

Math 2413 Honors Calculus I

PROFESSOR CONTACT INFORMATION:

Professor: Vinh Dang, Ph.D.

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Office Hours M/W: 11am-1pm
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WELCOME TO:

Term and Year: Spring 2017

Course Title: MATH 2413

Course Subject: CALCULUS I

Course Sections: 1103, 1104

Class Days & Times: M/W 8-10:15am

Class Room Locations: Winship 117

Credit Hours: 4

COURSE OVERVIEW:

Math 2413 is designed to present the basic techniques of differential and integral calculus and some of their applications. Calculus I emphasizes limits, continuity, derivatives of algebraic, trigonometric, natural exponential, and natural logarithmic functions. Applications such as curve sketching, optimization, and related rates are discussed. Following this is an introduction to integral calculus including Riemann Sums, The Fundamental Theorem of Calculus and the area between two curves.

The main goals of this Honors class are: 1) Students will gain proficiency in the essentials of the subject and develop strong problem solving skills. 2) Students will explore the widespread applications of calculus in science, engineering and economics. 3) Students will learn to communicate mathematical ideas (both verbal and written) clearly and effectively to their peers and general audience.

To achieve these goals, in addition to lectures which cover the fundamental material, a significant part of class time will be spent on discussing four mini-projects assigned throughout the semester. These projects are carefully designed to help students strengthen their problem solving skills by applying the

tools and techniques of calculus to solve problems in many other fields. They also help students critically reflect on the theoretical aspect of the subject and come up with questions for further explorations and generalizations. Furthermore, in the second half of the semester, students will be given the opportunity to research a topic, present their research to their classmates, and produce a poster summarizing their research. The topics can be chosen from the applications of calculus, the historical development of mathematics that led to calculus, or the development of mathematics after calculus.

This course differs from the non-honors course in that many activities are designed to let students embark on the journey that many mathematicians travel through when they develop original mathematical tools and solve complex applications. They usually start with small examples/questions and perform calculations to understand the examples. Then they work (usually in collaboration with others) to identify and understand the general patterns, derive formulas and theory, try to apply the formulas in other situations, run into problems, come up with questions and try to address these further questions and problems to enrich and deepen their knowledge. Finally, for their theory and knowledge to be useful, they also need to explain and communicate the ideas effectively to others. Working through projects and doing research in interesting mathematical topics will help students understand how scientists, engineers and mathematicians think about problems, formulate hypotheses, research and resolve the problems and communicate their results. Learning to present their research to their peers will help student communicate complicated and technical ideas clearly and effectively.

Honors Learning Outcomes:

1. To help students develop effective written communication skills (including the ability to make effective use of information and ideas).
2. To help students develop oral communication skills.
3. To help students develop their ability to analyze and synthesize a broad range of material.
4. To help students understand how scholars think about problems, formulate hypotheses, research those problems, and draw conclusions about them.
5. To help students become more independent critical thinkers, demonstrating the ability to use knowledge and logic when discussing an issue or an idea, while considering the consequences of their ideas, for themselves, for others, and for society.

GETTING READY:

Prerequisites: Precalculus (Math 2412). Engl 0305 or 0365 or higher level course or placement by testing

Required Materials:

Textbook: Calculus – Volume 1 – Openstax

The book can be access freely online at:

<https://openstax.org/details/calculus-volume-1>

(Please download the pdf version of the book)

WebAssign Online Homework System

Please register at <http://webassign.net/> by the end of Friday, January 20

The class key is: **lonestar.northharris 5181 9907**

Course Website: <http://apps.lonestar.edu/blogs/vindang/spring-2017/math-2413-honors-calculus-i/>

INSTRUCTOR GUIDELINES AND POLICIES:

FINAL GRADE CALCULATION:

WebAssign Homework	10%
3 Regular Exams and a Final Exam	60% (4 exams @ 15% each)
Four Mini-Projects:	20%
Final Presentation and Poster:	10%

GRADING POLICY:

90 – 100: A; 80 – 89: B; 70 – 79: C; 60 – 69: D; Below 60: F.

ATTENDANCE POLICY:

- Your attendance is critical. **I reserve the right to drop you after 3 or more absences.**
- If you anticipate missing class, please contact me in advance of your situation.
- You are expected to attend all classes, be on time and actively participate in class discussion.

HOMEWORK:

- The only way to learn mathematics is to DO mathematics. The homework is designed to help you understand the essential material and develop your problem solving skills. Understand these problems will also be very helpful when you work on the more involved problems and applications in the projects.
- The homework is assigned using WebAssign to provide you with valuable online resources and immediate feedback. The due date for each homework assignment is posted on WebAssign. Typically, there are online homework assignments due every week. I have made an effort to keep the number of problems in these assignments to a minimum so that you can solve them in a reasonable amount of time and obtain a thorough understanding of the basic material before getting started on the projects and your research topic. However, it is essential that you solve these problems to keep up with the fast pace of the course. Immediately work on the online homework for a section as soon as we finish covering that section in class.
- **I reserve the right to drop you after 5 or more zero homework assignments.**

REGULAR EXAMS/FINAL EXAM MAKE-UP POLICY:

- No make-up exams will be given. I do understand that schedules get hectic. Thus, if you know in advance that you will need to miss an exam, let me know and I will try to make an arrangement. The following guidelines will apply:
 - You must notify me both in person and via email.
 - You must notify me at least one week prior to the exam date.
 - If you wish to take the exam, you must take it before the regularly scheduled time.
 - Notice that a panicked cellphone call from the freeway on the morning of the exam does not fall into this category. Such an event is covered below.

- o Notice that asking me several days (or weeks or months) after the exam does not fall into this category. Such an event is covered below
- I also understand that unforeseeable events can occur. Hence, I will replace the lowest of your exam#1-3 scores with the score you make on the final exam, provided the score on the final exam is higher than your lowest regular exam scores. If you miss an exam, you will simply have your score from the final substituted for the missing score. The following guidelines will apply:
 - o The final exam will not be replaced. You must take the final.
 - o If you miss 2 exams, only one will be replaced.

USE OF PERSONAL ELECTRONIC EQUIPMENT IN CLASS:

- **Text messaging:** Out of courtesy to your classmates and your instructor, you are not permitted to use any form of electronic communication device during class. If you must have an electronic device turned on for emergency contact purposes, please inform me ahead of time. Then, if you receive a call, you may excuse yourself from class to conduct your business in the hall. You may then return to class when your business is completed.
- **PDA's, cell phones, and laptops:** Students may bring to class electronic equipment that can access the Internet, as long as the equipment is used with the instructor's knowledge and permission. Use of these devices in class for reasons other than pertaining to class, is prohibited, and students who do so, will be asked to leave the classroom.

BEHAVIOR:

I have zero tolerance for disruptive or disrespectful behaviors in class/web discussions/emails. Students who engage in such behaviors will be removed from the class room, or in more serious circumstances, dropped from the class. I will also remove any individual from the lectures/ discussions and/or the course who is deemed by me and/or others to be disrupting the educational process.

READING THE BOOK:

The textbook has thorough explanations and numerous interesting and important examples, clearly worked out. Therefore, I strongly recommend you read the sections that we are going to cover in class before coming to class. That way, we can use class time more effectively to go deeper into the intricate details of the material, concepts and techniques and discuss the projects and the interesting questions that you might have about the material.

WITHDRAWAL POLICY:

Withdrawal from the course after the official day of record and prior to "W" Day, (November 11th) will result in a final grade of "W" on your transcript. Instructor approval is necessary if you want to withdraw after official day. No credit will be awarded for a course earning a "W." If you stop attending class, you must withdraw at the registration office prior to "W" day. If you stop attending class and do not officially withdraw, you will receive an "F" for the course.

SIX DROP RULE:

Students who enrolled in Texas public institutions of higher education as first-time college students during the Fall 2007 term or later are subject to section 51.907 of the Texas Education Code, which states that an institution of higher education may not permit a student to drop (withdraw with a grade of

“W”) from more than six courses, including courses that a transfer student has previously dropped at other Texas public institutions of higher education that have already been counted against their six drop limit. Each student should fully understand this drop limit before you drop any course. Please see a Counselor or Advisor in our Student Services area for additional information and assistance.

Keep records of all work (including test scores) at least until you have received your grade from the admissions office following completion of the course. If you believe an error exists, communicate no later than ten days after the start of the next session / semester.

ACADEMIC INTEGRITY:

The Lone Star College System upholds the core values of learning: honesty, respect, fairness, and accountability. The system promotes the importance of personal and academic honesty. The system embraces the belief that all learners – students, faculty, staff and administrators – will act with integrity and honesty and must produce their own work and give appropriate credit to the work of others. Fabrication of sources, cheating, or unauthorized collaboration is not permitted on any work submitted within the system.

The consequences for academic dishonesty are determined by the professor, or the professor and academic dean, or the professor and chief student services officer and can include but are not limited to:

1. Having additional class requirements imposed,
2. Receiving a grade of zero or “F” for an exam or assignment,
3. Receiving a grade of “F” for the course,
4. Being withdrawn from the course or program,
5. Being expelled from the college system.

STUDENT BEHAVIOR EXPECTATIONS:

Students are expected to conduct themselves appropriately while on College property or in an online environment. Students may receive disciplinary action up to and including suspension, if they violate System or College rules, disrupt classes, or interfere with the opportunity of others to obtain an education. Students who pose a threat to the safety of others will be subject to immediate withdrawal from the classroom, campus environment, and/or online environment, as well as face subsequent criminal charges, as appropriate. Please refer to the Student Code of Conduct located online at <http://www.lonestar.edu/student-responsibilities.htm> for additional information.

AMERICANS WITH DISABILITIES ACT STATEMENT:

Lone Star College is dedicated to providing the least restrictive environment for all students. We promote equity in academic access through the implementation of reasonable accommodations as required by the Vocational Rehabilitation Act of 1973, Title V, Section 504 and the Americans with Disabilities Act of 1990 (ADA) which will enable students with disabilities to participate in and benefit from all post-secondary educational activities.

CAMPUS SAFETY AND SECURITY:

Lone Star College System is committed to maintaining the safety of the students, faculty, staff, and guests while visiting one of our campuses. See <http://www.lonestar.edu/safety-nh.htm> for details. Register at <http://www.lonestar.edu/12803.htm> to receive emergency notifications. In the event of an emergency, contact the police at 5911.

COMPUTER VIRUS PROTECTION:

Computer viruses are, unfortunately, a fact of life. Using flash drives on more than one computer creates the possibility of infecting additional computers and flash drives with computer viruses. This exposes college computers, personal computers, and any other computers to potentially damaging viruses. The college has aggressive anti-virus procedures in place to protect its computers, but cannot

guarantee that a virus might not temporarily infect one of its machines. It is your responsibility to protect all computers under your control and use and ensure that each flash drive you use, wherever you use it, has been scanned with anti-virus software.

EQUAL OPPORTUNITY STATEMENT:

It is the policy of the Lone Star College System to provide equal employment, admission and educational opportunities without regard to race, color, creed, national origin, gender, age, veteran's status, sexual orientation, or disability.

Lone Star Colleges strive to provide an excellent learning environment free from harassment or intimidation directed at any person's race, color, creed, national origin, gender, age, veteran's status, sexual orientation, or disability. Any form of harassment will not be tolerated.

FERPA:

The academic, financial, and non-directory information on your student account is confidential and protected by the Family Educational Rights & Privacy Act (FERPA). LSCS cannot release certain information to another person without your written authorization. The Authorization to Release Student Information Form can be found at http://www.lonestar.edu/departments/admissions/ARC-011_FERPA_Privacy_Request.pdf.

INTERNET AND EMAIL:

LSCS provides computing and network resources. You are encouraged to use the computers, software packages, and electronic mail (e-mail) for educational or System-related activities and to facilitate the efficient exchange of useful information. The equipment, software, and network capacities provided through the district computer services are the property of the System. Use of the equipment and networks is to comport with the policies and procedures of the System and access may be denied to any student who fails to comply with the System's policies and procedures regarding its use.

Access to the System's e-mail and similar electronic communications systems are a privilege and certain responsibilities accompany that privilege. All users are expected to demonstrate the same level of ethical and professional manner, as is required in face-to-face or written communications. Threatening, anonymous, or forged messages will be treated as a violation of this policy.

SOFTWARE PIRACY:

Law strictly prohibits unauthorized copying of software purchased by Lone Star College for use in laboratories. Lone Star College administration will take appropriate disciplinary action against anyone violating copyright laws.

RESOURCES:

Math Lab Tutoring: Students can get free help from tutors in MAC center (across the hall from the math office Win 115). No appointment is necessary and the Lab is staffed with a tutor or tutors during all the hours it is open.

Rhonda Cannon, Counselor for Math and Natural Sciences, is available in Winship 115G to assist you in meeting your academic, career, and personal goals.

Week Number	LECTURE MATERIAL	ASSIGNMENT
1		
JAN 18	2.1: A Preview of Calculus 2.2: The Limit of a Function	WebAssign HW1 and HW2 due Jan 27 by 11:59pm
2		
JAN 23	2.3: The Limit Laws Mini-Project 1 Discussion	WebAssign HW3 due Feb 3 by 11:59pm
JAN 25	2.4: Continuity Mini-Project 1 Discussion	WebAssign HW4 due Feb 3 by 11:59pm
3		
JAN 30	3.1:Defining the Derivative 3.2:The Derivative as a Function	WebAssign HW5 and HW6 due Feb 10 by 11:59pm Mini-project 1 due in class
FEB1	3.3: Differentiation Rules Mini-Project 2 Discussion	WebAssign HW7 due Feb 10 by 11:59pm
4		
FEB 6	3.4:Derivatives as Rates of Change 3.5: Derivatives of Trigonometric Functions	WebAssign HW 8 and HW9 due Feb 17 by 11:59pm
FEB8	3.6: The Chain Rule Mini-Project 2 Discussion	WebAssign HW10 due Feb 17 by 11:59pm
5		
FEB 13	3.7: Derivatives of Inverse Functions 3.8: Implicit Differentiation (Part 1)	WebAssign HW11 due Feb 24 by 11:59pm Mini-Project 2 due in class
FEB 15	3.8:Implicit Differentiation (Part 2) 3.9: Derivatives of Exponential and Logarithmic Functions	WebAssign HW12 and HW13 due Feb 24 by 11:59pm
6		
FEB 20	4.1:Related Rates Test 1 Review	WebAssign HW14 due Mar 3 by 11:59pm

Week Number	LECTURE MATERIAL	ASSIGNMENT
FEB 22	Test 1 Covers 2.1 through 3.9	
7		
FEB 27	4.2:Linear Approximations and Differentials 4.3:Maxima and Minima (Part 1)	WebAssign HW15 due Mar 10 by 11:59pm
MAR 1	4.3:Maxima and Minima (Part 2) 4.4:The Mean Value Theorem Mini-project 3 discussion	WebAssign HW16 and HW17 due Mar 10 by 11:59pm
8		
MAR 6	4.5:Derivatives and the Shape of a Graph Mini-project 3 discussion	WebAssign HW18 due Mar 17 by 11:59pm
MAR 8	4.6:Limits at Infinity and Asymptotes	WebAssign HW19 due Mar 17 by 11:59pm Mini-project 3 due in class
9		
Spring Break College Closed March 13-19, 2016		
10		
MAR 20	4.7: Applied Optimization Problems	WebAssign HW20 due Mar 31 by 11:59pm
MAR 22	4.8:L'Hôpital's Rule 4.9:Newton's Method	WebAssign HW21 and HW22 due Mar 31 by 11:59pm
11		
MAR 27	4.10: Antiderivatives Test 2 Review	WebAssign HW23 due April 7 by 11:59pm
MAR 29	Test 2 Covers 4.1 through 4.9	
12		
APRIL 3	5.1:Approximating Areas Mini-project 4 discussion	WebAssign HW24 due April 14 by 11:59pm

Week Number	LECTURE MATERIAL	ASSIGNMENT
APRIL 5	5.2: The Definite Integral Mini-project 4 discussion	WebAssign HW25 due April 14 by 11:59pm
13		
APRIL 10	5.3: The Fundamental Theorem of Calculus	WebAssign HW26 due April 21 by 11:59pm Mini-project 4 due in class
APRIL 12	5.5: Substitution	WebAssign HW27 due April 21 by 11:59pm
14		
APRIL 17	5.6: Integrals Involving Exponential and Logarithmic Functions Final Presentation Discussion	WebAssign HW28 due April 28 by 11:59pm
APRIL 19	5.7: Integrals Resulting in Inverse Trigonometric Functions Final Presentation Discussion	WebAssign HW29 due April 28 by 11:59pm
15		
APRIL 24	6.1: Areas between Curves Test 3 Review	WebAssign HW30 due May 5 by 11:59pm
APRIL 26	Test 3 Covers 4.10 through 5.7	
16		
MAY 1	Final Exam Review and Final Presentation Preparation	
MAY 3	Student Presentations	
17		
The Final Exam is on May 8, 2017 from 8 to 9:50am. The final exam is comprehensive.		