Wharton County Junior College

Administrative - Master Syllabus
COVER SHEET

***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

Equated Pay hours for course - 3

List Lab/ Other Hours
Lab Hours
Clinical Hours
Practicum Hours
Other (list)

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

Prepared by Dale Neaderhouser ***Date*** 8-24-13

Reviewed by Department Head Dale Neaderhouser ***Date*** 8-24-13

Accuracy Verified by Division Chair Kevin Dees ***Date*** 8-24-13

Approved by Dean or Vice President of Instruction *gghunt* ***Date*** 8-24-13

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

SECTION	OBJECTIVES TO COVER	EXAMPLES TO SKIP	SUGGESTED EXERCISES
Section R.4 – Equations	• Solve linear and quadratic equations	6, 7	1-25 odd
Section 1.1 – Slopes and Equations of Lines	• Find the lope 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	• 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		29, 31, 39, 45
Section 2.4 – Multiplication of Matrices	• Multiply a matrix by a constant value • Find the product of two matrices • Simplify matrix expressions	5, 6	1-11 odd, 14-31 odd, 47, 53
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	4, 5, 6	1-7 odd, 11-19 odd, 23-33 odd, 35, 41, 63, 65

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

SECTION	OBJECTIVES TO COVER	EXAMPLES TO SKIP	SUGGESTED EXERCISES
Section R.5 - Inequalities	• Solve linear, quadratic, and rational inequalities • Graph the solution of linear, quadratic, and rational inequalities • Write the solutions of linear, quadratic, and rational inequalities using interval notation	none	1-47 odd
Section 3.1 – Graphing Linear Inequalities	• Graph linear inequalities • Graph a system of linear inequalities • Determine the feasible region for a system of linear inequalities • Solve application problems	none	1-29 odd, 37, 39, 41, 45
Section 3.2 – Solving Linear Programming Problems Graphically	• Determine corner points • Solve linear programming problems graphically	none	1-15 odd
Section 3.3 – Applications of Linear Programming	• Solve application problems	3	1, 3, 7, 9, 15, 17, 21-25 odd
Section 4.1 – Slack Variables and the	• Determine the number of slack variables needed for a linear programming problem	none	1-23 odd, 31

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		
Section 4.2 – Maximization Problems	• Solve maximization problems using the simplex tableau and simplex method • Solve maximization application problems	none	1-11 odd
Section 4.3 – Minimization Problems; Duality	• Find the transpose of a matrix • Generate the dual problem • Solve minimization problems using the simplex method • Solve minimization application problems	5	1-11 odd, 12, 15, 19, 24, 27
Section 4.4 – Nonstandard Problems	• Solve nonstandard linear programming problems	3	1-11 odd, 15, 16, 23, 26, 29

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

SECTION	OBJECTIVES TO COVER	EXAMPLES TO SKIP	SUGGESTED EXERCISES
Section 5.1 – Simple and Compound Interest	• Compute the simple and compound interest • Compute the effective rate • Solve application problems	none	1-37 odd, 43, 45, 49, 51, 57, 67, 73
Section 5.2 – Future Value of an Annuity	• Find terms of a geometric sequence • Find the sum of a geometric sequence • Find the future value of an annuity • Find the future value of an annuity due • Find the payment for a sinking fund • Solve application problems	none	1-45 odd, 47, 55
Section 5.3 – Present Value of an	• Find the present value of an annuity • Find the payment needed for an amortized loan	none	1-25 odd, 27-37 odd, 47, 49

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	none	1-43 odd, 47, 53, 63, 67, 69
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	5, 8	1-33 odd, 39, 45, 47, 53

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

SECTION	OBJECTIVES TO COVER	EXAMPLES TO SKIP	SUGGESTED EXERCISES
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 •	6	3, 5, 7, 11, 25
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	none	5-17 odd, 23-27 odd
Section 9.4 – Normal Approximation to the Binomial Distribution	• Use the normal curve distribution to find binomial distribution probabilities • Solve application problems	none	3-9 odd

II. Course Learning Outcomes

Course Learning Outcomes **Upon successful completion of this course, students will:**	**Assessment Methods**
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 union B) = P(A)+P(B)-P(A intersect B) 11. To use the definition of odds. 12. To draw a graph of a linear equation	A. Hour exam and final. B. Hour exam and final. Outcomes assessed by: Hour exams Final Short Answer Discussion Board

13. To find the slope of a linear equation.
14. To write the equation of a line when given:
(1) Two points
(2) One point and the slope
15. Know when two lines are parallel by looking at the equations.
16. To solve a system of two linear equations.
17. To graph a system of linear inequalities.
18. To maximize or minimize a linear function.
F=AX + BY subject to certain conditions expressible as linear inequalities in X and Y.
19. To know what a matrix is.
20. To give the dimensions of a matrix.
21. Be able to add, subtract, multiply, and divide matrices.
22. To find the inverse of a matrix
23. To solve a system of equations using row operations with matrices.
24. To solve a system of equations using the inverse of a matrix.

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

Wharton County Junior College

Core Curriculum Review Form

Foundational Component Area: **Mathematics**

Course Prefix & Suffix: Math 1324

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

Student Learning Outcome supporting core objective: *For each core objective, there must be at least two different methods of assessment.*

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
The SLO is:	Insert SLO (from Administrative Master Syllabi(AMS)) below	Provide a brief name and description of the sample learning activity:	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective:
■ Existing ☐ Revised ☐ New ☐ State Mandated	Solve a Linear Programming problem. (AMS SLO #A5)	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.	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.
■ Existing ☐ Revised ☐ New ☐ State Mandated	Solve a probability problem. (AMS SLO #A2)	A written paragraph explaining the steps one takes to compute the probability of an event.	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.
■ Existing ☐ Revised ☐ New ☐ State Mandated	To operate with sets, Venn diagrams. (AMS SLO #B3)	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.	A quiz, test or scanned artifact showing the student's written answer. Grading for correctness and the rubric for critical thinking will assess this.

Department Head: Dale Neaderhouser Date: 8-24-13

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Core Curriculum Review Form

Foundational Component Area: **Mathematics**

Course Prefix & Suffix: Math 1324

Core Objective: **Communication Skills—**to include effective development, interpretation and expression of ideas through written, oral and visual communication

Student Learning Outcome supporting core objective: *For each core objective, there must be at least two different methods of assessment.*

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
The SLO is:	Insert SLO (from Administrative Master Syllabi(AMS)) below	Provide a brief name and description of the sample learning activity:	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective:
■ Existing ☐ Revised ☐ New ☐ State Mandated	Solve a Linear Programming problem. (AMS SLO #A5)	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.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for communication will assess this.
■ Existing ☐ Revised ☐ New ☐ State Mandated	Solve a probability problem. (AMS SLO #A2)	A written paragraph explaining the steps one takes to compute the probability of an event.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for communication will assess this.
■ Existing ☐ Revised ☐ New ☐ State Mandated	To operate with sets, Venn diagrams. (AMS SLO #B3)	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.	A quiz, test or scanned artifact showing the student's written answer. Grading for correctness and the rubric for communication will assess this.

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Core Curriculum Review Form

Foundational Component Area: **Mathematics**

Course Prefix & Suffix: Math 1324

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

Student Learning Outcome supporting core objective: *For each core objective, there must be at least two different methods of assessment.*

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
The SLO is:	Insert SLO (from Administrative Master Syllabi) below	Provide a brief name and description of the sample learning activity:	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective:
■ Existing ☐ Revised ☐ New ☐ State Mandated	Find the inverse of a matrix. (AMS SLO #B22)	A problem where the student computes the inverse of a 2x2 matrix using row operations and showing all steps.	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.
■ Existing ☐ Revised ☐ New ☐ State Mandated	Be able to add, subtract, multiply and divide matrices. (AMS SLO #B21)	A problem where the student multiplies two matrices.	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.
■ Existing ☐ Revised ☐ New ☐ State Mandated	Linear Programming. (AMS SLO #A5)	A problem where the student solves a Linear Programming problem.	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.