CORE CURRICULUM COMPONENT APPLICATION
Sam Houston State University

Revised October, 2012

PART I – Course Information

Course Type
☒ Existing/Restructured
☐ New Course Proposed Fall 2013
If new, have you submitted a Form B to the SHSU Curriculum Committee? ☐ Yes ☐ No

Course Prefix & Number: MATH 1324

Texas Common Course Number (TCCN Matrix): MATH 1324

Course Title: Mathematics for Managerial Decision Making I

Course Catalog Description (Copy and paste from online catalog for existing courses):
Topics include a review of introductory algebra, equations, relations, functions, graphs, linear programming, systems of equations and matrices, and mathematics of finance.

Course Prerequisites: THEA score of 270 or its equivalent.

Available Online?
☐ Yes, currently developed in online delivery mode
☐ Anticipated development in online delivery mode (Semester, Year:)
☒ No

Number of Sections to be Offered per Academic Year: 24

Estimated Enrollment per Section: 45

Course Level (freshman, sophomore): Freshman

Designated Contact Person (for follow-up communication purposes): Dr. Rebecca Garcia

E-Mail Address: rgarcia@shsu.edu

Phone: 936-294-3520

Approvals

Department Chair:	Signature	10-22-12 Date
Academic Dean:	Signature	10/22/12 Date

Submit completed, signed form to Core Curriculum Committee - Box 2478 or Fax 4-1271

PART II – THECB Foundational Component Areas

See Appendix for full description of each component area.

Select Component Area: II. Mathematics

In one paragraph, describe how the proposed course will fulfill the core and skill objectives of the component area: The purpose of a course on Mathematics for Managerial Decision Making I is to present mathematical skills and concepts and develop methods to apply them to ideas that are important to students in the management, life and social sciences. Students completing this course will be able to define each function in general, state properties of each (such as their domain and range), combine functions via arithmetic operations and composition, and provide examples of applications in which they are used. Implicitly, students successfully completing this course will (1) refine their understanding of key mathematical concepts such as functions and their general properties, (2) be familiar enough with these properties in order to use the functions in the subsequent course, and (3) learn when and how to apply the needed mathematical functions and concepts in appropriate settings.

PART III – Course Objectives & Student Learning Outcomes (SLO)

Insert the applicable course objectives stated as student learning outcomes (e.g., Students completing the course will be able to...) that support the core component area objectives. Please reference the component rubric for additional information on core component area objectives.

Objective/SLO 1: Students successfully completing this course will gain a greater understanding of the use of algebraic, exponential, and logarithmic functions in describing natural and physical arrangements; refine pattern recognition skills via graphing these functions and verification and/or proof of identities; and reformulate real world problems into accurate mathematical expressions that can be solved. In so doing, students will have increased quantitative literacy in the logic of describing geometric arrangements using algebraic, exponential, and logarithmic functions, the patterns within the properties of these functions, and the relationships among these functions.

How will the objective be addressed (including strategies and techniques)?
Through the topic of finance, students will be exposed to the relationship between the quantitative properties and uses of mathematical functions which arise naturally in this area (exponential and logarithmic functions, polynomial expressions and simple formulas which underlie notions of interest, future and present values of ordinary annuities and compound interest). Students will be exposed to the relationship between the definitions and properties of polynomial, rational, exponential and logarithmic functions and their graphical representation. In particular, students will be able to recognize a modified exponential function from its graph and provide its functional definition. In addition, students will be able to relate certain properties of each of these functions to the other functions. For example, students will be able to determine which logarithmic function is the inverse of a given exponential function.

Describe how the objective will be assessed: This objective will be assessed through embedded problems in quizzes, exams, and/or in-class worksheets. Instructors will incorporate a common subset of problem types in the final exam of each section. As an example, instructors will be asked to include a question that requires the student to determine which function is the inverse of specified algebraic function.

Objective/SLO 2: Students successfully completing this course will be able to state fully the definitions, properties, and uses of general polynomial, rational, exponential, and logarithmic functions. Emphasis will be placed on accurately representing given mathematical information both symbolically and graphically, with attention given to determining the domains and ranges of these functions, as well as translating between the graphical form of a function and its definition. In so doing, students will gain a greater understanding of key mathematical concepts.

How will the objective be addressed (including strategies and techniques)?
To comprehend the importance and uses of these functions in managerial sciences, their definitions must be understood, in particular their domains and ranges. Simply being able to compute function values on a calculator will not provide the skills necessary to use these functions properly nor correctly apply them when solving problems. Successful students will therefore be able to identify the domain, range, graph, and other fundamental properties of each of these functions.

In addition, the key uses of these algebraic and transcendental functions will be more fully understood after students are able to express information that is presented graphically or verbally as an equation involving these functions. That is, students will be able to sketch the graph of a given function; and be able to describe the type of function whose graph most closely matches one that is given; and be able to provide the function which most closely models a given set of circumstances.

Describe how the objective will be assessed: This objective will be assessed through embedded problems in quizzes, exams, and/or in-class worksheets. Instructors will incorporate a common subset of problem types in the final exam of each section. As an example, instructors will be asked to include a question requiring that the student sketch the graph of a given function, describe the type of function whose graph most closely matches one that is given or provide the function which most closely models a given set of circumstances.

Objective/SLO 3: Students successfully completing this course will solve problems using mathematical concepts, and judge the level of reasonability of the results. Students will learn to interpret mathematical formulas, graphs and tables and will expand their mathematical reasoning skills to develop sound mathematical arguments.

How will the objective be addressed (including strategies and techniques)?
Applications are an important part of understanding the key mathematical concepts used in managerial sciences. In particular, the applications have implicit conditions wherein these concepts make sense (e.g., a nonnegative reasonable production quantities within a particular range of values). Significant time will be spent on developing principle ideas arising from economics and finance; specifically how the properties of these functions are applied to further understanding these applications. Problems such as optimizing quadratic functions will be presented which do not explicity involve calculus.

Describe how the objective will be assessed: This objective will be assessed through embedded problems in quizzes, exams, and/or in-class worksheets. Instructors will incorporate a common subset of problem types in the final exam of each section. As an example, instructors will be asked to include a

question that requires the student to use rules of inference to validate an arugment, or to use Venn diagrams to analyze results of surveys.

Objective/SLO 4:

How will the objective be addressed (including strategies and techniques)?

Describe how the objective will be assessed:

Objective/SLO 5:

How will the objective be addressed (including strategies and techniques)?

Describe how the objective will be assessed:

PART IV – THECB Skill Objectives

Address each of the THECB skill objectives required within the component area. Explain how the skill is addressed, including specific strategies to address the skill(s). *Address ALL skill objectives associated with the selected Component Area. (See Appendix)*

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

How will the skill be addressed (including specific strategies, activities, and techniques)?
Students' conceptual understanding of the key ideas of mathematics is often accomplished by actively working on assigned problems that illustrate the topic graphically, numerically, symbolically and verbally. This process requires students to think critically about the problems and to evaluate, analyze and sythesize the given information.

The first stage in the development of mathematical and critical thinking is the acquisition of a clear, intuitive picture of the central ideas of a given problem. Next, the student learns to reason with their intuition and explain the reasoning clearly, in plain language. Once this foundation has been laid, students advance their understanding of theoretical constructs and applications applied to other disciplines. Each stage develops the students' skills from symbolic algebraic manipulation through logic and reasoning, pattern recognition and formulating accurate generalizations of observable phenomena.

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

How will the skill be addressed (including specific strategies, activities, and techniques)?
Students will develop their written, oral and visual communication skills as a natural part of the learning mathematics. For example, obtaining a true understanding of the content of amortized loans requires understanding the concept that the future values of the compounded growth and annuities intersect at the end of the term. Students are routinely asked to explore and explain a variety of mathematical concepts and applications in writing exercises that challenge students to discuss important concepts such as voting and apportionment methods, analyzing surveys, and validating arguments. In addition, many of the exercises task the student with translating plain language into symbolic mathematical expressions, resolving the problems algebraically, and communicating the results in plain language, either verbally or written.

Improving communication skills would be addressed in one of two ways, either in the form of class presentations or within group work. In those classrooms which implement student presentations, students will be expected to present solutions to several problems to the rest of the class on a regular basis.

Solutions will be presented in both written form (on the board, in front of the room) and orally (explaining methods used and conclusions drawn). Students presenting solutions will receive immediate feedback from those students listening to the presentation.

Those classrooms not having students present their work to their classmates will use group work to address communication skills. On a regular basis (such as during weekly quizzes) the class will be partitioned into small groups of three or four students, and each group will work on either a lengthy problem or on a sequence of problems related to selected topics. The groups will either be assigned by the instructor or formed by the students. Typically each student turns in her own set of solutions, requiring communication among group members, ensuring complete, correct solutions.

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

How will the skill be addressed (including specific strategies, activities, and techniques)?
As a natural part of the curriculum for mathematics for managerial sciences, students must develop skills to manipulate mathematical expressions, analyze numerical data or observable facts to provide accurate and informed conclusions. Early on, multiple representations of the basic functions are stressed: verbal, visual, algebraic and numeric. Students will learn to generate and interpret graphical representations of functions and symbolic formulae as tools for understanding both the quantitative and empirical real-world relationships of functions.

4. Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

How will the skill be addressed (including specific strategies, activities, and techniques)?

5. Personal Responsibility: to include the ability to connect choices, actions and consequences to ethical decision-making

How will the skill be addressed (including specific strategies, activities, and techniques)?

6. Social Responsibility: to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities

How will the skill be addressed (including specific strategies, activities, and techniques)?

PART V – SHSU Core Curriculum Committee Requirements

1. Using a 15-week class schedule, identify the topics to be covered during each week of the semester. Provide sufficient detail to allow readers to understand the scope and sequence of topics covered.

Week 1	Real Numbers and Polynomials
Week 2	Algebra of Polynomials
Week 3	Solving Equations and Inequalities
Week 4	Cartesian Coordinates and Graphs
Week 5	Linear Equations
Week 6	Algebra of Functions
Week 7	Quadratic Functions
Week 8	Modeling with Functions
Week 9	Exponential and Logarithmic Functions
Week 10	Applications of Exponential and Logarithmic Functions
Week 11	Future and Present Value
Week 12	Amortization and Sinking Funds
Week 13	Systems of Linear Equations
Week 14	Augmented Matrices
Week 15	Matrix Arithmetic

2. Attachments (Syllabus Required)

Syllabus Attached? ☒ Yes ☐ No

Other Attached? ☐ Yes ☐ No If yes, specify:

Appendix: THECB Component Area Descriptions and Skill Requirements

I. Communication (Courses in this category focus on developing ideas and expressing them clearly, considering the effect of the message, fostering understanding, and building the skills needed to communicate persuasively. Courses involve the command of oral, aural, written, and visual literacy skills that enable people to exchange messages appropriate to the subject, occasion, and audience.)

II. Mathematics (Courses in this category focus on quantitative literacy in logic, patterns, and relationships. Courses involve the understanding of key mathematical concepts and the application of appropriate quantitative tools to everyday experience.)

III. Life and Physical Sciences (Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.)

IV. Language, Philosophy, and Culture (Courses in this category focus on how ideas, values, beliefs, and other aspects of culture express and affect human experience. Courses involve the exploration of ideas that foster aesthetic and intellectual creation in order to understand the human condition across cultures.)

V. Creative Arts (Courses in this category focus on the appreciation and analysis of creative artifacts and works of the human imagination. Courses involve the synthesis and interpretation of artistic expression and enable critical, creative, and innovative communication about works of art.)

VI. American History (Courses in this category focus on the consideration of past events and ideas relative to the United States, with the option of including Texas History for a portion of this component area. Courses involve the interaction among individuals, communities, states, the nation, and the world, considering how these interactions have contributed to the development of the United States and its global role.)

VII. Government/ Political Science (Courses in this category focus on consideration of the Constitution of the United States and the constitutions of the states, with special emphasis on that of Texas. Courses involve the analysis of governmental institutions, political behavior, civic engagement, and their political and philosophical foundations.)

VIII. Social and Behavioral Sciences (Courses in this category focus on the application of empirical and scientific methods that contribute to the understanding of what makes us human.
Courses involve the exploration of behavior and interactions among individuals, groups, institutions, and events, examining their impact on the individual, society, and culture.)

Required Skill Objectives

Foundational Component Areas	Skill Objectives					
	Critical Thinking	Communication	Empirical & Quantitative	Team Work	Social Responsibility	Personal Responsibility
Communication	✓	✓		✓		✓
Mathematics	✓	✓	✓			
Life and Physical Sciences	✓	✓	✓	✓		
Language, Philosophy & Culture	✓	✓			✓	✓
Creative Arts	✓	✓		✓	✓	
American History	✓	✓			✓	✓
Government/Political Science	✓	✓			✓	✓
Social and Behavioral Sciences	✓	✓	✓		✓	

Submit completed, signed form to Core Curriculum Committee - Box 2478 or Fax 4-1271

Math 1324 Course Syllabus

Mathematics for Managerial Decision Making I

Location:
Time and Days:
Professor:
Office:

Telephone:
e-mail:
Office hours:

Course Description: Topics include a review of introductory algebra, equations, relations, functions, graphs, linear programming, systems of equations, matrices and mathematics of finance, 3 credits.

Prerequisite: Two years of high school algebra and one year of high school geometry.

Required Materials: We will be using the following required textbook:
It is the responsibility of the student to obtain all course materials at the beginning of the semester. We will be using the text in class. A graphing/scientific/business/engineering calculator, like the TI-83 or TI-84 is required for this course. Check with professor for approved calculators. The use of cellular telephones is prohibited in the classroom.
Course Objectives: Students successfully completing this course should have mastery of the topics listed below.

- Functions and Their Graphs
- Exponential and Logarithmic Functions
- Mathematics of Finance
- Systems of Linear Equations and Matrices
- Linear Programming

Students successfully completing this course will gain a greater understanding of the use of algebraic, exponential, and logarithmic functions in describing natural and physical arrangements; refine pattern recognition skills via graphing these functions and verification and/or proof of identities; and reformulate real world problems into accurate mathematical expressions that can be solved. In so doing, students will have increased quantitative literacy in the logic of describing geometric arrangements using algebraic, exponential, and logarithmic functions, the patterns within the properties of these functions, and the relationships among these functions.

Students successfully completing this course will be able to state fully the definitions, properties, and uses of general polynomial, rational, exponential, and logarithmic functions. Emphasis will be placed on accurately representing given mathematical information both symbolically and graphically, with attention given to determining the domains and ranges of these functions, as well as translating between the graphical form of a function and its definition. In so doing, students will gain a greater understanding of key mathematical concepts.

Students successfully completing this course will solve problems using mathematical concepts, and judge the level of reasonability of the results. Students will learn to interpret mathematical formulas, graphs and tables and will expand their mathematical reasoning skills to develop sound mathematical arguments.

Students' conceptual understanding of the key ideas of mathematics is often accomplished by actively working on assigned problems that illustrate the topic graphically, numerically, symbolically and verbally. This process requires students to think critically about the problems and to evaluate, analyze and sythesize the given information. Students will develop their written, oral and visual communication skills as a natural part of the learning mathematics.

Students will develop skills to manipulate mathematical expressions, analyze numerical data or observable facts to provide accurate and informed conclusions. Early on, multiple representations of the basic functions are stressed: verbal, visual, algebraic and numeric. Students will learn to generate and interpret graphical representations of functions and symbolic formulae as tools for understanding both the quantitative and empirical real-world relationships of functions.

Attendance Policy: Regular and punctual attendance for this course is mandatory and will be recorded throughout the semester. The student is responsible for obtaining any assignments or notices given during the date of their absence. For all documentable and excused absences (e.g. hospitalization, court appearances, university athletic conferences, etc...) students must immediately contact and inform the instructor of the situation and present proper documentation before re-entering the classroom. An absence of two class times or less throughout the entire semester is considered near perfect attendance. Any student with near perfect attendance will receive an additional 2 percentage points in their final grade.

Assignments: Homework will be assigned regularly. Students are expected to complete the assignment by the due date assigned. No late homework will be accepted. Homework is extra credit and each assignment will be graded out of 3 points. The average, a maximum of 3 percentage points, homework grade will be added to the final grade.

Exams: There will be four (4) in-class exams, including the final exam. The final exam is cumulative and will be given on the date corresponding to our class time in the Final Exam Schedule. The first three exams are tentatively scheduled below.

Exam 1:	
Exam 2:	
Exam 3:	

For any documentable and excused absence, the student must contact the professor on or before the day of the exam to make arrangements for examinations. Otherwise, no make-up exams will be administered.

Grading:

Exam 1	25%
Exam 2	25%
Exam 3	25%
Final Exam	25%

The following is the distribution for each letter grade.

90%	$\leq$	A	$\leq$	100%
80%	$\leq$	B	$<$	90%
70%	$\leq$	C	$<$	80%
60%	$\leq$	D	$<$	70%
		F	$<$	60%

Academic Dishonesty: All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. **Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action at the discretion of the instructor.** The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials.

Visitors in the Classroom: All visitors must not present a disruption to the class by their attendance. It is at the professor's discretion whether or not any visitor will be allowed to remain in the classroom.

Students with Disabilities: It is the policy of Sam Houston State University that no otherwise qualified disabled individual shall, solely by reason of his/her handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any academic or Student Life program or activity. Disabled students may request assistance with academically related problems stemming from individual disabilities by contacting the Director of the Counseling Center in the Lee Drain Annex or by calling (936) 294-1720. Please bring all the necessary paperwork to the instructor before the end of the first week of classes in order to proceed with the requested accommodations. All disclosures of disabilities will be kept strictly confidential. NOTE: no accommodation can be made until the student registers with the Counseling Center.

Classroom Rules of Conduct: Students will refrain from behavior in the classroom that intentionally or unintentionally disrupts the learning process and, thus, impedes the mission of the university. Cellular telephones and pagers must be turned off before class begins. Students are prohibited from eating in class, using tobacco products, making offensive remarks, reading newspapers, sleeping, talking at inappropriate times, wearing inappropriate clothing, or engaging in any other form of distraction. Inappropriate behavior in the classroom shall result in a directive to leave class. Students who are especially disruptive also may be reported to the Dean of Students for disciplinary action in accordance with university policy.

Observation of Holy Days: Section 51.911(b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence.

University policy 861001 provides the procedures to be followed by the student and instructor. A student desiring to absent himself/herself from a scheduled class in order to observe (a) religious holy day(s) shall present to each instructor involved a written statement concerning the religious holy day(s). This request must be made in the first fifteen days of the semester or the first seven days of a summer session in which the absence(s) will occur. The instructor will complete a form notifying the student of a reasonable timeframe in which the missed assignments and/or examinations are to be completed.

Additional Information: All information on this syllabus is subject to change. Any changes will be announced in class.