MATH 2413 – Calculus I Course Syllabus

Instructor contact information

Instructor: Phil Unruh  
Office Phone: 713-718-5874

Office: RM AD6  
Office Hours: 7:30-8:00AM, M-Th, 9:30-10:00 AM M-Th

E-mail: phil.unruh@hccs.edu  
Website: http://learning.hccs.edu/faculty/phil.unruh

Welcome to

Course Title: Calculus I  
Semester and Year: Fall, 2017
Course Prefix: Math  
Sec. 36155
Course Number: 2413  
Class Days & Times: MW 10:00-11:50 AM
Credit Hours: 4  
Lab Open
Lecture Hours: 4  
Class Room Location: RM 213
Lab Hours:

Course overview

Course Description
Math 2413: Calculus I. Topics includes: Limits and continuity; the Fundamental Theorem of Calculus; definition of the derivative of a function and techniques of differentiation; applications of the derivative to maximizing or minimizing a function; the chain rule, mean value theorem, and rate of change problems; curve sketching; definite and indefinite integration of algebraic, trigonometric, and transcendental functions, with an application to calculation of areas

Prerequisites: Math 2412: Pass with a “C” or better, or consent of the Department Head.

Course Intent: This course provides the background in mathematics for sciences, engineering, or further study in mathematics and its applications.

Audience: This course is a freshman level mathematics course which requires a background consisting of Math 2412.

Course Student Learning Outcomes (SLO):
Upon successful completion of this course, students will be able to:
1. Develop solutions for tangent and area problems using the concepts of limits, derivatives, and integrals.
2. Draw graphs of algebraic and transcendental functions considering limits, continuity, and differentiability at a point.
3. Determine whether a function is continuous and/or differentiable at a point using limits.
4. Use differentiation rules to differentiate algebraic and transcendental functions.
5. Identify appropriate calculus concepts and techniques to provide mathematical models of real-world situations and determine solutions to applied problems.
6. Evaluate definite integrals using the Fundamental Theorem of Calculus.
7. Articulate the relationship between derivatives and integrals using the Fundamental Theorem of Calculus.

Course Objectives:
Upon completion of this course, a student should be able to:
1. Describe the basic concepts of mathematical functions and the various types of functions, which exist.
2. Demonstrate knowledge of the concept of the limit of a function at a point and the properties such limits possess.
3. Demonstrate knowledge of the idea of continuity of a function
4. Differentiate various types of mathematical functions and know the meaning of the various orders of the derivatives including applications.
5. Recognize the discontinuity points of certain types of elementary functions.
6. Differentiate the trigonometric functions with applications.
7. Use calculus to sketch the curves of certain types of elementary functions
8. Demonstrate the ability to find antiderivatives involving polynomial and trigonometric functions.
9. Demonstrate the ability to evaluate a definite integral using Riemann sums.
10. Demonstrate the ability to compute the average value of a function over an interval.
11. Demonstrate an understanding of the Fundamental Theorem of Calculus.
12. Solve applied problems using definite integrals.
13. Find indefinite integrals with a change of variable.
14. Demonstrate the ability to evaluate the derivatives and the integral of Exponential functions.
15. Demonstrate the ability to evaluate the derivatives and the integral of logarithmic functions.
16. Demonstrate the ability evaluate derivatives of inverse functions

Course Outline
The instructor may choose to organize topics in any order, but the following material will be covered.

Chapter 1 – Limits and Their Properties
1.2 Finding Limits graphically and Numerically
1.3 Evaluating Limits Analytically
1.4 Continuity and One-Sided Limits
1.5 Infinite Limits

Chapter 2 – Differentiation
2.1 The Derivative and the Tangent Line Problem
2.2 Basic Differentiation Rules and Rates of Change
2.3 Product and Quotient Rules and Higher Order Derivatives
2.4 The Chain Rule
2.5 Implicit Differentiation
2.6 Related Rates

Chapter 3 – Applications of Differentiation
3.1 Extrema on an Interval
3.2 Rolle’s Theorem and the Mean Value Theorem
3.3 Increasing and Decreasing Functions and the First Derivative Test
3.4 Concavity and the Second Derivative Test
3.5 Limits at Infinity
3.6 A Summary of Curve Sketching
3.7 Optimization Problems
3.8 Newton’s Method
3.9 Differentials
Chapter 4 – Integration
4.1 Antiderivatives and Indefinite Integration
4.2 Area
4.3 Riemann Sums and Definite Integrals
4.4 The Fundamental Theorem of Calculus
4.5 Integration by Substitution

Chapter 5 – Logarithmic, Exponential, and Other Transcendental Functions
5.1 The Natural Logarithmic Function: Differentiation
5.2 The Natural Logarithmic Function: Integration
5.3 Inverse Functions
5.4 Exponential Functions: Differentiation and Integration

Core Objectives

Given the rapid evolution of necessary knowledge and skills and the need to take into account global, national, state, and local cultures, the core curriculum must ensure that students will develop the essential knowledge and skills they need to be successful in college, in a career, in their communities, and in life. Through the Texas Core Curriculum, students will gain a foundation of knowledge of human cultures and the physical and natural world, develop principles of personal and social responsibility for living in a diverse world, and advance intellectual and practical skills that are essential for all learning.

Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.

Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication.

Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.

Getting ready

Co-requisites: Scientific Calculator required. No graphing calculators or any electronic device will be allowed on test.

- ISBN-13: 978-1337275347 with WebAssign. Class Key is hccs 0810 7873

Optional Materials or Reference Texts: Student Solutions Manual
- MAPLE 2017, (www.maplesoft.com) Optional

Student Resource: Any student enrolled in Math 2413 at HCCS has access to the Academic Support Center where they may get additional help in understanding the theory or in improving their skills. The Center is staffed with mathematics faculty and student assistants, and offers tutorial help, video tapes and computer-assisted drills. Also available is a Student's Solutions Manual which may be obtained from the Bookstore.

The HCC Tutoring Centers provide free tutoring for individual subjects offered at specific times throughout the week on various campuses. There is no need to make an appointment. If you need a tutor, visit: www.hccs.edu/findatutor for times and locations. For more information about tutoring at HCC, visit www.hccs.edu/district/students/tutoring.
Additional help is also available through Student Support Services. Students can get free assistance, 24 hours a day, 7 days a week, in Math, English and other subjects, at [https://hccs.upswing.io/](https://hccs.upswing.io/). Typically, posted questions are answered by an HCC tutor or faculty within 24 hours (usually under 6 hours). There are also several online math resources that you can find with an internet search. You may also find information on the Learning Web site accessible through your specific HCCS campus website.

**Instructor guidelines and policies**

**Class Attendance** - *It is important that you come to class!* Attending class regularly is the best way to succeed in this class. Research has shown that the single most important factor in student success is attendance. Simply put, going to class greatly increases your ability to succeed. You are expected to be on time at the beginning of each class period. For complete information regarding Houston Community College’s policies on attendance, please refer to the Student Handbook. You are responsible for materials covered during your absences. Class attendance is checked daily. Although it is your responsibility to drop a course for nonattendance, the instructor has the authority to drop you for excessive absences. If you are not attending class, you are not learning the information. As the information that is discussed in class is important for your career, **students may be dropped from a course after accumulating absences in excess of six (6) hours of instruction.** The six hours of class time would include any total classes missed or for excessive tardiness or leaving class early.

You may decide NOT to come to class for whatever reason. As an adult making the decision not to attend, you do not have to notify the instructor prior to missing a class. However, if this happens too many times, you may suddenly find that you have “lost” the class.

Poor attendance records tend to correlate with poor grades. If you miss any class, including the first week, **you are responsible for all material missed.** It is a good idea to find a friend or a buddy in class who would be willing to share class notes or discussion or be able to hand in your work if you unavoidably miss a class.

If a student is absent from class it still remains the student’s responsibility to secure the notes from one of the other members of the class and to submit any required assignments.

**SUPPLEMENTAL INSTRUCTIONAL ACTIVITIES**

With the loss of two weeks of lectures due to hurricane Harvey, this course will require the following: Online Activities, Review Homework from WebAssign, this will count as 10% of your final test grade.

**Assignments:** No late assignments will be accepted.

**Make-up Exams:** No make-up exams will be given for any reason. One of the three major test grades (the lowest grade) can be replaced with the final test grade.

**Cell phones and beepers:** All cell phones and beepers must be turned off during lecture.

**Tentative Instructional Outline:**

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Reading Assignment</th>
<th>Reference Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>No Classes</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>REVIEW FUNCTIONS AND THEIR GRAPHS, A PREVIEW OF CALCULUS, FINDING LIMITS GRAPHICALLY AND NUMERICALLY.</td>
<td>CHAPTER 1</td>
</tr>
<tr>
<td>4</td>
<td>EVALUATING LIMITS ANALYTICALLY, CONTINUITY AND ONE-SIDED LIMITS, INFINITE LIMITS.</td>
<td>CHAPTER 1</td>
</tr>
<tr>
<td>5</td>
<td>REVIEW COMPUTER ASSIGNMENT 1</td>
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<tr>
<td>5</td>
<td>THE DERIVATIVE AND THE TANGENT LINE PROBLEM, BASIC DIFFERENTIATION RULES AND RATES OF CHANGE, THE PRODUCT AND QUOTIENT RULES AND HIGHER ORDER DERIVATIVES.</td>
<td>CHAPTER 2</td>
</tr>
<tr>
<td>6</td>
<td>THE CHAIN RULE, IMPLICIT DIFFERENTIATION, RELATED RATES.</td>
<td>CHAPTER 2</td>
</tr>
</tbody>
</table>
This unit presents the concept of logarithms, the natural logarithmic function with respect to differentiation and integration.

Chapter 5

inverse functions, exponential functions with respect to differentiation and integration

Chapter 5

Grade Determination:

<table>
<thead>
<tr>
<th>Details</th>
<th>Points (if applicable)</th>
<th>Percent of Final Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams and Review HW</td>
<td>Three exams will be given</td>
<td>100</td>
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<tr>
<td>Computer/Lab Assignments</td>
<td>WebAssign</td>
<td>100</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Wednesday, Dec. 13, 10-12 AM</td>
<td>100</td>
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<tr>
<td>Total:</td>
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Letter Grade Assignment:

<table>
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<tr>
<th>Letter Grade</th>
<th>Final Average in Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100-90</td>
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<tr>
<td>B</td>
<td>89-80</td>
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<tr>
<td>C</td>
<td>79-70</td>
</tr>
<tr>
<td>D</td>
<td>69-60</td>
</tr>
<tr>
<td>F</td>
<td>59-</td>
</tr>
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</table>
HCC Policy Statement - Students with disabilities

HCC strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please meet with a campus Abilities Counselor as soon as possible in order to establish reasonable accommodations. Reasonable accommodations are established through an interactive process between you, your instructor(s) and Ability Services. It is the policy and practice of HCC to create inclusive and accessible learning environments consistent with federal and state law. For more information, please go to http://www.hccs.edu/district/students/disability-services/

Ability Services Contact Information

<table>
<thead>
<tr>
<th>College</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central College</td>
<td>713-718-6164</td>
</tr>
<tr>
<td>Coleman College</td>
<td>713-718-7376</td>
</tr>
<tr>
<td>Northeast College</td>
<td>713-718-8322</td>
</tr>
<tr>
<td>Northwest College</td>
<td>713-718-5422</td>
</tr>
<tr>
<td>Southeast College</td>
<td>713-718-7144</td>
</tr>
<tr>
<td>Southwest College</td>
<td>713-718-5910</td>
</tr>
<tr>
<td>Adaptive Equipment/Assistive Technology</td>
<td>713-718-6629</td>
</tr>
<tr>
<td>Interpreting and CART services</td>
<td>713-718-6333</td>
</tr>
</tbody>
</table>

HCC Policy Statement: Title IX:

Houston Community College is committed to cultivating an environment free from inappropriate conduct of a sexual or gender-based nature including sex discrimination, sexual assault, sexual harassment, and sexual violence. Sex discrimination includes all forms of sexual and gender-based misconduct and violates an individual’s fundamental rights and personal dignity. Title IX prohibits discrimination on the basis of sex-including pregnancy and parental status-in educational programs and activities. If you require an accommodation due to pregnancy please contact an Abilities Services Counselor. The Director of EEO/Compliance is designated as the Title IX Coordinator and Section 504 Coordinator. All inquiries concerning HCC policies, compliance with applicable laws, statutes, and regulations (such as Title VI, Title IX, and Section 504), and complaints may be directed to:

David Cross
Director EEO/Compliance
Office of Institutional Equity & Diversity
3100 Main
Houston, TX 77266-7517 or Institutional.Equity@hccs.edu
Phone number: 713-718-8271

Campus Carry statement:

At HCC the safety of our students, staff, and faculty is our first priority. As of August 1, 2017, Houston Community College is subject to the Campus Carry Law (SB11 2015). For more information, visit the HCC Campus Carry web page at http://www.hccs.edu/district/departments/police/campus-carry/.

Personal Communication Device Policy:

All personal communication devices (any device with communication capabilities including but not limited to cell phones, blackberries, pagers, cameras, palmtop computers, lap tops, PDA’s, radios, headsets, portable fax machines, recorders, organizers, databanks, and electronic dictionaries or translators) must be muted or turned off during class. Such activity during class time is deemed to be disruptive to the academic process. Personal communication devices are to not be on the student desk during examinations. Usage of such devices during exams is expressly prohibited during examinations and will be considered cheating.
Misuse of Electronic Devices in the Classroom

The use of electronic devices by students in the classroom is up to the discretion of the instructor. Any use of such devices for purposes other than student learning is strictly prohibited unless authorized as an appropriate ADA accommodation from the ADA Counselor.

HCC Policy Statement: Academic Honesty

A student who is academically dishonest is, by definition, not showing that the coursework has been learned, and that student is claiming an advantage not available to other students. The instructor is responsible for measuring each student's individual achievements and also for ensuring that all students compete on a level playing field. Thus, in our system, the instructor has teaching, grading, and enforcement roles. You are expected to be familiar with the University's Policy on Academic Honesty, found in the catalog. What that means is: If you are charged with an offense, pleading ignorance of the rules will not help you. Students are responsible for conducting themselves with honor and integrity in fulfilling course requirements. Penalties and/or disciplinary proceedings may be initiated by College System officials against a student accused of scholastic dishonesty. “Scholastic dishonesty”: includes, but is not limited to, cheating on a test, plagiarism, and collusion.

Cheating on a test includes:
- Copying from another students’ test paper;
- Using materials not authorized by the person giving the test;
- Collaborating with another student during a test without authorization;
- Knowingly using, buying, selling, stealing, transporting, or soliciting in whole or part the contents of a test not yet administered;
- Bribing another person to obtain a test that is to be administered.

Plagiarism means the appropriation of another’s work and the unacknowledged incorporation of that work in one’s own written work offered for credit.

Collusion means the unauthorized collaboration with another person in preparing written work offered for credit. Possible punishments for academic dishonesty may include a grade of 0 or F in the particular assignment, failure in the course, and/or recommendation for probation or dismissal from the College System. (See the Student Handbook)

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**HCC Course Withdrawal Policy**

If you feel that you cannot complete this course, you will need to withdraw from the course prior to the final date of withdrawal. Before, you withdraw from your course; please take the time to meet with the instructor to discuss why you feel it is necessary to do so. The instructor may be able to provide you with suggestions that would enable you to complete the course. Your success is very important. Beginning in fall 2007, the Texas Legislature passed a law limiting first time entering freshmen to no more than **SIX** total course withdrawals **throughout** their educational career in obtaining a certificate and/or degree.

To help students avoid having to drop/withdraw from any class, HCC has instituted an Early Alert process by which your professor may “alert” you and HCC counselors that you might fail a class because of excessive absences and/or poor academic performance. It is your responsibility to visit with your professor or a counselor to learn about what, if any, HCC interventions might be available to assist you – online tutoring, child care, financial aid, job placement, etc. – to stay in class and improve your academic performance.

If you plan on withdrawing from your class, you **MUST** contact a HCC counselor or your professor prior to withdrawing (dropping) the class for approval and this must be done **PRIOR** to the withdrawal deadline to receive a “W” on your transcript. **Final withdrawal deadlines vary each semester and/or depending on class length, please visit the online registration calendars, HCC schedule of classes and catalog, any HCC Registration Office, or any HCC counselor to determine class withdrawal deadlines. Remember to allow a 24-hour response time when communicating via email and/or telephone with a professor and/or counselor. Do not submit a request to discuss withdrawal options less than a day before the deadline.** If you do not withdraw before the deadline, you will receive the grade that you are making in the class as your final grade. The last day to withdraw is **November 3, 2017.**

**Repeat Course Fee**

The State of Texas encourages students to complete college without having to repeat failed classes. To increase student success, students who repeat the same course more than twice, are required to pay extra tuition. The purpose of this extra tuition fee is to encourage students to pass their courses and to graduate. Effective fall 2006, HCC will charge a higher tuition rate to students registering the third or subsequent time for a course. If you are considering course withdrawal because you are not earning passing grades, confer with your instructor/counselor as early as possible about your study habits, reading and writing homework, test taking skills, attendance, course participation, and opportunities for tutoring or other assistance that might be available.

**Student Course Reinstatement Policy:**

Students have a responsibility to arrange payment for their classes when they register, either through cash, credit card, financial aid, or the installment plan. Faculty members have a responsibility to check their class rolls regularly, especially during the early weeks of a term, and reconcile the official class roll to ensure that no one is attending class whose name does not appear on it. Students who are dropped from their courses for nonpayment of tuition and fees who request reinstatement after the official date of record (OE Date) can be reinstated by making payment in full and paying an additional \$75 per course reinstatement fee. A student requesting reinstatement should present the
registrar with a completed **Enrollment Authorization Form** with the signature of the instructor, department chair, or dean who should verify that the student has been attending class regularly. Students who are reinstated are responsible for all course policies and procedures, including attendance requirements.

**EGLS 3 -- Evaluation for Greater Learning Student Survey System**

At Houston Community College, professors believe that thoughtful student feedback is necessary to improve teaching and learning. During a designated time, you will be asked to answer a short online survey of research-based questions related to instruction. The anonymous results of the survey will be made available to your professors and division chairs for continual improvement of instruction. Look for the survey as part of the Houston Community College Student System online near the end of the term. Visit [www.hccs.edu/EGLS3](http://www.hccs.edu/EGLS3) for more information.

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### Administration contact information

<table>
<thead>
<tr>
<th>College - Level Math Courses</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Chair of Math</strong></td>
<td>Jaime Hernandez</td>
</tr>
<tr>
<td>- <strong>Admin. Assistant</strong></td>
<td>Tiffany Pham</td>
</tr>
<tr>
<td>- <strong>Admin. Assistant</strong></td>
<td>Dipal Parekh</td>
</tr>
<tr>
<td><strong>Math Assoc. Chair</strong></td>
<td>Clen Vance</td>
</tr>
<tr>
<td><strong>Math Assoc. Chair</strong></td>
<td>Ernest Lowery</td>
</tr>
<tr>
<td><strong>Math Assoc. Chair</strong></td>
<td>Mahmoud Basharat</td>
</tr>
</tbody>
</table>

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<tr>
<th>Developmental Math Courses</th>
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<tbody>
<tr>
<td><strong>Chair of Dev. Math</strong></td>
<td>Susan Fife</td>
</tr>
<tr>
<td>- <strong>Admin. Assistant</strong></td>
<td>Carmen Vasquez</td>
</tr>
<tr>
<td><strong>Dev. Math Assoc. Chair</strong></td>
<td>Marisol Montemayor</td>
</tr>
<tr>
<td><strong>Dev. Math Assoc. Chair</strong></td>
<td>Jack Hatton</td>
</tr>
</tbody>
</table>

For issues related to your class, please first contact your instructor. If you need to contact departmental administration, then contact the appropriate Associate Chair. If further administrative contact is necessary, then contact the appropriate Department Chair.

“Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. Furthermore, please notify the professor if you are comfortable in doing so.”