonable directive of an instructor or the University, the instructor has the authority to ask that the student immediately leave the space for the remainder of the class period. Additionally, the instructor is asked to report the incident to the Office of Student Accountability for the possibility of additional follow-up. Students who need a temporary alternative learning arrangement related to COVID-19 expectations should contact Student Disability Services (https://sds.studentlife.uiowa.edu/fall-2020/covid-19-temporary-learning- arrangements/; +1 319 335-1462).

Class Recordings: Privacy and Sharing

Some sessions of a course could be recorded or live-streamed. Such a recording or streaming will only

be available to students registered for the course. These recordings are the intellectual property of the faculty, and they may not be shared or reproduced without the explicit written consent of the faculty member. Students may not share these sessions with those not in the class; likewise, students may not upload recordings to any other online environment. Doing so is a breach of the Code of Student Conduct and, in some cases, a violation of the Federal Education Rights and Privacy Act (FERPA).

Communication and the Required Use of UI Email

Students are responsible for official correspondences sent to the UI email address (uiowa.edu) and must use this address for all communication within UI (Operations Manual, III.15.2).

Complaints

Students with a complaint about an academic issue should first visit with the instructor or course supervisor and then with the Chair of the department or program offering the course; students may next bring the issue to the College of Liberal Arts and Sciences; see this page for more information: https://clas.uiowa.edu/students/handbook/student-rights-responsibilities.

Final Examination Policies

The final exam schedule is announced around the fifth week of classes; students are responsible for knowing the date, time, and place of a final exam. Students should not make travel plans until knowing this information. No exams of any kind are allowed the week before finals with a few exceptions made for particular types of courses such as labs or off-cycle courses: https://registrar.uiowa.edu/final-examination-scheduling-policies.

Nondiscrimination in the Classroom

The University of Iowa is committed to making the classroom a respectful and inclusive space for people of all gender, sexual, racial, religious, and other identities. Toward this goal, students are invited in MyUI to optionally share the names and pronouns they would like their instructors and advisors to use to address them. The University of Iowa prohibits discrimination and harassment against individuals on the basis of race, class, gender, sexual orientation, national origin, and other identity categories set forth in the University's Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity (https://diversity.uiowa.edu/eod; +1 319 335-0705 or (diversity.uiowa.edu)

Sexual Harassment

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community must uphold the UI mission and contribute to a safe environment that enhances learning. Incidents of sexual harassment must be reported immediately. For assistance, please see https://osmrc.uiowa.edu/.