



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 – Elementary Statistical Methods (Formerly known as Introduction to Statistics)

Course Prefix and Number – MATH 1342

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

Course Catalog Description – Collection, analysis, presentation and interpretation of data, and probability. Analysis includes descriptive statistics, correlation and regression, confidence intervals and hypothesis testing. Use of appropriate technology is recommended.

List Lab/ Other Hours
Lab Hours 0
Clinical Hours 0
Practicum Hours 0
Other (list) 0

Prerequisites/Co-requisites – TSI satisfied in math

Type: ACAD

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 *gg/hunt*

Date 8-24-13

I. Topical Outline –

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
- Computing \bar{x} and s for Grouped Data
- The Five-Number Summary; Boxplots
- 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 and 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 \bar{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

Course Learning Outcomes	Assessment Methods
Upon successful completion of this course, students will: 1. Explain the use of data collection and statistics as tools to reach reasonable conclusions. 2. Recognize, examine and interpret the basic principles of describing and presenting data. 3. Compute and interpret empirical and theoretical probabilities using the rules of probabilities and combinatorics. 4. Explain the role of probability in statistics. 5. Examine, analyze and compare various sampling distributions for both discrete and continuous random variables. 6. Describe and compute confidence intervals.	1. <u>Hour exam, final.</u> 2. <u>Hour exam, final.</u> 3. <u>Hour exam, final.</u> 4. <u>Hour exam, final.</u> 5. <u>Hour exam, final.</u> 6. <u>Hour exam, final.</u> 7. <u>Hour exam, final.</u> 8. <u>Hour exam, final.</u> Outcomes assessed by: Hour exams Final

7. Solve linear regression and correlation problems. 8. Perform hypothesis testing using statistical methods.	Short Answer Discussion Board
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III. Required Text(s), Optional Text(s) and/or Materials to be Supplied by Student.

Understanding Statistics, 10th edition; Brase and Brase; Cengage, (required)
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

Unit tests, class participation, and final exam

Semester grade:

Comprehensive Final 20-25%

Remainder of work 75-80%

Grading as specified by the instructor.

A= 90-100 B= 80-89 C= 70-79 D= 60-69 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**
If needed, revise the Program SCANS Matrix & Competencies Checklist.



Core Curriculum Review Form

Foundational Component Area: **Mathematics**

Course Prefix & Suffix: **Math 1342**

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:
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Compute and interpret empirical and theoretical probabilities using the rules of probabilities and combinatorics. (AMS SLO #3)	Given a table of empirical probabilities, the student should compute the probability of various events. 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.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Perform hypothesis testing using statistical methods. (AMS SLO #8)	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.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Describe and compute confidence intervals. (AMS SLO #6)	Have the student grade an incorrect result for a confidence interval. 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 discussion board artifact showing the student's written answer. Grading for correctness and the rubric for critical thinking will assess this.

Department Head: Dale Neaderhouser
 WCJC Core Curriculum Review Form-Mathematics (April 2013)
 (Modified from Collin College)

Date: 8-24-13



Core Curriculum Review Form

Foundational Component Area: **Mathematics**

Course Prefix & Suffix: Math 1342

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:
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Compute and interpret empirical and theoretical probabilities using the rules of probabilities and combinatorics. (AMS SLO #3)	Given a table of empirical probabilities, the student should compute the probability of various events. 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.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Perform hypothesis testing using statistical methods. (AMS SLO #8)	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.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Describe and compute confidence intervals. (AMS SLO #6)	Have the student grade an incorrect result for a confidence interval. 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 discussion board artifact showing the student's written answer. Grading for correctness and the rubric for communication will assess this.



Core Curriculum Review Form

Foundational Component Area: **Mathematics**

Course Prefix & Suffix: Math 1342

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(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:
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Describe and compute confidence intervals. (AMS SLO #6)	A problem where the student computes a confidence interval.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for EQS will assess this.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Solve linear regression and correlation problems. (AMS SLO #7)	A problem where the student computes the regression line and coefficient of determination. The use of both a small table of detailed computation ($N < 10$) and an Excel spreadsheet with a scatter plot and trendline are suggested.	A homework or scanned artifact showing the student's written answer. Grading for correctness and the rubric for EQS will assess this.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Perform hypothesis testing using statistical methods. (AMS SLO #8)	A problem (application) where the student performs hypothesis testing and gives a statement explaining the conclusion.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for EQS will assess this.