University of Houston-Downtown

Core Course Proposal Form

Date prepared: 5/1/13 **Effective semester:** Fall 2014

Lead faculty proposing the course: Timothy A. Redl **Phone:** (713) 226-5224

Course prefix, number, and title: MATH 1310: College Mathematics for Liberal Arts

Foundational Component Area the course will satisfy:
Mathematics

CIP code: **Funding code:**

Type of update (mark all boxes that apply):

	New course	X	**Change prerequisites/corequisites**
	Change course title	X	**Change course description**
	Change course number		**ourse to Core without catalog changes**
	Other		

For all classes:
Lecture hours: 3

Lab hours: 0

Prerequisites/corequisites: A grade of C or better in MATH 0300 or a TSI score of 350 or higher.

Cross-listed courses: None

Are there additional fees that will be charged for this course? No

If "yes", specify what the fees are and provide a justification for it in the "Other Information" area below:

Course Description (as it will appear in the catalog): An introduction to contemporary mathematical ideas and problem-solving techniques. Designed for students requiring one college-level mathematics course. This course cannot be applied toward any degree in the Department of Mathematics and Statistics or the Department of Computer Science and Engineering Technology (MATH 1332)

Other helpful information or justification: The course now requires the use of a scientific calculator, as well as the use of an online course management system (i.e., WebAssign) for online homework, and a high-impact experience for students in the form of a written paper and/or oral presentation or poster presentation, focusing on some aspect of the history of mathematics, some contemporary application of mathematics, or an explanation/illustration of how math fits into the student's individual interests.

For all proposals, please attach a sample syllabus, including learning outcomes, topics, and major assignments.

Approvals

_____ _____
Chair, Department Curriculum Committee Date

_____ _____
Department Chair Date

_____ _____
Dean Date

_____ _____
Chair, Foundational Component Committee Date

_____ _____
Chair, Core Curriculum Task Force Date

_____ _____
Chair, University Curriculum Committee Date

_____ _____
Vice President for Academic Affairs Date

Mathematics Worksheet: MATH 1310

The state requires that all classes in this component area "focus on quantitative literacy in logic, patterns, and relationships. Courses involve the understanding of key mathematical concepts and the application of appropriate mathematical tools to the everyday experience" and must teach "Critical Thinking Skills; Communication Skills; and Empirical and Quantitative Skills." The faculty-led committee for this core has decided that these goals will be met with five learning outcomes listed below. For each, describe how your class will teach them and how you will evaluate them. If the proposal is accepted, every section of the class must adhere to these teaching and evaluation strategies.

Learning Outcome **Students will be able to:**	**Instructional strategy or content used to achieve the outcome**	**Method by which students' mastery of this outcome will be evaluated**
Describe and communicate mathematical information verbally, numerically, graphically, and symbolically.	Evaluation of logical statements and truth tables; construction of Venn Diagrams; interpretation of statistical measures, graphs, and charts; graph theory applications. Students will be assigned to write a short paper and/or give a brief oral presentation or poster presentation on some aspect of the history of mathematics, some contemporary application of mathematics, or an explanation or illustration of how math fits into the student's individual interests.	Enhanced WebAssign or written homework In-class Quizzes (optional) In-class Exams Final Exam Methods of evaluation include: 1. Open ended discussion questions 2. Questions involving interpretation and critical analysis of mathematical concepts 3. Peer to peer activities, where students should explain to each other orally their solution to a mathematical problem and/or concepts from a particular topic in mathematics.
Use appropriate mathematical techniques to model situations from a variety of settings, including real-world applications in generalized mathematical forms.	Graph theory models and applications; statistical models; financial calculations and applications; voting systems and apportionments; calculations involving combinatorics, counting methods, and probabilities.	Enhanced WebAssign or written homework In-class Quizzes (optional) In-class Exams Final Exam
Interpret mathematical models, such as formulas, graphs, tables, and schematics, and draw inferences from them.	Analysis and interpretation of statistical models and graphs, including box-whisker plots, stem-leaf plots, and box plots, and probability distributions; financial calculations and applications; graph theory applications.	Enhanced WebAssign or written homework In-class Quizzes (optional) In-class Exams Final Exam

Discern relationships and patterns in quantitative data to arrive at informed conclusions.	Application of counting methods (permutations and combinations) in calculating probabilities; comparison and contrast of different measures of central tendency and variation in statistics; finding relationships between simple and compound interest and annuity calculations.	Enhanced WebAssign or written homework In-class Quizzes (optional) In-class Exams Final Exam
Utilize appropriate technology to enhance mathematical thinking and understanding, to solve mathematical problems, and to judge the reasonableness of the results.	Students will learn to use a scientific calculator for financial calculations involving simple and compound interest and annuities, as well as calculations involving counting methods (permutations and combinations) and probabilities.	Enhanced WebAssign or written homework In-class Quizzes (optional) In-class Exams Final Exam Some problems will require students to use a scientific calculator to perform mathematical computations, and then be asked to analyze and interpret the results obtained.

Appendix 1: Certification and Staffing Worksheet (MATH 1310)

Please provide the following information for the class being proposed. Questions 1 through 3 will be used for class planning; 4 and 5 for internal reporting purposes.

1. Long Semester Staffing:

Total sections of the course that will be offered each long semester:	Recommended class size:	Total number of seats offered each long semester (total sections x class size):
10	40	400

2. Short Semester (summers, winters, etc.) Staffing:

Total sections of the course that will be offered each short semester:	Recommended class size:	Total number of seats offered each short semester (total sections x class size):
Winter (1) May (1) Summer I (1) Summer III (1) TOTAL: 4	40	160

3. Staffing Notes:

Briefly present your anticipated T/TT coverage rates for this class and explain any other staffing issue that may be relevant (e.g., if the class will not be offered every semester, or if it is a team-taught class).

***** Based on past semesters, it is anticipated that in a given academic year, approximately 1/3 of the sections of MATH 1310 will be taught by T/TT CMS faculty, 1/3 of the sections of MATH 1310 will be taught by CMS Lecturers, and 1/3 of the sections of MATH 1310 will be taught by CMS Adjunct Faculty.**

4. High Impact Experiences:

Describe any high impact practices that will be consistently used across all sections of the course. An overview of high impact practices may be found on the American Association of Colleges and Universities at the following website: http://www.aacu.org/leap/hip.cfm. A course does not need to include a high impact practice to be considered for the Core.

***** Instructors will assign a short (4-5 page) typed paper or a brief oral class presentation or poster presentation as part of the course requirements. This will qualify as a High Impact Requirement for all sections of MATH 1310.**

5. Faculty Qualification Oversight:

If a course proposed is outside of the discipline(s) traditionally associated with the Foundational Component Area that it would fulfill, or if the curriculum is cross-disciplinary in nature, briefly explain the plan for managing faculty qualifications. (Strategies may include, but are not limited to, the following: documentation of special training or work experience, completion of post-doc work, specialized professional development for faculty teaching the course, or team teaching in which a partnership is formed with faculty within the traditional discipline).

***** Not applicable; MATH 1310 is a Mathematics course**

APPENDIX 2: SAMPLE SYLLABUS

COURSE: Math 1310: College Mathematics for Liberal Arts (3 – 3 – 0)

CATALOG DESCRIPTION: An introduction to contemporary mathematical ideas and problem-solving techniques. Designed for students requiring one college-level mathematics course. This course cannot be applied toward any degree in the Department of Mathematics and Statistics or the Department of Computer Science and Engineering Technology (MATH 1332)

PREREQUISITE: A grade of C or better in MATH 1300 or a TSI score of 350 or higher.

AUDIENCE: This is a freshman-level mathematics course, which requires a background consisting of two years of high school mathematics or MATH 0300. The course is primarily intended for majors in liberal arts, social and behavioral sciences.

PURPOSE: This course satisfies the general education core mathematics requirement, elevating the student's mathematical literacy to college-level by introducing contemporary mathematical ideas and problem-solving techniques that demonstrate the broad usefulness and importance of mathematics to modern life.

COURSE LEARNING OUTCOMES:
Upon completion of the course, the student should be able to:

1.	Represent statements symbolically using connectives and quantifiers.
2.	Identify valid and invalid syllogisms
3.	Perform operations on sets and use Venn diagrams to solve survey problems.
4.	Calculate permutations and combinations and use them to solve counting problems.
5.	Apply counting principles to compute probabilities.
6.	Use measures of central tendency and dispersion to compare data sets.
7.	Calculate simple interest, compound interest, present and future value of an annuity.
8.	Compare and contrast different voting systems and methods of apportionment.
9.	Identify and apply some basic terms, concepts, and applications of graph theory.

GENERAL EDUCATION CORE LEARNING OUTCOMES:
(THECB Objectives: Communication, Critical Thinking, Empirical/Quantitative Reasoning)
Upon completion of the course, the student should be able to:

1. Describe and communicate mathematical information verbally, numerically, graphically, and symbolically.
2. Use appropriate mathematical techniques to model situations from a variety of settings, including real-world applications in generalized mathematical forms.
3. Interpret mathematical models, such as formulas, graphs, tables, and schematics, and draw inferences from them.
4. Discern relationships and patterns in quantitative data to arrive at informed conclusions.
5. Utilize appropriate technology to enhance mathematical thinking and understanding, to solve mathematical problems, and to judge the reasonableness of the results.

GENERAL EDUCATION CORE LEARNING OUTCOMES VS.

COURSE LEARNING OUTCOMES

Course Outcome

Core Outcome	1	2	3	4	5	6	7	8	9
1	X	X	X	X	X	X	X	X	X
2	X	X	X	X	X				
3	X		X	X	X	X	X		X
4			X	X	X	X		X	
5				X	X		X		

TEXTBOOK: *Mathematics: A Practical Odyssey*, 7th Edition with Enhanced WebAssign, by David Johnson and Thomas Mowry, Brooks/Cole Publishing Company, Pacific Grove, California, 2012.

Each student is expected to purchase or otherwise have access to a scientific calculator throughout the semester and will be allowed to use it on exams (including the final exam).

Textbooks available in the UHD bookstore are bundled with access to Enhanced WebAssign which is a comprehensive course management system that algorithmically generates and automatically grades online homework assignments and quizzes. It further provides online access to many publisher services as well as a complete electronic version of the textbook (eBook).

Instructors are required to use WebAssign homework assignments and to count homework equivalent to a regular test grade. Students can purchase WebAssign access to the course at www.webassign.net to view an electronic copy of the textbook (eBook) and complete online homework for the course.

METHOD OF EVALUATION: Departmental policy requires the following:

1. A maximum of four and a minimum of three in-class tests and a comprehensive final exam must be given. The final exam must be taken by all students.
2. All major tests should be announced at least one week in advance.
3. The final exam counts 1/3 of the course grade.
4. Instructors are required to use WebAssign homework assignments and to count homework equivalent to a regular test grade. A MATH 1310 "Master Course" will be created in WebAssign each semester for instructors to copy into their WebAssign account to assist them in assigning WebAssign homework. Students can purchase WebAssign access to the course at www.webassign.net to view an electronic copy of the textbook (eBook) and complete online homework for the course. E-mail Tim Redl (redlt@uhd.edu) for more info.

5. The final course average will be used to assign the final course grade according to the standard college formula:
   90-100 → "A"
   80-89 → "B"
   70-79 → "C"
   60-69 → "D"
   0-59 → "F"
6. Neither an open book nor a take-home major test may be given. An equivalent version of a test may not be distributed to students before a major test. Any review sheet should be comprehensive and the student should not feel that classroom notes, homework or the text may be ignored in favor of the review sheet.
7. The instructor should assign a short paper and/or a brief in-class oral presentation to count the same as an in-class exam. The topic of such a paper may be some aspect of the history of mathematics, some contemporary application of mathematics, or an explanation/illustration of how math fits into the student's individual interests.
8. Peer-Interview Activity: Students will be paired up to participate in a peer-interview about a particular topic in mathematics. Choice of a topic and the specifics are left to the instructor (see example in the Appendix).

SOME ADDITIONAL DEPARTMENTAL POLICIES REGARDING THIS COURSE:

1. Each instructor must cover all course topics by the end of the semester.
2. Each instructor must include and evaluate activities that involve the use of scientific calculators. These activities are necessary to satisfy the use of technology learning outcome. Some online homework problems will assume the use of scientific calculators.
3. Each instructor must include short answer problems (non-multiple choice) on their tests. These problems are necessary to satisfy the written communication learning outcome.
4. Each instructor must set up a peer-interview activity and a post-interview quiz to evaluate it, which counts as part of the homework score. This activity is designed to satisfy the oral communication learning outcome. During the activity, students should explain to each other orally their solution to a mathematical problem and/or concepts from a particular topic in mathematics. Choice of a topic and the specifics are left to the instructor (see example in the Appendix). Our expectation is that students should be able to communicate mathematics using correct terminology and sound reasoning. They should be able to express themselves accurately and follow logical steps in their solutions. Aside from giving a correct solution they should be able to describe their thinking process to their peers (and ultimately to their instructor).

It is particularly helpful in this course to solve meaningful application problems and give problems in context wherever possible. Within the stated course objectives, instructors will employ various teaching methods and are encouraged to share their results with the department. Examples of such teaching methods include: having students write explanations of answers and methods where possible; having students work in groups during class when appropriate; having students do activities with scientific calculators where appropriate. Classroom kits of graphing calculators are also available from the department.

COURSE CONTENT:

Chapter	Sections
1: Logic	1.1: Deductive vs. Inductive Reasoning 1.2: Symbolic Logic 1.3: Truth Tables
2: Sets and Counting	2.1: Sets and Set Operations 2.2: Applications of Venn Diagrams 2.3: Introduction to Combinatorics 2.4: Permutations and Combinations
3: Probability	3.1: History of Probability 3.2: Basic Terms of Probability 3.3: Basic Rules of Probability 3.4: Combinatorics and Probability
4: Statistics	4.1: Population, Sample, and Data 4.2: Measures of Central Tendency 4.3: Measures of Dispersion 4.4: The Normal Distribution
5: Finance	5.1: Simple Interest 5.2: Compound Interest 5.3: Annuities
6: Voting and Apportionment	6.1: Voting Systems 6.2: Methods of Apportionment
9: Graph Theory	9.1: A Walk through Konigsberg 9.2: Graphs and Euler Trails 9.3: Hamilton Circuits 9.4: Networks

Additional sections may be covered at the discretion of the instructor, as time permits.

RESOURCE MATERIALS: Students enrolled in MATH 1310 at UHD have access to the Center for Math & Statistics (formerly called the Math Lab) in the Academic Support Center (925-N) where they may receive additional tutoring on understanding concepts or improving their skills. The Center is staffed with mathematics faculty and student assistants, and offers tutorial help, videotapes, calculators, and computers with web access on a walk-in basis. The Center maintains extensive hours which are published each semester. Please encourage students to make use of available services in the Center.

GENERAL UNIVERSITY POLICIES: All students are subject to UH-Downtown's Academic Honesty Policy and to all other university-wide policies and procedures as they are set forth in the UH-Downtown University Catalog and Student Handbook.

STATEMENT ON REASONABLE ACCOMODATIONS: UH-Downtown adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. Students with disabilities should register with Disabled Student Services (in S409) and contact me in a timely manner to arrange for appropriate accommodations. Whenever possible, and in accordance with 504/ADA guidelines, UHD will attempt to provide reasonable academic adjustments/auxiliary aids to students who request and require them. Students may call 713-226-5227 for more assistance.

APPENDIX 3: Peer-Interview Activity and Peer-Interview Assessment

Example of a Peer-Interview Activity: MATH 1310

Directions: Assign students to work in pairs (this will be better with two students but could accommodate three). Assign each student a mathematics problem from the course—the problem and topic should be up to the instructor. Each student is to prepare to present their strategy and solution to the problem to their partner. The presentation should take no more than 20 minutes total and students can present the problem to each other outside of class time if necessary. After their presentations to each other, each student will fill out a peer-interview assessment. The entire activity—the presentation and the assessment—should count for some portion of the homework grade.

Here is one example:

MATH 1310: The instructor decides to assign counting problems involving permutations and combinations.

For each problem, students are asked the following questions:

Question 1: Does this problem involve permutations or combinations? Explain.

Question 2: Describe at least two ways (for example, using a formula – which one?) that one could use to solve this problem, and then solve it.

Question 3: Modify the problem slightly in one of the following ways:

a) If the original problem is a "permutations problem", then the modification is a "combinations problem", or
b) If the original problem is a "combinations problem", then the modification is a "permutations problem", or
c) The modified problem is an exercise in calculating probability based on permutations or combinations

Question 4: Solve the modified problem and compare and contrast the solution to both problems.

Purpose of activity: This activity illustrates the expectation that students should be able to communicate mathematics using correct terminology. They should be able to discuss mathematics accurately and follow logical steps to get to their solution. Students should be able to be able to do more than just give the correct solution to a problem — they must also be able to communicate, in written and oral form, their knowledge of mathematics and describe their thinking process to their peers.

Peer-Interview Assessment: MATH 1310

A. Rate your partner's use of mathematical terminology.

1. He/she used words incorrectly
2. He/she mostly used words correctly
3. He/she used words correctly

B. Rate your partner's explanation of his/her solution to the problem.

1. I could not follow it at all
2. I understood most of what he/she was saying
3. The solution was clear and easy to follow

C. Rate your partner's ability to answer your questions in a helpful way.

1. He/she could not answer all of my questions
2. He/she answered most of my questions satisfactorily
3. He/she was able to answer all of my questions thoroughly

D. Rate your partner's presentation of his/her solution to the problem.

1. Inadequate
2. Adequate
3. Superior