Administrative - Master Syllabus

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 - Introduction to Statistics
Course Prefix and Number - MATH 1342
Department - MATH
Division - Math and Physical Sciences

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 - Includes the principles and techniques of collection and tabulation of data, bar charts, graphs, tables, sampling, averages, dispersion, correlation, the normal distribution, and probability with applications to various fields.

Prerequisites/Corequisites - THEA math requirement met.

Approvals – the contents of this document have been reviewed and are found to be accurate.

Prepared by Date Neaderhouser

Department Head James Kelley

Division Chair Dr. Kirby Lowery

Vice President Dr. Ty Pate

Signature

Signature

Signature

Date 6-30-09

Date 7-1-09

Date 7-13-09
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):

The Nature of Statistics
- Two Kinds of Statistics
- Classifying Statistical Studies
- The Development of Statistics
- Is a Study Necessary?
- Simple Random Sampling
- Other Sampling Procedures
- Observational Studies and Designed Experiments

Organizing Data
- Variables and Data
- Grouping Data
- Graphs and Charts
- Stem-and-Leaf Diagrams
- Distribution Shapes; Symmetry and Skewness
- Misleading Graphs

Descriptive Measures
- Measures of Central Tendency
- Summation Notation; The Sample Mean
- Measures of Dispersion; the Sample Standard Deviation
- Interpretation of the Standard Deviation; z-Scores
- Sample Mean and Sample Standard Deviation for Grouped Data
- The Five-Number Summary; Box-plots
- Descriptive Measures for Populations: Use of Samples

Probability Concepts
- Introduction; Classical Probability
- Events
- Some Rules of Probability
- Contingency Tables; Joint and Marginal Probabilities
- Conditional Probability
- The Multiplication Rule; Independence
- Bayes’s Rule
- Counting Rules

Discrete Random Variables
- Discrete Random Variables; Probability Distributions
- The Mean an Standard Deviation of a Discrete Random Variable
- Binomial Coefficients; Bernoulli Trails
- The Binomial Distribution
- The Mean and Standard Deviation of a Binomial Random Variable
- The Poisson Distribution

The Normal Distribution
- The Normal Standard
- Normal Curves
- Normally
Distributed Populations
Normally Distributed Random Variables
Normal Probability Plots
The Normal Approximation to the Binomial Distribution

**The Sampling Distribution of the Mean**
- Sampling Error; the Need for Sampling Distributions
- The Mean and Standard Deviation of x
- The Sampling distribution of the Mean

**Confidence Intervals for One Population Mean**
- Estimating a population mean
- Large-Sample Confidence Intervals for One Population Mean
- Sample Size considerations
- Confidence Intervals for One Normal Population Mean

**Hypothesis Tests for One Population Mean**
- The nature of hypotheses testing
- Terms, errors, and hypotheses
- Large-Sample Hypothesis Tests for One Population Mean
- Type II Error Probabilities; Power
- P-Values
- Hypothesis Tests for One Normal Population Mean
- The Wilcoxon Signed-Tank Test

**Inferences for Two Population Means**
- Large-Sample Inferences for Two Population Means Using Independent Samples
- Inferences for the Means of Two Normal Populations Using Independent Samples
- The Mann-Whitney Test
- Inferences for Two Populations Means Using Paired Samples

**Inferences for Populations Proportions**
- Confidence Intervals for One Population Proportion
- Hypothesis Tests for One Population Proportion
- Inferences for Two Population Proportions Using Independent Samples

**Chi-Square Procedures**
- The Chi-Square Distribution
- Chi-Square Goodness-of-fit Test
- Chi-Square Independence Test
- Inferences for a Population Standard Deviation

**II. Course Learning Outcomes**

<table>
<thead>
<tr>
<th>Course Outcome/Objective</th>
<th>Assessment Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Purpose:</strong> To provide students with the knowledge and skills necessary to solve problems of the type in the list of topics.</td>
<td><strong>1.</strong> Hour exam final.</td>
</tr>
<tr>
<td><strong>2. Detailed list of objectives:</strong> Upon successful completion of this course the students will be able to solve problems and prove theorems similar to those in the sections listed in the topical outline</td>
<td><strong>2.</strong> Hour exam final.</td>
</tr>
</tbody>
</table>
III. Required Text(s), Optional Text(s) and/or Materials to be Supplied by Student.
Understanding Basic Statistics, 4th edition; Brase & Brase; Houghton Publishing Company
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.
Classroom with large chalkboards and chalk

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.

Critical Thinking competency: This course requires more than memorization and comprehension of factual information. It emphasizes the application, analysis, synthesis, and evaluation of concepts.

Grading System:
a. Average of one hour exams 40-80%
b. Daily participation, quizzes, extra credit 0-15%
c. Homework grade 0-30%
d. Comprehensive Final 20-30%
Or grading as specified by the instructor.
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 Checklist, including the following:
  • Basic Intellectual Competencies
  • Perspectives
  • Exemplary Educational Objectives

☐ - WECM Courses
  Attach the following:
  • Program SCANS Matrix
  • Course SCANS Competencies Checklist
### Page 1: Competencies

**Course Prefix & Number:** MATH 1342

<table>
<thead>
<tr>
<th>Competency</th>
<th>Method of Assessment</th>
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</thead>
<tbody>
<tr>
<td><strong>READING:</strong> Reading at the college level means the ability to analyze and interpret a variety of printed materials – books, articles, and documents.</td>
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<td><strong>WRITING:</strong> Competency in writing is the ability to produce clear, correct, and coherent prose adapted to purpose, occasion, and audience.</td>
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</tr>
<tr>
<td><strong>SPEAKING:</strong> Competence in speaking is the ability to communicate orally in clear, coherent, and persuasive language appropriate to purpose, occasion, and audience.</td>
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<tr>
<td><strong>LISTENING:</strong> Listening at the college level means the ability to analyze and interpret various forms of spoken communication.</td>
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<tr>
<td><strong>CRITICAL THINKING:</strong> Critical thinking embraces methods for applying both qualitative and quantitative skills analytically and creatively to subject matter in order to evaluate arguments and to construct alternative strategies.</td>
<td><strong>Final Exam</strong></td>
</tr>
<tr>
<td><strong>COMPUTER LITERACY:</strong> Computer literacy at the college level means the ability to use computer-based technology in communicating, solving problems, and acquiring information.</td>
<td></td>
</tr>
<tr>
<td>Perspective</td>
<td>Method of Assessment</td>
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<tr>
<td>----------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>1. Establish broad and multiple perspectives of the individual in relationship to the larger society and world in which he or she lives, and help the student to understand the responsibilities of living in a culturally-and ethically-diversified world;</td>
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</tr>
<tr>
<td>2. Stimulate a capacity to discuss and reflect upon individual, political, economic, and social aspects of life to understand ways to be a responsible member of society;</td>
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<td>3. Recognize the importance of maintaining health and wellness;</td>
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<tr>
<td>4. Develop a capacity to use knowledge of how technology and science affect lives;</td>
<td>Final Exam</td>
</tr>
<tr>
<td>5. Develop personal values for ethical behavior;</td>
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<td>6. Develop the ability to make aesthetic judgments;</td>
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<td>7. Use logical reasoning in problem solving;</td>
<td>Final Exam</td>
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<tr>
<td>8. Integrate knowledge and understanding of the interrelationships of the scholarly disciplines</td>
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</tr>
</tbody>
</table>
## Core Curriculum Checklist

### Exemplary Educational Objectives

**Course Prefix & Number:** MATH 1342  
**Component Area:** Mathematics

<table>
<thead>
<tr>
<th>Exemplary Educational Objective</th>
<th>Method of Assessment</th>
</tr>
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<tbody>
<tr>
<td>1. Apply arithmetic, algebraic, geometric, higher-order thinking, and statistical methods to modeling and solving real-world situations.</td>
<td>Final Exam</td>
</tr>
<tr>
<td>2. Represent and evaluate basic mathematical information verbally, numerically, graphically, and symbolically.</td>
<td>Final Exam</td>
</tr>
<tr>
<td>3. Expand mathematical reasoning skills and formal logic to develop convincing mathematical arguments.</td>
<td>Final Exam</td>
</tr>
<tr>
<td>4. Use appropriate mathematical thinking and understanding to solve mathematical problems and judge the reasonableness of the results.</td>
<td>Final Exam</td>
</tr>
<tr>
<td>5. Interpret mathematical models such as formulas, graphs, tables and schematics, and draw inferences from them.</td>
<td>Final Exam</td>
</tr>
<tr>
<td>6. Recognize the limitations of mathematical and statistical models.</td>
<td>Final Exam</td>
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<tr>
<td>7. Develop the view that mathematics is an evolving discipline, interrelated with human culture, and understand its connections to other disciplines.</td>
<td>Final Exam</td>
</tr>
</tbody>
</table>