Purpose: It is the intention of this Administrative-Master Syllabus to provide a general description of the course, outline the required elements of the course and to lay the foundation for course assessment for the improvement of student learning, as specified by the faculty of Wharton County Junior College, regardless of who teaches the course, the timeframe by which it is instructed, or the instructional method by which the course is delivered. It is not intended to restrict the manner by which an individual faculty member teaches the course but to be an administrative tool to aid in the improvement of instruction.

Course Title – Mathematics for Business & Social Sciences I (Finite Mathematics) (Formerly Finite Mathematics)
Course Prefix and Number – MATH 1324
Department - MATH Division – Math and Science
Course Type: (check one)
☐ Academic General Education Course (from ACGM – but not in WCJC Core)
☒ Academic WCJC Core Course
☐ WECM course (This course is a Special Topics or Unique Needs Course: Y ☐ or N ☐)

Semester Credit Hours #: Lecture Hours #: Lab/Other Hours #  3:3:0
Equate Pay hours for course - 3

Course Catalog Description – Topics from college algebra (linear equations, quadratic equations, functions and graphs, inequalities), mathematics of finance (simple and compound interest, annuities), linear programming, matrices, systems of linear equations, applications to management, economics, and business. (The content level of MATH 1324 is expected to be at or above the level of college algebra, MATH 1314)

Prerequisites/Co-requisites – TSI satisfied in math
I. **Topical Outline** – Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, clinical or other non-lecture instruction):

**Unit 1 – Linear Functions and Applications, Systems of Linear Equations and Matrices**
*Sections 1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5*

<table>
<thead>
<tr>
<th>SECTION</th>
<th>OBJECTIVES TO COVER</th>
<th>EXAMPLES TO SKIP</th>
<th>SUGGESTED EXERCISES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section R.4 – Equations</td>
<td>• Solve linear and quadratic equations</td>
<td>6, 7</td>
<td>1-25 odd</td>
</tr>
</tbody>
</table>
| Section 1.1 – Slopes and Equations of Lines | • Find the slope of a line  
• Find the equation of a line using a point and the slope  
• Find the equation of parallel and perpendicular lines  
• Graph the equation of a line  
• Solve application problems using linear functions | none             | 1-35 odd, 45-53 odd, 57, 61, 63, 65 |
| Section 1.2 – Linear Functions and Applications | • Evaluate linear functions  
• Write equations for linear models  
• Solve application problems | none             | 1-9 odd, 19-29 odd, 33-37, 41, 45 |
| Section 2.1 – Solution of Linear Systems by the Echelon Method | • Apply system transformation operations on matrices  
• Solve linear systems using the echelon method  
• Solve application problems | none             | 1-15 odd, 23, 29, 35, 36, 41, 45 |
| Section 2.2 – Solution of Linear Systems by the Gauss-Jordan Method | • Perform row operations on matrices  
• Solve linear systems by the Gauss-Jordan method  
• Solve application problems | 5                | 1-7 odd, 11-23 odd, 29, 31, 37 |
| Section 2.3 – Addition and Subtraction | • Identify the size of a matrix | 1, 5, 7          | 1, 7, 9, 11, 15, 17, 19, 21, 23, 25, 27, |
### Subtraction of Matrices
- Add and subtract matrices

### Section 2.4 – Multiplication of Matrices
- Multiply a matrix by a constant value
- Find the product of two matrices
- Simplify matrix expressions

### Section 2.5 – Matrix Inverses
- Determine if two matrices are inverses of each other
- Find the inverse of a matrix (if it exists)
- Solve a system by using the inverse
- Solve application problems

### Unit 2 – Linear Programming: The Graphical Method and the Simplex Method
#### Sections 3.1, 3.2, 3.3, 4.1, 4.2, 4.3, 4.4

<table>
<thead>
<tr>
<th>SECTION</th>
<th>OBJECTIVES TO COVER</th>
<th>EXAMPLES TO SKIP</th>
<th>SUGGESTED EXERCISES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section R.5 - Inequalities</td>
<td>• Solve linear, quadratic, and rational inequalities</td>
<td>none</td>
<td>1-47 odd</td>
</tr>
<tr>
<td></td>
<td>• Graph the solution of linear, quadratic, and rational inequalities</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>• Write the solutions of linear, quadratic, and rational inequalities using interval notation</td>
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</tr>
<tr>
<td>Section 3.1 – Graphing Linear Inequalities</td>
<td>• Graph linear inequalities</td>
<td>none</td>
<td>1-29 odd, 37, 39, 41, 45</td>
</tr>
<tr>
<td></td>
<td>• Graph a system of linear inequalities</td>
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<tr>
<td></td>
<td>• Determine the feasible region for a system of linear inequalities</td>
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<tr>
<td></td>
<td>• Solve application problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Section 3.2 – Solving Linear Programming Problems Graphically</td>
<td>• Determine corner points</td>
<td>none</td>
<td>1-15 odd</td>
</tr>
<tr>
<td></td>
<td>• Solve linear programming problems graphically</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Section 3.3 – Applications of Linear Programming</td>
<td>• Solve application problems</td>
<td>3</td>
<td>1, 3, 7, 9, 15, 17, 21-25 odd</td>
</tr>
<tr>
<td>Section 4.1 – Slack Variables and the</td>
<td>• Determine the number of slack variables needed for a linear programming problem</td>
<td>none</td>
<td>1-23 odd, 31</td>
</tr>
</tbody>
</table>
### Pivot
- Add slack variables to a linear programming problem
- Generate the initial simplex tableau
- Identify the pivot and find the resulting matrix
- Solve linear programming problems using the simplex tableau
- Solve application problems

<table>
<thead>
<tr>
<th>Section 4.2 – Maximization Problems</th>
<th>Objectives to Cover</th>
<th>Examples to Skip</th>
<th>Suggested Exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 4.3 – Minimization Problems; Duality</td>
<td>Find the transpose of a matrix</td>
<td>5</td>
<td>1-11 odd, 12, 15, 19, 24, 27</td>
</tr>
<tr>
<td>Section 4.4 – Nonstandard Problems</td>
<td>Solve nonstandard linear programming problems</td>
<td>3</td>
<td>1-11 odd, 15, 16, 23, 26, 29</td>
</tr>
</tbody>
</table>

### Unit 3 – Mathematics of Finance and Sets
**Sections: 5.1, 5.2, 5.3, 7.1, 7.2**

<table>
<thead>
<tr>
<th>SECTION</th>
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<th>EXAMPLES TO SKIP</th>
<th>SUGGESTED EXERCISES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 5.1 – Simple and Compound Interest</td>
<td>Compute the simple and compound interest</td>
<td>none</td>
<td>1-37 odd, 43, 45, 49, 51, 57, 67, 73</td>
</tr>
<tr>
<td>Section 5.2 – Future Value of an Annuity</td>
<td>Find terms of a geometric sequence</td>
<td>none</td>
<td>1-45 odd, 47, 55</td>
</tr>
<tr>
<td>Section 5.3 – Present Value of an Annuity</td>
<td>Find the present value of an annuity</td>
<td>none</td>
<td>1-25 odd, 27-37 odd, 47, 49</td>
</tr>
</tbody>
</table>
Annuity; Amortization
• Generate an amortization table
• Solve application problems

Section 7.1 – Sets
• Understand set notation and terminology
• Find the union and intersection of sets

Section 7.2 – Applications of Venn Diagrams
• Draw and interpret the Venn diagram for a set
• Find the number of elements in a set
• Solve application problems

## Unit 4 – Probability and Statistics
Sections 7.3, 7.4, 7.5, 7.6, 9.1, 9.2, 9.3, 9.4

<table>
<thead>
<tr>
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<th>OBJECTIVES TO COVER</th>
<th>EXAMPLES TO SKIP</th>
<th>SUGGESTED EXERCISES</th>
</tr>
</thead>
</table>
| Section 7.3 – Introduction to Probability | • Generate the sample space for a given experiment  
• Find the probability of an event  
• Identify empirical probabilities  
• Solve application problems | none | 1-39 odd, 41, 45, 51, 55, 61 |
| Section 7.4 – Basic Concepts of Probability | • Identify mutually exclusive events  
• Find the probability of an even using probability rules | 5, 6, 7, 8, 9 | 1-21 odd, 22, 30, 31, 35, 37, 39 47, 53, 61, 71 |
| Section 7.5 – Conditional Probability; Independent Events | • Identify independent events  
• Use the product rule to find the probability of an event  
• Find the conditional probability of an event | 1, 5, 6, 7, 9, 10 | 1-23 odd, 29, 38, 45, 49, 53, 63, 65, 73, 75, 82 |
| Section 7.6 – Bayes’ Theorem | • Use Bayes’ theorem  
• Solve application problems | 3 | 11-17 odd |
| Section 9.1 – Frequency Distributions; Measures of Central Tendency | • Generate a frequency distribution table  
• Find the mean, median, and mode of a data set  
• Solve application problems | none | 1, 3, 7, 9, 13, 17-29 odd |
### Section 9.2 – Measures of Variation
- Find the range of a data set
- Find the standard deviation of a data set
- Solve application problems

<p>| | | |</p>
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<tbody>
<tr>
<td>6</td>
<td>3, 5, 7, 11, 25</td>
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</tr>
</tbody>
</table>

### Section 9.3 – The Normal Distribution
- Find the area (probability) under the normal curve
- Understand the standard normal curve
- Find the z-score associated with a given area (probability) under the normal curve
- Solve application problems

<p>| | | |</p>
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<tbody>
<tr>
<td>none</td>
<td>5-17 odd, 23-27 odd</td>
<td></td>
</tr>
</tbody>
</table>

### Section 9.4 – Normal Approximation to the Binomial Distribution
- Use the normal curve distribution to find binomial distribution probabilities
- Solve application problems

<p>| | | |</p>
<table>
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</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>3-9 odd</td>
<td></td>
</tr>
</tbody>
</table>

## II. Course Learning Outcomes

### Upon successful completion of this course, students will:

A. To provide students with the knowledge and mathematical skills necessary to solve certain problems from the following topics:
   1. Survey analysis
   2. Probability
   3. Linear equations
   4. Inequalities
   5. Linear Programming
   6. Matrix algebra

B. Detailed list of objectives: Upon successful completion of this course, the student will be able
   1. To find the union, intersection, relative and absolute complements of two sets.
   2. To use Venn diagrams to solve survey analysis problems.
   3. To operate with sets, Venn diagrams.
   4. To use counting methods
   5. To apply the techniques of counting to survey analysis
   6. To find and apply permutations and combinations
   7. To solve further counting problems.
   8. To state the definition of probability.
   9. To know that if \( P(E) \) denotes the probability of the event \( E \), then
      \( 0 \leq P(E) \leq 1 \).
   10. To use the following theorems to compute the probability of an event.
      (1) \( P(E) + P(E^{'}) = 1 \)
      (2) \( P(A \text{ union } B) = P(A)+P(B)-P(A \text{ intersect } B) \)
   11. To use the definition of odds.
   12. To draw a graph of a linear equation

### Assessment Methods

A. Hour exam and final.
B. Hour exam and final.

Outcomes assessed by:

- Hour exams
- Final
- Short Answer
- Discussion Board
III. Required Text(s), Optional Text(s) and/or Materials to be Supplied by Student.
Finite Mathematics, 10th Edition 2012. Lial, Greenwall, and Ritchey; Pearson Addison-Wesley Publishers
Calculator (Instructor’s discretion)

IV. Suggested Course Maximum - 35

V. List any specific spatial or physical requirements beyond a typical classroom required to teach the course.
Students must have computer access to the WCJC website, their WCJC student email and online accounts. WCJC has
open computer labs, with internet access, on all campuses for students to use.

VI. Course Requirements/Grading System – Describe any course specific requirements such as research papers or reading
assignments and the generalized grading format for the course
Grading System:
a. Average of one hour exams 40-85% A= 90-100
b. Daily participation, quizzes, extra credit 0-15% B= 80-89
c. Homework grade 0-20% C= 70-79
d. Comprehensive Final 15-30% D= 60-69
Or grading as specified by the instructor. F= 59 and below

VII. Curriculum Checklist
☐ - Academic General Education Course (from ACGM – but not in WCJC Core) No additional documentation needed
☒ - Academic WCJC Core Course
Attach the Core Curriculum Review Forms
  ☒ Critical Thinking
  ☒ Communication
  ☒ Empirical & Quantitative Skills
  ☐ Teamwork
  ☐ Social Responsibility
  ☐ Personal Responsibility

☐ - WECM Courses
Attach the following:
  • Program SCANS Matrix
  • Course SCANS Competencies Checklist
Core Curriculum Review Form

Foundational Component Area: **Mathematics**

Core Objective: **Critical Thinking Skills**—to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information

For each core objective, there must be at least two different methods of assessment.

<table>
<thead>
<tr>
<th>SLO Status</th>
<th>Student Learning Outcome (SLO)</th>
<th>Learning Activity</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>The SLO is:</td>
<td>Insert SLO (from Administrative Master Syllabi(AMS)) below</td>
<td>Provide a brief name and description of the sample learning activity:</td>
<td>Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective:</td>
</tr>
<tr>
<td>■ Existing</td>
<td>Solve a Linear Programming problem. (AMS SLO #A5)</td>
<td>A word problem (application) where the student must identify variables, assemble the correct formulas and solve for the desired result. Including a brief paragraph explaining what was done.</td>
<td>A quiz, test or discussion board artifact showing the student’s written answer. Grading for correctness and the rubric for critical thinking will assess this.</td>
</tr>
<tr>
<td>■ Existing</td>
<td>Solve a probability problem. (AMS SLO #A2)</td>
<td>A written paragraph explaining the steps one takes to compute the probability of an event.</td>
<td>A quiz, test or discussion board artifact showing the student’s written answer. Grading for correctness and the rubric for critical thinking will assess this.</td>
</tr>
<tr>
<td>■ Existing</td>
<td>To operate with sets, Venn diagrams. (AMS SLO #B3)</td>
<td>Have the student grade an incorrect Venn diagram involving intersection, union and complements of two sets. The student should write a brief paragraph stating what was done incorrectly and what must be done to correct the solution.</td>
<td>A quiz, test or scanned artifact showing the student’s written answer. Grading for correctness and the rubric for critical thinking will assess this.</td>
</tr>
</tbody>
</table>
Core Objective: **Communication Skills**—to include effective development, interpretation and expression of ideas through written, oral and visual communication

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<td>Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective:</td>
</tr>
<tr>
<td>■ Existing □ Revised □ New □ State Mandated</td>
<td>Solve a Linear Programming problem. (AMS SLO #A5)</td>
<td>A word problem (application) where the student must identify variables, assemble the correct formulas and solve for the desired result. Including a brief paragraph explaining what was done.</td>
<td>A quiz, test or discussion board artifact showing the student’s written answer. Grading for correctness and the rubric for communication will assess this.</td>
</tr>
<tr>
<td>■ Existing □ Revised □ New □ State Mandated</td>
<td>Solve a probability problem. (AMS SLO #A2)</td>
<td>A written paragraph explaining the steps one takes to compute the probability of an event.</td>
<td>A quiz, test or discussion board artifact showing the student’s written answer. Grading for correctness and the rubric for communication will assess this.</td>
</tr>
<tr>
<td>■ Existing □ Revised □ New □ State Mandated</td>
<td>To operate with sets, Venn diagrams. (AMS SLO #B3)</td>
<td>Have the student grade an incorrect Venn diagram involving intersection, union and complements of two sets. The student should write a brief paragraph stating what was done incorrectly and what must be done to correct the solution.</td>
<td>A quiz, test or scanned artifact showing the student’s written answer. Grading for correctness and the rubric for communication will assess this.</td>
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</tbody>
</table>
Foundational Component Area: **Mathematics**

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

For each core objective, there must be at least two different methods of assessment.

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<td>The SLO is:</td>
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<td>Provide a brief name and description of the sample learning activity:</td>
<td>Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective:</td>
</tr>
<tr>
<td>□ Existing</td>
<td>Find the inverse of a matrix. (AMS SLO #B22)</td>
<td>A problem where the student computes the inverse of a 2x2 matrix using row operations and showing all steps.</td>
<td>A quiz, test or discussion board artifact showing the student’s written steps and answer. Grading for correctness and the rubric for EQS will assess this.</td>
</tr>
<tr>
<td>□ Revised</td>
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<td></td>
</tr>
<tr>
<td>□ New</td>
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<tr>
<td>□ State Mandated</td>
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</tr>
<tr>
<td>□ Existing</td>
<td>Be able to add, subtract, multiply and divide matrices. (AMS SLO #B21)</td>
<td>A problem where the student multiplies two matrices.</td>
<td>A quiz, test or discussion board artifact showing the student’s written steps and answer. Grading for correctness and the rubric for EQS will assess this.</td>
</tr>
<tr>
<td>□ Revised</td>
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<tr>
<td>□ New</td>
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</tr>
<tr>
<td>□ State Mandated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Existing</td>
<td>Linear Programming. (AMS SLO #A5)</td>
<td>A problem where the student solves a Linear Programming problem.</td>
<td>A quiz, test or discussion board artifact showing the student’s written steps and answer. Grading for correctness and the rubric for EQS will assess this.</td>
</tr>
<tr>
<td>□ Revised</td>
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<tr>
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