UH Core Curriculum Supplement

Academic Unit / Office NSM/Mathematics **Catalog Year of Implementation** 2020-2021

Course (Prefix / Number) MATH / 1431 **Course Title Calculus I**

PROPOSAL ACTION TYPE:

☐ Add existing UH course to Core

☐ Add new UH Course to Core, see Course Proposal

☐ Revision current Core, switch Component Area

☒ Revision current Core, substantive change (e.g. prerequisites, course requirements, course level, restricted enrollment)

☒ SYLLABUS ATTACHED

Core Proposal Rationale and Justification for adding/revising the course?

Please provide a rationale for including, or continuing to include, this course in the UH Core Curriculum: This is a standard first course in differential and integral calculus. This proposal does not affect the content of MATH 1431, so we believe this course should continue to serve as a core Mathematics and Math/Reasoning course.

Following the "C- rule" implemented by many public universities in Texas (see below), we propose to add a C- or better grade requirement for MATH 1330 credit used as a prerequisite for MATH 1431. Specifically, we propose to modify the prerequisite for MATH 1431 as follows: "Credit for MATH 1330 with a grade of C- or better, or a satisfactory score on a placement examination."

Since a student cannot earn transfer credit for a course with a grade below C-, this requirement would ensure that transfer and native students are held to the same prerequisite standards.

The primary rationale for this proposal is that students who pass MATH 1330 with a grade below C- (D+, D, or D-) have only a 6% chance of passing MATH 1431 with a grade of C- or above. In other words the DWF rate for this group of students is approximately 94%. This estimate is based on regular semester (Fall and Spring) enrollments between 2015 and 2018. (A summary of this data is included in our proposal.)

Since some students take MATH 1330 and MATH 1431 to satisfy core requirements even when these courses are not specifically required for their degree plan, we think this new grade requirement will encourage some students to consider other math core options for which they are better prepared. For a student whose degree plan requires MATH 1431, we think that this new prerequisite will create a GPA safeguard that will help prevent a pattern of poor grades in this core math sequence.

Based on the data referenced above a "C- rule" would have affected only 2.5% of students (294 out of 11,739) who enrolled in MATH 1431 between 2015 and 2018 (which amounts to 9% of students (294 out of 3337) who completed the prerequisite, MATH 1330, at University of Houston during this period). Moreover, students with a grade of D in MATH 1330 would still be able to enroll in non-math courses which require MATH 1330 as a prerequisite. These points help mitigate the concern that a "C- rule" could hold some students back.

The list of Texas institutions which currently implement a "C- rule" for Calculus 1 include: UT Austin (MATH 408C), Texas State University (MATH 2471), University of North Texas (MATH 1710), Texas Tech University (MATH 1451), UT San Antonio (MAT 1214), UT Dallas (MATH 2413), UT Rio Grande Valley (MATH 2413), UT El Paso (MATH 1411)

UH Core Curriculum Supplement

COURSE LEVEL?

Is the course lower-division (1000/2000 level)? ☐ NO ☒ YES

If upper division (3000/4000 level) please provide a rationale for including the course in the UH Core Curriculum.

STEP 1: IDENTIFY THE FOUNDATION CORE COMPONENT AREA for this course

If the course is intended to be listed under Math/Reasoning or Writing in the Disciplines it must first qualify for Core under one of the Foundation Component Areas and under Step 2.

SELECT ONE	**FOUNDATION COMPONENT AREA**	REQUIRED CORE OBJECTIVES *(see THECB Core objectives)*					
		CT	**COM**	**EQS**	**TW**	**SR**	**PR**
☐	COMMUNICATION	☑	☑		☑		☑
☒	MATHEMATICS	☑	☑	☑			
☐	LIFE & PHYSICAL SCIENCES	☑	☑	☑	☑		
☐	LANGUAGE, PHILOSOPHY, & CULTURE	☑	☑			☑	☑
☐	CREATIVE ARTS	☑	☑		☑	☑	
☐	AMERICAN HISTORY	☑	☑			☑	☑
☐	GOVERNMENT/POLITICAL SCIENCE	☑	☑			☑	☑
☐	SOCIAL & BEHAVIORAL SCIENCES	☑	☑	☑		☑	

KEY : **CT**= Critical Thinking , **COM** = Communication, **EQS** = Empirical and Quantitative Skills
PR= Personal Responsibility, **SR** = Social Responsibility, **TW** = Team Work

UH Core Curriculum Supplement

STEP 2 : *If not selecting a course for Core Math/Reasoning or Writing in the Disciplines proceed to Step 3.*

IDENTIFY THE COMPONENT AREA OPTION for this course – Requires Step 1 & Step 2
If the course is intended to be listed under Math/Reasoning or Writing in the Disciplines it must first qualify for Core under one of the Foundation Component Areas identified in Step 1. Identify the Foundational Component Area and required Core Objectives.

SELECT ONE	**UH Component Area Options:**	**Meets definition of Foundational Component Area (FCA) identified in Step 1**	**Double-List? ***	**CT**	**COM**	**EQS**	**TW**	**SR**	**PR**
☒	MATH/REASONING	*MATHEMATICS* *in Step 1 must select Mathematics*	☐	☑	☑	☑			
☐	WRITING in the DISCIPLINES	*Identify Foundational Component Area:* Select One: *& select additional objective(s) that align with the associated foundation component area selected in Step 1 (e.g. Language, Philosophy, Culture select SR, PR)*	☐	☑	☑	☐	☐	☐	☐

KEY : **CT**= Critical Thinking , **COM** = Communication, **EQS** = Empirical and Quantitative Skills
PR= Personal Responsibility, **SR** = Social Responsibility, **TW** = Team Work

*DOUBLE –LIST?
UH Core course typically serve under only one component area.
Indicate request for the course be evaluated to also be listed in the Catalog under the Foundational Component Area (for example, *Language, Philosophy, Culture* & *Writing in the Disciplines*).

UH Core Curriculum Supplement

STEP 3: CORE OBJECTIVE ASSESSMENT

Select the applicable required Core Objectives for the associated Foundation Component Area.

For each required Core objective identify:

a. How students will demonstrate achievement of the objective in the course (e.g. critical thinking, communication)

b. What course assignment that may be used to assess student performance related to the objective. *An assignment may serve as a tool to assess more than one Core Objective.*

Select related required Objectives from Step 1 & 2)	**Core Objectives**	**How will students demonstrate achievement of the objective in the course?**	**Assignment to be Assessed** *(e.g. Essay #2, Project, Test #3)*
☑	**CT** **required for all courses*	This is a standard first course in differential and integral calculus with an emphasis on problem solving. Students develop critical thinking skills through the process of analyzing mathematical statements, synthesizing information and applying valid mathematical reasoning, and deciding the appropriate rules or methods to apply in a given mathematical context. Students demonstrate proficiency in these skills through a variety of assessments including homework assignments, quizzes, and tests.	Tests 1-4, Final Exam, Homework, Online Quizzes, Lab Quizzes, Poppers
☑	**COM** ** required for all courses*	To effectively communicate quantitative information, students must develop a greater vocabulary and understanding of the language of mathematics. In particular, this course develops vocabulary related to limits, derivatives, and integrals of functions which are fundamental in many fields of science and engineering. Students develop written communication skills by learning to express mathematical quantities and statements in a clear and consistent way using proper notation. Students develop oral communications skills through in-class discussions and group work. Students demonstrate proficiency in these skills through a variety of assessments including written homework assignments, free response test questions, and lab/recitation work.	Free Response Homework and Test Questions, Lab/Recitation Work and Discussions

UH Core Curriculum Supplement

☒	**EQS** **required for Math/Reasoning*	Students develop empirical and quantitative skills through the process of evaluating and graphing functions, analyzing solutions of equations and inequalities, and evaluating limits, derivatives, and definite integrals to obtain information about the rate of change or the net change of a given quantity. Students demonstrate proficiency in these skills through a variety of assessments including homework assignments, quizzes, and tests.	Tests 1-4, Final Exam, Homework, Online Quizzes, Lab Quizzes, Poppers
☐	**TW**		
☐	**SR**		
☐	**PR**		

KEY : **CT**= Critical Thinking , **COM** = Communication, **EQS** = Empirical and Quantitative Skills
PR= Personal Responsibility, **SR** = Social Responsibility, **TW** = Team Work

MATH 1431 - COURSE SYLLABUS

****

YEAR COURSE OFFERED: 2019-2020

SEMESTER COURSE OFFERED: FALL

DEPARTMENT: MATH

COURSE NUMBER: 1431 (This information applies to all sections)

NAME OF COURSE: Calculus I

****

PREREQUISITES: MATH 1330 or a satisfactory score on a placement exam.

TEXTBOOK

The textbook, online quizzes, and additional help materials will be made available by logging into CourseWare at http://www.casa.uh.edu . The first portion of these materials are freely available for the first two weeks of class. **Students are required to purchase an access code to access the learning materials by the end of the second week of school. Access code can be purchased at UH Book Store. Note that if you order the access code online, you will receive it in the mail (which might take several days). If you don't enter the code by the deadline stated on CASA, you will lose access to CASA temporarily – until you enter the code.** *If students miss assignments during the no access period, they should not expect to have make up options for those assignments.*

COURSE OBJECTIVES FOR CALCULUS I

Upon successful completion of this course, students will understand and be able to apply the ideas of differential and integral calculus to problems involving instantaneous rates of change, properties of curves, areas bounded by curves, and motions of accelerated bodies. They will develop proficiency in the rules and techniques of single-variable calculus, including derivatives of various combinations of functions, the chain rule, substitution, the mean value theorems, and the fundamental theorem of calculus. Students will be able to use graphical information and symbolic expression simultaneously in solving mathematical problems. They will be able to translate ordinary language descriptions of problems into mathematical expression, derive solutions by rigorous mathematical methods, interpret their results, and explain them.

This course has a corresponding recitation that does not have a separate grade. Lecture is 3 hours per week and Lab (recitation) is also 3 hours. The lab hours are an extension of lecture and an opportunity to work on homework and practice extra problems to prepare you for exam day. These lab sessions are mandatory and are a portion of your overall grade calculation.

MATH 1431 - COURSE SYLLABUS

COMMUNICATION via EMAIL

Your instructor will be sending class emails using PeopleSoft; you are responsible for checking your UH email. Per UH Policy, notices properly addressed and so sent (for example, via PeopleSoft) shall be presumed to have been received by the student. Thus, you are responsible for the content in emails sent to your UH account, regardless if your external (non-UH) email provider filters or blocks them.

When emailing your instructor, it is recommended that you use a professional email address and include the course name on the subject line so that your instructor can address your questions accordingly. Please read this link for more on communication via email: EMAIL ETIQUETTE

HONOR PRINCIPLE

University of Houston students are expected to adhere to the Academic Honesty Policy as described in the UH Undergraduate Catalog. "Academic dishonesty" means employing a method or technique or engaging in conduct in an academic endeavor that contravenes the standards of ethical integrity expected at the University of Houston or by a course instructor to fulfill any and all academic requirements.
Academic dishonesty includes, but is not limited to, the following: *Plagiarism; Cheating and Unauthorized Group Work; Fabrication, Falsification, and Misrepresentation*; *Stealing and Abuse of Academic Materials; Complicity in Academic Dishonesty; Academic Misconduct.* Refer to UH Academic Honesty website and the UH Student Catalog for the definition of these terms and university's policy on Academic Dishonesty. Anyone caught cheating will receive sanctions as explained on these documents and will be reported to the department for further disciplinary action. The sanctions for confirmed violations of this policy shall be commensurate with the nature of the offense and with the record of the student regarding any previous infractions. Sanctions may include, but are not limited to: a lowered grade, failure on the examination or assignment in question, failure in the course, probation, suspension, or expulsion from the University of Houston, or a combination of these. Students may not receive a W for courses in which they have been found in violation of the Academic Honesty Policy. If a W is received prior to a finding of policy violation, the student will become liable for the Academic Honesty penalty, including F grades.

ASSESSMENTS

Test 1 (online) 3%
Tests 2, 3, 4 (proctored in CASA) 15% each
Final exam- 25%
LAB (recitation) Grade: 15%
Online Quizzes - 8%
In-class Poppers and Attendance - 4%

Note: The percentage grade on the final exam can be used to replace your lowest test score.

MATH 1431 - COURSE SYLLABUS

GRADING SCALE

University of Houston standard grading scale will be used to determine your letter grade in this course. If x is your semester numerical score, then your grade will be:

A	$x \geq 93$	B-	$80 \leq x < 83$	D+	$67 \leq x < 70$
A-	$90 \leq x < 93$	C+	$77 \leq x < 80$	D	$63 \leq x < 67$
B+	$87 \leq x < 90$	C	$73 \leq x < 77$	D-	$60 \leq x < 63$
B	$83 \leq x < 87$	C-	$70 \leq x < 73$	F	Below 60

It is the student's responsibility to withdraw from the course. Your instructor cannot do this for you. You are STRONGLY encouraged to talk with your advisor, your TA and your instructor **prior** to withdrawal.

INSTRUCTIONS FOR POPPERS

- For each lecture starting on the third week of classes you will be asked a series of problems that will have to do with the lecture.
- This requires a buying a poppers package from the bookstore. Make sure that the package is for your specific section of 1431.
- You are required to fill in your id number, popper number and blacken the correct circles. Make sure that your id number and popper number are correct before turning in the popper at the end of the lecture. If these are not filled out correctly or if the darken circles are too light you will not get credit for that day's lecture even if you attended. Popper grades **will not be adjusted** after form submission, so be sure to pay close attention when filling in your daily popper.
- Completing poppers for another student is in violation of the University's Academic Policy. Violations are reported to the DHO (the departmental hearing officer for the Honor Board).
- The total number of questions for the course will be counted, 85% of the total number of questions will be the 100%. For example, *if* there are 5 questions each class for 24 classes, which is 120 questions. Your grade will be calculated out of 120(.85) = 102 points.

INSTRUCTIONS FOR ONLINE QUIZZES

- Quizzes are accessed in the CASA CourseWare course website under the "Online Assignments" tab.
- Quizzes will close on the due dates given on CourseWare at 11:59 pm and will not re-open.
- One of the lowest quizzes will be dropped.
- You have 20 times to take each quiz.
- There is a 60 minute time limit for each quiz.

MATH 1431 - COURSE SYLLABUS

HOMEWORK:

- Written homework can be found on your instructor's CASA page and will contain problems from the textbook and / or assigned problems according to the instructor and turned in during your recitation. Written homework must be turned in on appropriate form with all work shown in the space provided for full credit.
- You must turn in your homework – another student may not do so for you. Failure to comply will result in zeros for all persons involved.
- Late homework will not be accepted.**
- Electronic multiple-choice problems ***may be*** assigned by your instructor and entered on CourseWare under the EMCF tab.
- One of the lowest homework scores will be dropped.

RECITATION (LAB):

- Attendance is mandatory for all labs.
- Perpetual Tardiness will not be tolerated and may affect your grade.
- Lab work may be assigned for attendance.
- Lab quizzes are given weekly.
- See your TA's syllabus for how your lab (recitation) grade will be calculated. Your lab information in on CourseWare under MLAB 1431.
- If student is absent from lab, any assignments / quizzes missed **cannot be made up**.**

LATE ASSIGNMENT, MAKE-UP AND INCOMPLETE POLICIES

- This course is a cumulative course. You as a student need to keep up with the reading, quizzes, homework assignments and exams. Thus, late work or make-ups will not be accepted.****In case of late enrollment or re-registration after being dropped:** No make ups will be provided for assignments missed during the "no access to the course" period due to late enrollment or being dropped. Similarly, if students lose access to CASA for not entering access code by the deadline, there will be no make ups for the assignments they missed during that period.
- The temporary grade of I (incomplete) is a conditional and temporary grade assigned when students for non-academic reasons beyond their control have not completed a relatively small part of all requirements for a course. The student must:
    - be currently passing the course or have a reasonable chance of passing the course, in the judgment of the instructor;
    - contact the instructor immediately regarding the reasons that prevent the student from completing the course, final assignment and/or final examination;
    - initiate the request for an I grade within 90 days of the posting of the course grade; o make arrangements with the instructor to complete the course requirements, if assigned;

- understand that the only way to have an I grade changed to a passing grade is to fulfill course requirements in accordance with the conditions specified by the instructor;
- understand that the grade of I may be changed only to another letter grade. If the student does not complete the course requirements in the time allotted (a maximum of one year) the I grade will convert to an F grade and will be noted as a lapsed incomplete on the student's transcript. An I grade once lapsed to an F grade may not be changed to a grade of W; and ○ not re- enroll (re-register) for the courses in which their grade is currently recorded as an I. Even when the conditions for fulfilling the course requirements include participation in all or part of the same course in another semester, the student must not re-enroll (re-register) for the course.

****NOTE:** Exceptions may be made per the Student Academic Adjustments/Auxiliary Aids Policy for students with approved CSD accommodations, as well as for students with an official excused absence as recognized by University of Houston in accordance with federal and state law.

EXAM INFORMATION

Midterm testing dates:
Test 1: (online) Opens August 19th and closes August 29th
Test 2: September 14th to September 18th
Test 3: October 14th to October 17th
Test 4: November 8th to November 12th

Final Exam: Covers chapters 1 through 6 (comprehensive) **December 5th to 8th**

- The tests will be given in CASA located on the second floor of Garrison or in CBB or in AH, see the exam scheduler for details.
- You can access the scheduler for these exams by logging into Courseware.
- The exams given in CASA will consist of both multiple choice and written questions.
- The multiple-choice questions will be machine graded.
- The written questions (free response) will be graded by the instructors and teaching assistants.
- There will be a practice test on Courseware for each exam. 5% of your practice test score will be added to your exam score as bonus. The due date for practice exams is the day before the exam period begins.
- The scheduler will be available approximately 2 weeks prior to the start of the exam cycle. Exam dates are listed above.

MATH 1431 - COURSE SYLLABUS

LIST OF DISCUSSION/LECTURE TOPICS

Chapter 1 Limits and Continuity
1.1 A Review of Functions
1.2 An Intuitive Introduction to Limits
1.3 Definition of Limit and Arithmetic Rules
1.4 Continuity
1.5 The Intermediate Value Theorem
1.6 Limits of Trigonometric Functions and the Pinching Theorem

Chapter 2 Differentiation
2.1 The Definition of the Derivative
2.2 Derivatives of Polynomials and Trigonometric Functions
2.3 Differentiation Rules
2.4 Implicit Differentiation

Chapter 3 Applications of the Derivative
3.1 Related Rates
3.2 The Mean-Value Theorem
3.3 Intervals of Increase and Decrease
3.4 Extreme Values
3.5 Concavity and Points of Inflection
3.6 Curve Sketching

Chapter 4 The Transcendental Functions
4.1 Inverse Functions
4.2 The Exponential Function
4.3 Natural Logarithm Function
4.4 Inverse Trigonometric Functions
4.5 Hyperbolic Functions

Chapter 5 Further Applications of the Derivative
5.1 Optimization
5.2 Differentials
5.3 L'Hospital's Rule

Chapter 6 Integration
6.1 The Definite Integral
6.2 The Fundamental Theorem of Calculus
6.3 Basic Integration Rules
6.4 Integration by Substitution

MATH 1431 - COURSE SYLLABUS

TUTORING OPTIONS

- For help with any pre-requisite materials, you can log on to your CASA account, then choose MATH PLACEMENT from your course listing and then choose Help Videos
- SEP workshop schedule
- CASA Tutoring Center
- LAUNCH Website
- ONLINE Tutoring: Information is on the course webpage

STUDENT SUCCESS PROGRAM

This course is part of a Student Success Program which includes activities beyond the traditional lecture and recitation study groups. This program will provide early assistance to students who are having academic difficulties in the course and offer worthwhile enrichment opportunities for all students. Currently, this program is supported by a Howard Hughes Medical Institute (HHMI) Undergraduate Science Education Grant. For more info: http://www.uh.edu/nsm/scholar-enrichment/

CSD ACCOMMODATIONS

The University of Houston System complies with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, pertaining to the provision of reasonable academic adjustments/auxiliary aids for students who have a disability. In accordance with Section 504 and ADA guidelines, University of Houston strives to provide reasonable academic adjustments/auxiliary aids to students who request and require them. If you believe that you have a disability requiring an academic adjustments/auxiliary aid, please visit The Center for Students with DisABILITIES (CSD) website at http://www.uh.edu/csd/ for more information.

Academic Adjustments/Auxiliary Aids: The University of Houston System complies with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, pertaining to the provision of reasonable academic adjustments/auxiliary aids for students who have a disability. In accordance with Section 504 and ADA guidelines, University of Houston strives to provide reasonable academic adjustments/auxiliary aids to students who request and require them. If you believe that you have a disability requiring an academic adjustments/auxiliary aid, please visit The Center for Students with DisABILITIES (CSD) website at http://www.uh.edu/csd/ for more information.

Accommodation Forms: Students seeking academic adjustments/auxiliary aids must, in a timely manner (usually at the beginning of the semester), provide their instructor with an approved current Student Accommodation Form (paper copy or online version, as appropriate) before an approved accommodation can be implemented.

Details of this policy, and the corresponding responsibilities of the student are outlined in The Student Academic Adjustments/Auxiliary Aids Policy (01.D.09) document under *[STEP 4: Student Submission (5.4.1 & 5.4.2), Page 6]*. For more information please visit the Center for Students with Disabilities FAQs page.

Additionally, if a student is requesting a (CSD approved) testing accommodation, then the student will also complete a Request for Individualized Testing Accommodations (RITA) paper form to arrange for tests to be administered at the CSD office. CSD suggests that the student meet with their instructor during office hours and/or make an appointment to complete the RITA form to ensure confidentiality.

*Note: RITA forms must be completed at least 48 hours in advance of the original test date. Please consult your counselor ahead of time to ensure that your tests are scheduled in a timely manner. Please keep in mind that if you run over the agreed upon time limit for your exam, you will be penalized in proportion to the amount of extra time taken.

UH CAPS STATEMENT

Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach CAPS (www.uh.edu/caps) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. No appointment is necessary for the "Let's Talk" program, a drop-in consultation service at convenient locations and hours around campus.
http://www.uh.edu/caps/outreach/lets_talk.html