Morehead State University

College of Science
Department of Mathematics

Statistics
MATH 353 - 301
Spring 2024

(Tentative, Tentative, Tentative, Tentative, ... ∞)

NOTE*:* The instructor reserves the right to make changes to this tentative course guide. Any changes during the semester will be for the benefit of the class as a whole and not for individuals or subgroups of students in the class.

ETHICS CODE

I COMMIT TO UPHOLD THE IDEALS OF ETHICAL BEHAVIOR AND INTEGRITY BY REFUSING TO BETRAY THE TRUST BESTOWED UPON ME AS A MEMBER OF THE MOREHEAD STATE UNIVERSITY COMMUNITY. SHOULD I BE TEMPTED TO BREAK THAT TRUST, I WILL SEEK THE HELP OF MY INSTRUCTOR INSTEAD.

Instructor: Mr. Kyle Bradley

Office Hours: None since this is an online course. However, if you need to contact me, the best way would be to send an e-mail.

e-mail: ***akbradley@moreheadstate.edu***
e-mail: ***kyle.bradley@rowan.kyschools.us***

Course Meeting Times and Place: No meeting place since this is an online course.

Course Description: **MATH 353.301 Statistics. (3-0-3); I, II, III.*

Prerequisites: MATH 123 or higher. *The purpose of this course is to present key concepts from a non-calculus point of view in descriptive statistics, probability, discrete and continuous distributions, regression and correlation analysis and modeling, sampling distributions, confidence intervals, and hypothesis tests for one and two population parameters, and one-way analysis of variance. Applications will be in a wide variety of fields. Technology integration will be restricted to the ones used in the scientific community.*

**A student may receive credit toward graduation in only one of the following: MATH 353 or MATH 305.*

Course Objectives:

- By the end of the semester, students will be introduced to some elementary probability and statistical concepts that will enable them to solve and analyze basic real-world problems from a statistical standpoint.

Texts: (Required materials) **Discovering Statistics and Data eBook, 3rd Edition (James S. Hawkes)**.

- Please purchase the course materials from the MSU bookstore (or the MSU bookstore website).
- You will need the access code that is included in the course package to log into the course and register on the Hawkes Learning Systems website.
- You will need the E-Book for the course content.

NOTE: You may also purchase the materials at the following website.

- **http://www.hawkeslearning.com/Support/GetYourAccessCode/OnlinePurchase_SelectSchool.aspx**

NOTE: You can call HAWKES at 843-571-2825 with any questions about the materials for the course.

Technology and Resources:

- There are also student resources (like the practice problems) in the Hawkes software and the Hawkes TV at their website. You should also make ample use of these resources.
- The name of the course as listed on the Hawkes Learning website is **MATH 353 – Fall 2024 - Bradley**

Course Content: Assignments

(1) From the e-book: Discovering Statistics and Data 3rd Edition - Math 353

NOTE: Official Spring Start Date is 08/19/2024 (August 19th, 2024) at 12:01 am. and the official End Date is 12/13/2024 at 11:59 pm (December 13th, 2024 at 11:59pm).
I WILL MAKE THE COURSE AVILABLE IN HAWKES ON August 19th.

Assignment Break Down:

- **Lessons** - Before Each exam, there will be a certain number of lessons to complete to prepare you for the exam. (25% of the course.)
    - A total of 50 Homework Assignments - 5 Lowest Homework Assignments will be dropped.
- **Exams** – Total of 3 Exams (60% of the course, each exam is weighted 20% of the total).
- **Final Exam** - Cumulative Final (15% of the course)
    - Your final exam score may replace a regular exam score if both of the following requirements are met:
        1. The student took all 3 regular exams.
        2. The student scores higher on the final than at least one regular exam.
    - If both requirements are met, the final exam will replace the lowest regular exam score.
- **All assignments will be done online at the Hawkes Learning System (HLS) web site.**

NOTE: I have grouped the assignments according to the Exam content. Please follow the guide to keep on track to complete the assignments.

Exam NOTEs:

1. You will have two (2) attempts for each exam.
    a. If you attempt an assignment twice, the higher of the two scores will be recorded in the course grade book in Hawkes.
2. You will be allowed a total of two (2) pauses during the taking of an exam.
3. Each exam will be available for two hours per attempt.
    a. Once you start the exam, the time will begin.
    b. Note: All assignments will be done online at the Hawkes Learning System (HLS) website.
4. For exams, you will be permitted to use one piece of paper for notes, front and back.
5. Much of the curriculum relies on the use of spreadsheet technology (Microsoft Excel or Google Sheets).
    a. Any spreadsheets that you make for use on homework assignments are also permitted on exams.
6. Formula sheets and statistical tables will be provided by Hawkes or the math lab.

Taking Exams:

Exams for this course will require one of two testing environments described below:

- Math Tutoring Lab - Lappin 108
    - You may take exams in the Math Tutoring Lab, on Morehead State's main campus in Lappin Hall, room 108.
    - If you choose this method, please be aware of their schedule as they are not open on the weekends and during certain hours, as some other classes meet in that room.
    - When using this method, you will tell a tutor that you are there for your exam and they will enter the test security password for you.
- Secure (approved) Proctor
    - If you choose this method, you and your potential proctor must fill out a sheet (provided on blackboard), and must be approved by me.
    - Your proctor should be the same person for exam exam, and cannot be a friend or another student.

- Past proctors have included but are not limited to past or current teachers, coaches, other MSU teachers, public libraries, and employers.

- **You may also use the lab for some exams, and proctors for others. You do not need to inform me that you are taking an exam on a given day or the method that you are using to take the exam.**

❖ Exam 1 - Chapters 1, 2, 3, 4, and 6			
Week #	**Section #**	**Assignment Title**	**Due Date**
1	1.1 - 1.8	Introduction to Statistical Thinking	Friday 8/23 @11:59 pm
1	2.1	The Lords of Data	Friday 8/23 @11:59 pm
1	2.2	Data Classification	Friday 8/23 @11:59 pm
1	2.3	Time Series Data vs. Cross-Sectional Data	Friday 8/23 @11:59 pm
2	3.1	Frequency Distributions	Friday 8/30 @11:59 pm
2	3.2	Displaying Qualitative Data Graphically	Friday 8/30 @11:59 pm
2	3.3	Constructing Frequency Distributions for Quantitative Data	Friday 8/30 @11:59 pm
2	3.4	Histograms and Other Graphical Displays of Quantitative Data	Friday 8/30 @11:59 pm
3	3.5	Analyzing Graphs	Friday 9/6 @11:59 pm
3	4.1	Measures of Location	Friday 9/6 @11:59 pm
3	4.2	Measures of Dispersion	Friday 9/6 @11:59 pm
3	4.3	Measures of Relative Position, Box Plots, and Outliers	Friday 9/6 @11:59 pm
4	6.1	Introduction to Probability	Friday 9/13 @11:59 pm
4	6.2	Addition Rules for Probability	Friday 9/13 @11:59 pm
4	6.3	Multiplication Rules for Probability	Friday 9/13 @11:59 pm
4	6.4	Combinations and Permutations	Friday 9/13 @11:59 pm
5	Exam 1		Friday 9/20 @11:59 pm

❖ Exam 2 - Chapters 7, 8, 9, and 10

Week #	Section #	Assignment Title	Due Date
6	7.1	Types of Random Variables	Friday 9/27 @11:59 pm
6	7.2	Discrete Random Variables	Friday 9/27 @11:59 pm
6	7.3	The Discrete Uniform Distribution	Friday 9/27 @11:59 pm
6	7.4	The Binomial Distribution	Friday 9/27 @11:59 pm
6	8.1	The Uniform Distribution	Friday 9/27 @11:59 pm
7	Spring Break		
8	8.2	The Normal Distribution	Friday 10/11 @11:59 pm
8	8.3	The Standard Normal Distribution	Friday 10/11 @11:59 pm
8	8.6	Approximation to the Binomial Distribution	Friday 10/11 @11:59 pm
8	9.1	Random Samples	Friday 10/11 @11:59 pm
8	9.2	Introduction to Sampling Distributions	Friday 10/11 @11:59 pm
8	9.3	The Distribution of the Sample Mean and the Central Limit Theorem	Friday 10/11 @11:59 pm
8	9.4	The Distribution of the Sample Proportion	Friday 10/11 @11:59 pm
9	9.5	Other Forms of Sampling	Friday 10/18 @11:59 pm
9	10.1	Point Estimation of the Population Mean	Friday 10/18 @11:59 pm
9	10.2	Interval Estimation of the Population Mean	Friday 10/18 @11:59 pm
9	10.3	Estimating the Population Proportion	Friday 10/18 @11:59 pm
10	Exam 2		Friday @11:59 pm

❖ Chapter 3 - Chapters 5, 11, 12, 13, 15, and 16			
Week #	**Section #**	**Assignment Title**	**Due Date**
11	11.1	Introduction to Hypothesis Testing	Friday 11/1 @11:59 pm
11	11.2b	Testing a Hypothesis about a Population Mean with Sigma Unknown	Friday 11/1 @11:59 pm
11	11.3	The Relationship Between Confidence Interval Estimation and Hypothesis Testing	Friday 11/1 @11:59 pm
11	11.4a	Testing a Hypothesis about a Population Proportion	Friday 11/1 @11:59 pm
11	11.4b	Testing a Hypothesis about a Population Proportion Using P-Values	Friday 11/1 @11:59 pm
12	12.1b	Inference about Two Mean: Independent Samples with Sigma Unknown	Friday 11/8 @11:59 pm
12	12.2	Inference about Two Means: Dependent Samples (Paired Difference)	Friday 11/8 @11:59 pm
12	12.3	Inference about Two Population Proportions	Friday 11/8 @11:59 pm
12	5.1	Scatterplots and Correlation	Friday 11/8 @11:59 pm
12	5.2	Fitting a Linear Model	Friday 11/8 @11:59 pm
13	5.3	Evaluating the Fit of a Linear Model	Friday 11/15 @11:59 pm
13	13.1	Assumptions of the Simple Linear Model	Friday 11/15 @11:59 pm
13	13.2	Inference Concerning Slope	Friday 11/15 @11:59 pm
13	13.3	Inference Concerning the Model's Prediction	Friday 11/15 @11:59 pm
14	15.1	One-Way ANOVA	Friday 11/22 @11:59 pm
14	16.1	The Chi-Square Distribution	Friday 11/22 @11:59 pm
14	16.2	The Chi-Square Test for Goodness of Fit	Friday 11/22 @11:59 pm
14	16.3	The Chi-Squre Test for Association	Friday 11/22 @11:59 pm
15	Thanksgiving Break		
16	Exam 3		Friday 12/6 @11:59 pm

Grading Policy:

A = 90% - 100%
B = 80% - 89%
C = 70% - 79%
D = 60% - 69%
E = 00% - 59%

Late Penalty:

Penalty Values:Number of graduations: 4

1.	10.00	% penalty for up to	1	day(s) late
2.	20.00	% penalty for up to	2	day(s) late
3.	30.00	% penalty for up to	3	day(s) late
4.	50.00	% penalty for more than	3	day(s) late

Academic Honesty: Cheating, fabrication, plagiarism or helping others to commit these acts will not be tolerated. Academic dishonesty will result in severe disciplinary action including, but not limited to, failure of the student assessment item or course, and/ or dismissal from MSU. If you are not sure what constitutes academic dishonesty, read the Eagle: Student Handbook or ask your instructor. An example of plagiarism is copying information from the internet when appropriate credit is not given. The policy is located at http://morehead-st.edu/units/studentlife/handbook/academicdishonesty.html

Americans with Disabilities Act (ADA): In compliance with the ADA, all students with a documented disability are entitled to reasonable accommodations and services to support their academic success and safety. Though a request for services may be made at any time, services are best applied when they are requested at or before the start of the semester. To receive accommodations and services the student should immediately contact the Disability Services Coordinator in the Office of Academic and Career Services, 223 Allie Young Hall, 606-783-5188, www.moreheadstate.edu/acs/

****Campus Safety Statement:*** Emergency response information will be discussed in class. Students should familiarize themselves with the nearest exit routes in the event evacuation becomes necessary. You should notify your instructor at the beginning of the semester if you have special needs or will require assistance during an emergency evacuation. Students should familiarize themselves with emergency response protocols at http://www.moreheadstate.edu/emergency

Note: The campus safety statement is provided for your benefit. Please visit the website to review the protocols.

**** *This only applies when in a building on any of MSU's campuses.*

A. *Purpose of the Course*

This course will provide students with experiences designed to improve their understanding of elementary descriptive and inferential statistics as applied to

the business world. The purpose of this course is to develop thinking skills so that students can be more effective in designing a study, in collecting, organizing, and presenting data. Also, students will be able to use the information from data and appropriate technology to make inferences about populations and to prepare professional documents to present their findings.

B. *General Education Goals*

Student Learner Outcomes
for the Morehead State University
General Education Program

1. Communication Skills

- Students will demonstrate the ability to:
  - 1a. Listen and speak effectively in conversational, small group, public, and intercultural contexts
  - 1b. Read college-level critical, creative, and technical texts for comprehension
  - 1c. Write effectively for a variety of target audiences using conventions associated with Standard English
  - 1d. Convey quantitative and qualitative relationships using symbols, equations, graphs, and tables

2. Intellectual Skills

- Students will demonstrate the ability to:
  - 2a. Employ current technologies to locate, analyze, evaluate, and use information in multiple contexts and for a variety of purposes
  - 2b. Recognize and effectively utilize both deductive and inductive reasoning
  - 2c. Thoughtfully analyze and evaluate diverse points of view
  - 2d. Perceive and articulate ethical consequences of decisions and actions
  - 2e. Apply knowledge and skills to new settings and complex problems
  - 2f. Explore the connections among practical, esoteric, critical, and creative thinking

3. Quantitative Skills

- Students will demonstrate the ability to:
  - 3a. Analyze situations and/or problems using arithmetic, geometric, algebraic, and statistical methods
  - 3b. Use deductive reasoning in a formal, symbolic, axiomatic system
  - 3c. Verify answers to mathematical and scientific problems to determine reasonableness, identify alternative methods of solution, and select the most reliable results

5. Knowledge of the Natural World

- Students will demonstrate the ability to:

- 5a. Comprehend and apply basic scientific, quantitative, and technological methods and knowledge of natural systems to the solution of problems in the business world.
- 5b. Employ scientific methods and theories to analyze and address open and debated questions in business.
- 5c. Analyze explanations to classify them as scientific or nonscientific

C. Teaching Strategies

- Because students learn differently, a variety of teaching strategies will be used in the course. These strategies include:
  - *Inquiry-Based Teaching:* Students will encounter experiences that will allow them to formulate their understanding of elementary probability and statistics as applied to the business world.
  - *Use of Multiple Representations:* The instructor will give the class experiences in presenting concepts from a multiple representation standpoint which may include graphical, numerical, natural language, statistical language, and concrete and iconic modeling.
  - *Use of Appropriate Technology:* The students will be instructed with the use of appropriate technology. This experience will allow students to become familiar with the technology.