

Component Area Option (a): Mathematics/Reasoning - MATH - 1313

Restricted Use - AR -UGRD Course - REVISE existing Core Course <or> Revise existing non-core course to ADD to Core

General Information

Please use this form to:

- **REVISE** a course that is already on the Core course list.
- **ADD** to the Core course list an existing permanent course that is not already on the Core course list

Course Ownership

Department* Department of Mathematics

Will the course be cross-listed with another area?*

Yes

No

If "Yes", please enter the cross-listed course information (Prefix Code Title)

Implementation

Academic Year to begin offering course:*

2015

2016

2017

Term(s) Course will be TYPICALLY Offered:*

Fall (including all sessions within term)

Spring (including Winter Mini all sessions within term)

Summer (including Summer Mini and all sessions within term)

Justification for changing course

Justification(s) for Adding Course*

1. REVISE EXISTING non-CORE COURSE ADD TO CORE

Justification "Other" if selected above:

Importing course information for revising existing Core course

Instructional Area/Course Prefix* MATH

Course Number* 1313

Long Course Title* Finite Mathematics with Applications

Short Course Title

Instruction Type and Student Contact Hours

Instruction Type* Lecture ONLY

Contact Hours

Student Contact Hours are determined by a number of factors, including instruction type, and are used to determine the accuracy of credit hours earned by accrediting agencies and THECB. Please contact your college resource for assistance with this information.

Student Contact Hours must match the instruction type.

Eg: If Lecture ONLY, then Student Contact Hours for Lab must be zero.

Eg: If Lab ONLY, then Student Contact Hours for Lecture must be zero.

Lecture* 3

Lab* 0

Grade Options

Grade Option* Letter (A, B, C.....)

CIP Code

The CIP Code is used by the university and the THECB to determine funding allocated to the course, which means that selecting the most helpful valid code may have an effect on your course.

If assistance is needed with code selection, please contact your college resource.

CIP Code Directory: <http://www.txhighereddata.org/Interactive/CIP/>

CIP Code must use this format:
##.####.## ##

Course Repeatability

Can this course be repeated for credit?*

Yes No

If Yes, how often and/or under what conditions may the course be repeated?

CIP Code* 27.0101.00 01

Catalog Descriptions

Prerequisite(s):* *Prerequisite:* credit for or placement out of MATH 1310.

Corequisite(s)

Course
Description*

Systems of linear equations, introduction to linear programming, mathematics of finance, topics in probability and statistics.

Course Notes **Note:** Students with prior credit for MATH 2331 will not receive credit for MATH 1313. May not apply to course or gpa requirements for a major or minor in natural sciences and mathematics.

Authorized Degree Program(s)

Impact Report *

Impact Report for Math 1313

Prerequisite:	MATH 2303 - Concepts in Algebra
	MATH 3303 - Elements of Algebra and Number Theory
	MATH 3304 - Elements of Mathematical Analysis
	MATH 3305 - Formal and Informal Geometry
	FINA 4334 - Managerial Analysis
	FINA 3332 - Principles of Financial Management
	MATH 3306 - Problem Solving in Mathematics
	TELS 4341 - Production and Service Operations
	TELS 4342 - Quality Improvement Methods
	SCM 3301 - Service and Manufacturing Operations
	STAT 3331 - Statistical Analysis for Business Applications I
	MATH 3307 - Statistical Applications
Note:	MATH 1313 - Finite Mathematics with Applications
Programs	Construction Management, B.S.
	Digital Media, B.S.

	Finance Minor
	General B.B.A. Requirements
	Organizational Leadership and Supervision, B.S.
	Personal Financial Planning Minor
	Risk Management and Insurance Minor
	Sample B.B.A. Degree Plan
	Supply Chain and Logistics Technology, B.S.
	Supply Chain Management Minor

Core Curriculum Information

For additional guidance when developing course curriculum that will also meet the Core Curriculum requirements, please refer to the Undergraduate Committee website for Core Curriculum:

http://www.uh.edu/undergraduate-committee/doc_2014-core-review.html

Therein you will find a chart for the required and optional competencies based on the Core Component Area (Core Category) selected.

<p>Component Area for which the course is being proposed (select one)*</p>	<p>Component Area Option (a): Mathematics/Reasoning</p>
<p>List the student learning outcomes for the course*</p>	<p>Upon successful completion of this course, students will be able to solve systems of linear equations and inequalities in a variety of ways. They will apply these skills to mathematical descriptions of real-world scenarios and will be able to communicate their conclusions. They will be able to apply algebraic methods in solving problems in business and financial mathematics. They will understand and be able to use various counting techniques and will apply them to elementary problems in probability. They will learn elementary methods of descriptive and inferential statistics and will appreciate the role of statistics in thinking critically about other areas of knowledge</p>
<p>Competency areas addressed by the course*</p>	<p>Communication Skills</p> <p>Critical Thinking</p> <p>Empirical & Quantitative Skills</p>

Because we will be assessing student learning outcomes across multiple core courses, assessments assigned in your course must include assessments of the core competencies. For each competency selected above, indicated the specific course assignment(s) which, when completed by students, will provide evidence of the competency.

Provide (upload as attachment) detailed information, such as copies of the paper or project assignment, copies of individual test items, etc. A single assignment may be used to provide data for multiple competencies.

Critical Thinking, if applicable Much of the course requires mathematical critical thinking. Questions 3, 4, 5, 8 etc of the attached would all be evaluations of critical thinking skills.

Communication Skills, if applicable Writing equations is a mathematical communication skill. Thus questions 1, 2, 5, and 11 of the attached exam serve to illustrate this skill.

Empirical & Quantitative Skills, if applicable As a lower-division math course, much of the material requires quantitative skills. Virtually every question in the attached exam would serve to evaluate these skills.

Teamwork, if applicable

**Social
Responsibility, if
applicable**

**Personal
Responsibility, if
applicable**

Syllabus

Syllabus* Syllabus Attached

**Will the syllabus
vary across
multiple section of
the course?*** Yes No

**If yes, list the
assignments that
will be constant
across sections**

Important information regarding Core course effectiveness evaluation:

Inclusion in the core is contingent upon the course being offered and taught at least once every other academic year. Courses will be reviewed for renewal every 5 years.

The department understands that instructors will be expected to provide student work and to participate in university-wide assessments of student work. This could include, but may not be limited to, designing instruments such as rubrics, and scoring work by students in this or other courses. In addition, instructors of core courses may be asked to include brief assessment activities in their course.

Additional Information Regarding This Proposal

Comments:

Math 1313: Finite Math Course Syllabus

Section number: This information applies to ALL face-to-face sections

Delivery format: face-to-face lecture

Prerequisites: Credit for or placement out of math 1310. Students with prior credit of MATH 2331 or INDE 2331 will not receive credit for this course. May not apply to a major or minor in Mathematics.

Textbook: Available in electronic form (PDF) through CASA for all enrolled students.

The information contained in this class outline is an abbreviated description of the course. Additional important information is contained in the departmental policies statement at <http://www.math.uh.edu/~dog/13xxPolicies.doc> and at your instructor's personal webpage. You are responsible for knowing all of this information.

Upon successful completion of this course, students will be able to solve systems of linear equations and inequalities in a variety of ways. They will apply these skills to mathematical descriptions of real-world scenarios and will be able to communicate their conclusions. They will be able to apply algebraic methods in solving problems in business and financial mathematics. They will understand and be able to use various counting techniques and will apply them to elementary problems in probability. They will learn elementary methods of descriptive and inferential statistics and will appreciate the role of statistics in thinking critically about other areas of knowledge.

A student in this class is expected to complete the following assignments:

- 1 Online Exam (prerequisite)
- 2 3 Regular Exams
- 3 Final Exam
- 4 Online Quizzes – about one per week.
- 5 Homework – on each section of the textbook covered in class
- 6 Poppers – in-class quizzes given daily starting the 3rd week of classes.

Grading

Online Exam: 8%

Regular Exams: 42% (14% each)

Final Exam: 18%

Online Quizzes: 12%

Daily Classroom Quizzes (Poppers): 10%

Homework: 10%

Total: 100%

The learning materials for Math 1313, including the textbook, are found online on the CourseWare site at www.casa.uh.edu. Students are required to purchase an access code at the Book Store to access the learning materials.

Math 1313 Finite Math – Topics List

Linear Equations

- Slope and Equations of Lines
- Graphs of Linear Equations
- Systems of Linear Equations
- Graphs of Linear Inequalities
- Linear Models

Solving Equations and Inequalities

- Solving Linear Programming Problems
- Applications of Linear Programming

Matrices

- Matrices
- Solving Systems of Linear Equations
- Matrix Operations
- Matrix Multiplication
- The Inverse of a Matrix

Math of Finance

- Simple Interest and Compound Interest: Future and Present Value
- Annuities: Future Value and Present Value
- Sinking Funds and Amortizations

Sets and Counting Techniques

- Sets and Venn Diagrams
- The Number of Elements in a Set
- The Multiplication Principle
- Permutations and Combinations

Probability

- Experiments, Events and Sample Spaces
- Introduction to Probability
- Rules of Probability
- Using Counting Techniques in Probability
- Conditional Probability
- Bayes Theorem

Random Variables, Probability Distribution and Statistics

Random Variable

Expected Value and Odds

Variance and Standard Deviation

The Binomial Distribution

The Normal Distribution

Applications

Whenever possible, and in accordance with 504/ADA guidelines, the University of Houston will attempt to provide reasonable academic accommodations to students who request and require them. Please call 713-743-5400 for more assistance.

Math 1313 Course Objectives

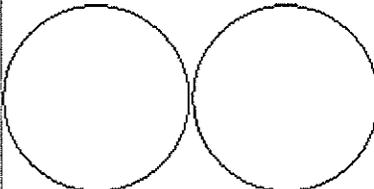
Chapter.Section	Objective and Examples	Material Covered by End of Week #
1.3	<p>Given a linear depreciation problem, find the rate of depreciation, the expression that expresses the book value at the end of t years and the value of the asset after a given amount of years.</p> <p>Example: A company purchased a car in 2000 for \$13,000. The car is depreciated linearly for 5 years. The scrap value of the car is \$4,000. What is the rate of depreciation? Write the expression that expresses the book value of the car after t years of use. What is the value of the car in 2003?</p> <p>Given the production cost, selling price of a product and the fixed costs of the company, find the cost function, revenue function, profit function, and compute the profit or loss corresponding to certain production levels.</p> <p>Example A company has a fixed cost of \$100,000 and a production cost of \$14 for each unit produced. The product sells for \$20 per unit. What is the cost function? What is the revenue function? What is the profit function? What is the break-even point? What is the profit or loss corresponding to a production level of 12,000 and 20,000 units?</p>	2

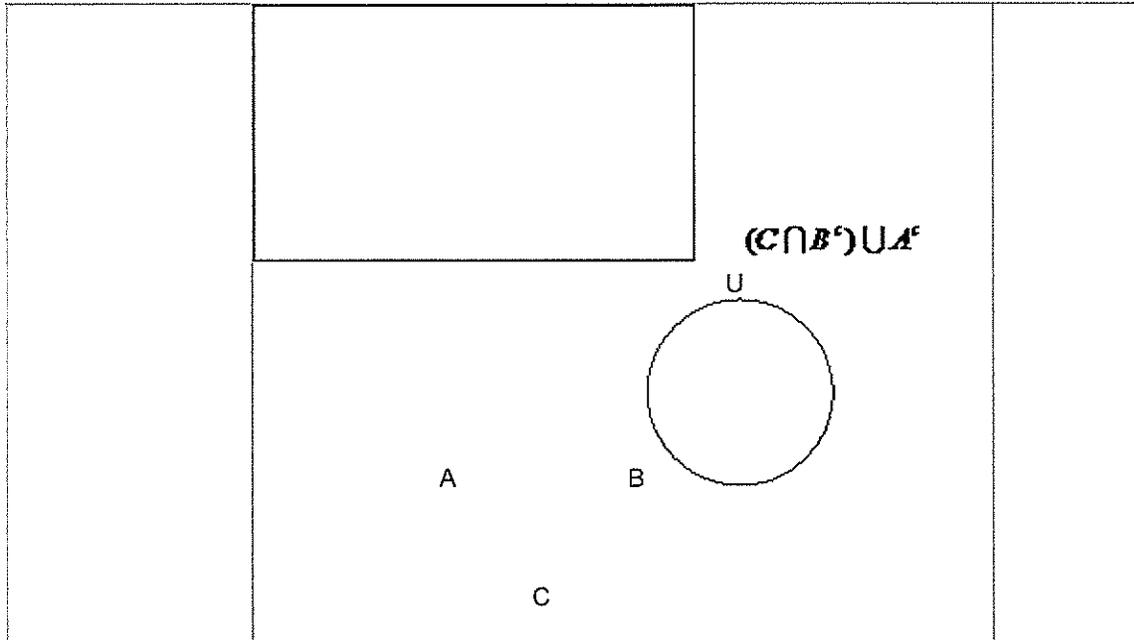
Chapter.Section	Objective and Examples	Material Covered by End of Week #
1.4	<p>Given a word problem find break-even quantity, break-even revenue and break-even point of the company.</p> <p>Example A company has a fixed cost of \$100,000 and a production cost of \$14 for each unit produced. The product sells for \$20 per unit.</p>	2

	What is the break-even quantity? What is the break-even revenue? What is the break-even point?	
--	--	--

Chapter.Section	Objective and Examples	Material Covered by End of Week #														
1.5	<p>Given a set of data or a word problem, find the equation for the least-square line of the data and use this equation to predict a certain future value.</p> <p>Example: _____</p> <p>The size of the average farm in a certain town has been growing steadily over the years. The accompanying data was collected and gives the size of the average farm y (in acres) from 1945 to 1995. (Here $x = 0$ corresponds to the beginning of the year 1945.)</p> <table border="1"> <tr> <td>Year, x</td> <td>0</td> <td>10</td> <td>20</td> <td>30</td> <td>40</td> <td></td> </tr> <tr> <td>Acres, y</td> <td>57</td> <td>63</td> <td>76</td> <td>88</td> <td>92</td> <td>Number of</td> </tr> </table> <p>a. Find the equation of the least-squares line for these data. b. Use the result in part (a) to estimate the size of the average farm in the year 1998.</p>	Year, x	0	10	20	30	40		Acres, y	57	63	76	88	92	Number of	3
Year, x	0	10	20	30	40											
Acres, y	57	63	76	88	92	Number of										
Chapter.Section	Objective and Examples	Material Covered by End of Week #														
3.2, 3.3	<p>Set up and solve a linear programming problem.</p> <p>Example: A company manufactures two products, A and B, on two machines I and II. It has been determined that the company will realize a profit of \$3 on each unit of product A and a profit of \$4 on each unit of product B. To manufacture a unit of product A requires 6 min on machine I and 5 min on machine II. To manufacture a unit of product B requires 9 min on machine I and 4 min on machine II. The company has 5 hours of machine time on machine I and 3 hours of machine time on machine II in each work shift. How many units of each product should be produced in each shift to maximize the company's profit? Set up the linear programming problem then solve it.</p>	4														

Chapter.Section	Objective and Examples	Material Covered by End of Week #
5.1-5.3	<p>Given a certain math of finance problem, recognize what kind of problem it is and solve it. The kind of</p>	5

	<p>problems given will be: simple interest, future value or present value with simple interest, effective rate, future value or present value with compound interest, future value or present value of an annuity, amortization, or sinking fund.</p> <p>Example: A company would like to have \$50,000 in 2 years to replace machinery. The account they wish to invest in earns 3.45% per year compounded quarterly. How much should they deposit into this account each quarter to have the desired funds in 2 years?</p> <ol style="list-style-type: none"> What kind of problem is this? Solve the problem. <p>Example: Karen has decided to deposit \$300 each month into an account that earns 2.34% per year compounded monthly. How much will she have in this account after 3 years?</p> <ol style="list-style-type: none"> What kind of problem is this? Solve the problem. 	
Chapter.Section	Objective and Examples	Material Covered by End of Week #
6.1	<p>Given sets, list the subsets and proper subsets of a set. Find the union, intersection and/or complement of certain given sets.</p> <p>Example: Let $U = \{1,2,3,4,5,6,7,a,b,c,d,e\}$, $A = \{1,2,3,4,5,a,b,c\}$, $B = \{1,3,5,6,a,c,d\}$, and $C = \{2,4,7,b,d,e\}$, and $D = \{1,2,a\}$</p> <ol style="list-style-type: none"> List the subsets of D. Find $(A \cup B)$ $(B^c \cap C) \cup A$ <p>Use Venn diagram shading to find the union, intersection and/or complement of certain given sets.</p> <p>Example: Given the following Venn diagram, shade the given set.</p> 	6



Chapter.Section	Objective and Examples	Material Covered by End of Week #
6.2	<p>Find the number in sets by using formulas or Venn diagram shading.</p> <p>Example: Of 30 elementary school children, 15 read a book last summer, 17 practiced math last summer and 7 read a book and practiced math last summer. How many of the 30 children:</p> <ol style="list-style-type: none"> did not read a book last summer? read a book but did not practice math last summer? did not read a book and did not practice math last summer? 	7
Chapter.Section	Objective and Examples	Material Covered by End of Week #
6.3, 6.4	<p>Solve word problems by using counting technique(s) such as the multiplication principle, combination or permutation.</p> <p>Example: A coin is tossed 20 times, how many outcomes are there?</p> <p>Example: In how many ways can you arrange 3 different pictures from 5 available on a wall from left to right? Example: In how many ways can you choose 3 mystery</p>	8

	books from a collection of 15 mystery books and 5 romance books from a collection of 20 romance books?	
--	--	--

Chapter.Section	Objective and Examples	Material Covered by End of Week #
7.1, 7.2	<p>Given a set of data or a certain experiment, list the simple events, find the probability of each of the simple events, find the probability distribution, and find the probability of an event that consists of more than one simple event.</p> <p>Example: A pair of dice is cast. List the simple events. Assign probabilities to each of the simple events. Find the probability distribution of the experiment. Find the probability that the sum of the numbers is even.</p>	9

Chapter.Section	Objective and Examples	Material Covered by End of Week #
7.3	<p>Given a word problem, use formulas or Venn diagram shading to find the probability of the union, intersection and/or complement of certain events.</p> <p>Example: Of 30 elementary school children, 15 read a book last summer, 17 practiced math last summer and 7 read a book and practiced math last summer.</p> <p>What is the probability that a child selected at random</p> <ol style="list-style-type: none"> did not read a book last summer? read a book but did not practice math last summer? did not read a book and did not practice math last summer? 	9

Chapter.Section	Objective and Examples	Material Covered by End of Week #
7.4	<p>Use counting techniques to find the probability of certain events.</p> <p>Example: A box contains 25 batteries of which 5 are defective. A random sample of 4 is chosen. What is the probability that at least 2 are defective?</p>	10

Chapter.Section	Objective and Examples	Material Covered by End of Week #
7.5	<p>Use the conditional probability formula or tree diagrams to aid in finding certain probabilities.</p> <p>Example: A group of senators is comprised of 48 Democrats and 52 Republicans. Seventy-one percent of the Democrats served in the military, whereas 68% of the Republicans served in the military. What is the probability that a senator chosen at random</p> <ol style="list-style-type: none"> is Republican? Is a Democrat and did not serve in the military? served in the military? did not serve in the military, given that he/she is a Democrat? <p>Given that certain events are independent, find the probability of the intersection of those independent events.</p> <p>Example: If A and B are independent events and $P(A)=0.4$ and $P(B)=0.6$, find $P(A \cup B)$.</p>	11

Chapter.Section	Objective and Examples	Material Covered by End of Week #
7.6	<p>Use tree diagrams and Bayes' formulas to find certain conditional probabilities.</p> <p>Example: A group of senators is comprised of 48 Democrats and 52 Republicans. Seventy-one percent of the Democrats served in the military, whereas 68% of the Republicans served in the military. What is the probability that a senator chosen at random is a Republican, given that he/she served in the military?</p>	11

Chapter.Section	Objective and Examples	Material Covered by End of Week #
8.1	<p>Given a probability distribution, find certain probabilities and draw a histogram associated with the given probability distribution. Construct the probability distribution of a random variable.</p> <p>Example: The probability distribution of the random variable X is shown below.</p>	12

	x	$P(X=x)$
	1	0.2
	2	0.3
	3	0.5
<p>a. Find $P(1 < X \leq 3)$.</p> <p>b. Draw the histogram corresponding to the given probability distribution.</p>		
<p>Example: Given the following frequency table, construct the probability distribution associated with the random variable X.</p>		
	x	$P(X=x)$
	1	45
	2	20
	3	32

Chapter.Section	Objective and Examples	Material Covered by End of Week #
8.2	<p>Find the expected value of a given probability distribution or of a word problem.</p> <p>Example: The following probability distribution tables describes the number of cars, x, that a certain car dealer will sell in a given day along with its associated probability.</p> <div style="text-align: center;"> x </div> <div style="text-align: center;"> $P(X=x)$ </div>	12

	<p>1 0.2 2 0.3 3 0.5</p> <p>Find the expected number of cars the car dealer will sell in a given day.</p> <p>Given a word problem, find the odds in favor, odds against or given the odds find a certain probability.</p> <p>Example: The odds in favor of an event occurring are 4 to 5. What is the probability of the event not occurring?</p>	
--	---	--

Chapter.Section	Objective and Examples	Material Covered by End of Week #												
8.3	<p>Given a probability distribution or a word problem, find the variance and standard deviation.</p> <p>Example: Given</p> <table style="margin-left: 40px;"> <tr> <td style="border-top: 1px solid black; border-bottom: 1px solid black;">1</td> <td style="border-top: 1px solid black; border-bottom: 1px solid black;">0.2</td> <td style="border-top: 1px solid black; border-bottom: 1px solid black;">_____x</td> <td style="border-top: 1px solid black; border-bottom: 1px solid black;">$P(X=x)$</td> </tr> <tr> <td>2</td> <td>0.3</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>0.5</td> <td></td> <td></td> </tr> </table> <p>Find the variance and standard deviation. Use Chebychev's inequality to estimate a certain probability.</p> <p>Example: The expected lifetime of a certain machine is 24 mo and the standard deviation is 3 mo. Use Chebychev's inequality to estimate the probability that one of these machines will last between 20 and 28 mo.</p>	1	0.2	_____x	$P(X=x)$	2	0.3			3	0.5			13
1	0.2	_____x	$P(X=x)$											
2	0.3													
3	0.5													

Chapter.Section	Objective and Examples	Material Covered by End of Week #
8.4	<p>Given a binomial experiment, find certain probabilities, the mean, the variance, and the standard deviation.</p> <p>Example: The probability that a certain CD player will be</p>	13

	<p>defective is 0.04. If a sample of 15 CD players is chosen at random, what is the probability that the sample contains</p> <ol style="list-style-type: none"> no defective CD players? at most 3 defective CD players? Find the mean, variance and standard deviation of this experiment. 	
--	--	--

Chapter.Section	Objective and Examples	Material Covered by End of Week #
8.5	<p>Given a standard normal distribution, find certain probabilities or given the probability find the value of z.</p> <p>Example: Let Z be a standard normal random variable. Find:</p> <ol style="list-style-type: none"> $P(Z < 1.34)$ $P(Z > -2.33)$ $P(-0.23 < Z < 1.22)$ <p>Example: Let Z be a standard normal random variable. Find the value of z if:</p> <ol style="list-style-type: none"> $P(Z > z) = 0.8749$ $P(-z < Z < z) = 0.4908$ <p>Given a normal distribution, possibly a word problem, standardize it to find certain probabilities.</p> <p>Example: Let X be a normal random variable. The mean is 25 and the standard deviation is 4. Find:</p> <ol style="list-style-type: none"> $P(X < 30)$ $P(X > 10)$ $P(15 < X < 25)$ 	14

Chapter.Section	Objective and Examples	Material Covered by End of Week #
8.6	<p>Use the normal distribution to approximate a binomial distribution.</p> <p>Example: Use the normal distribution to approximate the following binomial distribution. A biased coin is tossed 100 times. The probability of obtaining a head is 30%. What is the probability that the coin will land heads at least 90 times?</p>	14