

Montgomery County Community College
 MAT 131
 Introduction to Statistics I
 3-3-0

COURSE DESCRIPTION:

A basic course designed for students in all fields. Topics include organization of data, measures of central tendency, measures of variation, statistical inference and correlation. This is a self-contained course, or with MAT 132, it is a course with greater depth and applications. A graphing calculator is required for class, homework and testing. Classroom instruction and programs will be presented using a TI-84 Plus.

REQUISITE(S):*Previous Course Requirements*

- MAT 100 Intermediate Algebra or MAT 100B Intermediate Algebra with Review or MAT 104 Foundations of Mathematics II or MAT 106 Math Applications with a minimum grade of "C"

Concurrent Course Requirements

None

COURSE COMMENTS:

- * Quantitative Reasoning, Algebra, and Statistics Accuplacer Test Score of 251 or higher or an Advanced Algebra and Functions Accuplacer Test Score of 237-275. Or
- * Elementary Algebra Accuplacer Test Score of 67 to 85 or a College Level Math Accuplacer Test Score of 53 to 85 may be substituted for MAT100/ MAT100B/ MAT104/ MAT106

LEARNING OUTCOMES Upon successful completion of this course, the student will be able to:	LEARNING ACTIVITIES	EVALUATION METHODS
1. Find and compute the mean, median, mode, midrange, range, variance and standard deviation for a given set of data.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
2. Construct frequency tables and statistical graphs including histograms, frequency polygons, ogives, stem and leaf plots and box plots.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
3. Solve probability problems using the addition and multiplication rules and complementary events.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
4. Define probability distribution and random variables.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
5. Calculate the mean and variance for the binomial probability distribution.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
6. Apply the Central Limit Theorem.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
7. Test a hypothesis about a mean or a proportion.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
8. Explain the meaning of the p-value of a test.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
9. Determine point estimates and confidence interval estimates for a mean or a proportion.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
10. Determine minimum sample sizes for a desired level of confidence and margin of error.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
11. Calculate a correlation coefficient and test for its significance.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
12. Calculate an equation for a regression line and use it for prediction when appropriate.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
13. Perform χ^2 tests for goodness-of-fit.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
14. Perform χ^2 tests for independence or homogeneity.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
15. Demonstrate proficiency in the use of the TI 84 calculator. a. A student must be able to use the following commands on the TI 84 calculator: 1-Var Stats L ₁ [and L ₂ where appropriate] binompdf (n,p,x) and binomcdf (n,p,x) normalcdf (LH,RH), tcdf (LH,RH,df), and χ^2 cdf (LH,RH,df) invNorm (area) [and on the TI-84, invT (area)] LinReg(ax+b)	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
16. Determine whether row variable is independent of column variable in a 2-Way Table using X ² Test of Independence and draw a conclusion using the p-value method.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
17. Develop an appropriate linear regression model to predict values of a dependent variable that correspond to given values of an independent variable.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
18. Construct Confidence Intervals to estimate population parameters such as the population mean and the population proportion.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
19. Apply Normal Distributions to determine percentiles for data sets.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
20. Locate and access information from various sources and synthesize the information in order to formulate appropriate mathematical models.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria.*

SEQUENCE OF TOPICS:

1. Introduction; Types of Data
2. Critical Thinking; Experimental Design
3. Frequency Distributions
4. Histograms; Statistical Graphs
5. Measures of Center
6. Measures of Variation
7. Measures of Relative Standing
8. Data Analysis
9. Fundamentals
10. Addition Rule
11. Multiplication Rule: Basics
12. Multiplication Rule: Complement and Conditional Prob.
13. Random Variables; Binomial Distribution
14. Mean, St. Dev. for Binomial
15. Standard Normal Distribution
16. Applications of the Normal Distribution

17. Sampling Distribution and Estimation
18. Central Limit Theorem
19. Estimating Pop Proportions
20. Estimating Pop Means: σ Known
21. Estimating Pop Means: σ Not Known
22. Basics of Hypothesis Testing
23. HT: Proportions
24. HT: Mean σ Known
25. HT: Mean σ Not Known
26. Correlation
28. Regression
28. Multinomial Experiments: Goodness-of-Fit
29. Contingency Tables
30. HT: Two Means Independent

LEARNING MATERIALS:

Textbook:

Illollosky, Barbara and Dean, Susan. 2016. Introductory Statistics. Openstax

Calculator:

TI-84 (Plus or Silver Edition) Graphics Calculator. If a student has a TI-83+, they do not need to buy a TI-84+.

Other learning materials may be required and made available directly to the student and/or via the College's Libraries and/or course management system.

COURSE APPROVAL:

Prepared by:	Guy Vuotto, Professor of Mathematics	Date:	6/1997
Revised by:	Edwina Smith, Professor of Mathematics	Date:	4/1998
Revised by:	Edwina Smith, Professor of Mathematics	Date:	4/2001
Revised by:	Edwina Smith, Professor of Mathematics	Date:	1/2004
Revised by:	Edwina Smith, Professor of Mathematics	Date:	5/2004
Revised by:	Edwina Smith, Professor of Mathematics	Date:	3/2007
Revised by:	Richard Kern, Asst. Professor of Mathematics	Date:	7/2007
VPAA/Provost Compliance Verification:	Dr. John C. Flynn, Jr.	Date:	9/11/2009
Revised by:	Mark McFadden	Date:	12/2012
VPAA/Provost or designee Compliance Verification:	Victoria L. Bastecki-Perez, Ed.D.	Date:	5/23/2013
Revised by:	Marion Graziano/Debbie Dalrymple	Date:	8/2/2017
VPAA/Provost or designee Compliance Verification:		Date:	8/24/2017



This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.