Marshall University
DEPARTMENT OF MATHEMATICS
STUDENT INFORMATION SHEET AND SYLLABUS

Course Title/Number	STA 225 – Introductory Statistics (CT)
Semester/Year	Spring 2018
Days/Time	TR 5:00 – 6:15 PM
Location	SH 514
Instructor	Alaa Elkadry
Office	3231 WAEC
Phone	(304) 696-3047
E-Mail	elkadry@marshall.edu
Office Hours	MTWRF 11:30-12:30 PM and by appointment.
University Policies	By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to www.marshall.edu/academic-affairs and clicking on "Marshall University Policies." Or, you can access the policies directly by going to www.marshall.edu/academic-affairs/policies/. Academic Dishonesty/Excused Absence Policy for Undergraduates/Computing Services Acceptable Use/Inclement Weather/Dead Week/Students with Disabilities/Academic Forgiveness/Academic Probation and Suspension/Academic Rights and Responsibilities of Students/Affirmative Action/Sexual Harassment

Course Description: From Catalog

A critical thinking course in applied statistical reasoning covering basic probability, descriptive statistics and fundamental statistical inference procedures. Parameter estimation and hypothesis testing for variety of situations with wide applications. More on course objectives and learning outcomes appear on the 2nd and 3rd page of this document.

Required Texts and Other Materials

Title	: *Elementary Statistics: A step by step approach (A Brief Version), 7th edition.*
Author	: Allen G. Bluman
ISBN	: 978-0-07-772058-2
Publisher	: McGraw-Hill, New York, NY.
Calculator	: You will need a calculator. It is recommended that you use a TI-83/TI-83 plus or similar graphing calculator. You may use the calculator on all work and assignments in this class. You may not use your phone, iPad, laptop, etc. as a calculator on any quiz or exam. No other technology may be used in class without permission.
MUOnline	: Assignments, announcements, grades and other course materials will be posted regularly on MUOnline.

CRITICAL THINKING "CT" RELATED LEARNING OUTCOMES ADDRESSED, PEDAGOGICAL METHODS, AND CLASSROOM ASSESSMENTS

Course Student Learning Outcomes	How students will practice each outcome in this Course	How student achievement of each outcome will be assessed in this Course
1: Integrative Thinking: Students will **make connections** and **transfer** skills and learning among varied disciplines, domains of thinking, experiences, and situations.	Homework and quizzes	Project: Data Analysis
2: Communication Fluency: Students will **develop** cohesive oral, written, and visual communications **tailored** to specific audiences.	Classroom discussions and on homework and quiz problems. Moreover, they need to draft project report.	Project: Data Analysis
3: Inquiry Based Thinking: Students will **formulate** focused questions and hypotheses, **evaluate** existing knowledge, **collect** and **analyze** data, and **draw** justifiable conclusions.	Homework and quizzes	Exams and Project: Data Analysis
4: Metacognitive Thinking: Students will **evaluate** the effectiveness of a project plan or strategy to **determine** the degree of their improvement in knowledge and skills.	Classroom discussions	Project: Data Analysis
5: Quantitative Thinking: Students will **analyze** real-world problems quantitatively, **formulate** plausible estimates, **assess** the validity of visual representations of quantitative information**,** and **differentiate** valid from questionable statistical conclusions.	Homework and quizzes.	Exams and Project: Data Analysis

How each student learning outcomes will be practiced and assessed in the course.

Course Student Learning Outcomes	How students will practice each outcome in this Course	How student achievement of each outcome will be assessed in this Course
Students will select and produce appropriate graphical, tabular, and numerical summaries of the distributions of variables in a data set. Summarize such information into verbal descriptions.	Students are required to participate in class discussions, intensive reading of relevant chapters, and most importantly, practice numerous exercises that are available at the end of every chapter of the recommended textbook.	Homework assignments, quizzes, exams and project.
Students will summarize relationships in bivariate data using graphical, tabular, and numerical methods including scatter plots, correlation coefficients, and least squares regression lines.	Students are required to participate in class discussions, intensive reading of relevant chapters, and most importantly, practice numerous exercises that are available at the end of every chapter of the recommended textbook.	Homework assignments, quizzes and exams.
Students will construct a model for a random phenomenon using outcomes, events, and the assignment of probabilities. Use the addition rule for disjoint events and the multiplication rule for independent events.	Students are required to participate in class discussions, intensive reading of relevant chapters, and most importantly, practice numerous exercises that are available at the end of every chapter of the recommended textbook.	Homework assignments, quizzes and exams.
Students will be able to recognize the difference between discrete and continuous random variables and probability distribution. Especially use the normal distribution to interpret z-scores and compute probabilities	Students are required to participate in class discussions, intensive reading of relevant chapters, and most importantly, practice numerous exercises that are available at the end of every chapter of the recommended textbook.	Homework assignments, quizzes and exams.
Students will estimate a population mean, a population proportion or difference between means and difference between proportions using point estimates and confidence intervals and interpret the confidence level and margin of error. Understand the dependence of margin of error on sample size and confidence level.	Students are required to participate in class discussions, intensive reading of relevant chapters, and most importantly, practice numerous exercises that are available at the end of every chapter of the recommended textbook.	Homework assignments, quizzes, exams and project.
Given research questions involving a single population or two populations, student will be able to formulate null and alternative hypotheses. Describe the logic and framework of the inference of hypothesis testing. Make decisions using classical and p-value approaches and draw appropriate conclusions. Interpret statistical and practical significance in this setting.	Students are required to participate in class discussions, intensive reading of relevant chapters, and most importantly, practice numerous exercises that are available at the end of every chapter of the recommended textbook.	Homework assignments, quizzes, exams and project.

Course Requirements

Prerequisite: MTH 121 with a grade of C or higher, or at least 21 on Math ACT, or at least 500 on Math SAT.

Homework: For each topic we discuss in class, homework problems from the textbook will be assigned. It is your responsibility to understand the homework because test and quiz questions will be based on these problems. You are encouraged to work with your peers on the homework outside of class and to ask me if you have any questions. The problems may not always be graded, they are for your benefit in assisting you with understanding the material.

Quiz: 7 Quizzes will be given as scheduled. Any unexcused absence on the day of a quiz will result in a score of zero. The top 5 quizzes will be counted, and the lowest 2 scores will be dropped. Each quiz is worth 30 points.

Project: It is an integral part of this course. Please make sure that you get your project idea and data collection technique approved by me within the first two weeks of the course. Find more about the project on pages 5 and 6 of this syllabus.

Attendance Policy

Students are expected to attend all scheduled classes. It is the student's responsibility to find out what was discussed in a missed class. Attendance records will not be used to compute grades; however, missing class can be expected to significantly reduce your chances of success. Note also that it is the student's responsibility to present approved notice of any absence that would be excused under the terms and regulations stipulated by the university.

Student behavior

Students are advised to turn their cell phones and other noise generating devices off prior to entering the class. In the case where a student awaits any emergency call, the noise should be restricted and made personal. And in this case, I should be notified as soon as the student enters the class. Food items, apart from water or soft drink, are not allowed in the class. The reading of newspapers and other unrelated materials while the class is in session is prohibited. Please ensure that other students are respected.

Tutoring Facilities

The Department of Mathematics offers a **free** tutoring lab for Marshall students enrolled in mathematics courses. The tutors can help with all classes from MTH 098 to MTH 231. No appointment is necessary; just stop in and ask for a tutor. The lab location and tutoring hours are:

- In Smith Hall 62510:00am to 4:00pm Monday to Thursday, and 10:00am to noon on Friday.
- In Smith Hall 620: 5:00pm to 6:30pm Monday to Thursday.

The Tutoring Center in Communications Building has tutors who are available for **free**, by appointment. Please consult their web page for additional information.

More information about these facilities can be accessed by going to http://www.marshall.edu/math/tutoring/

Policy for Students with Disabilities:

Marshall University is committed to equal opportunity education for all students, including those with physical, learning and psychological disabilities. University policy states that it is the responsibility of students with disabilities to contact the Office of Disability Services (ODS) in Prichard Hall 117 (304.696.2467) to provide documentation of their disability.

Following this, the ODS Coordinator will send a letter to each of the student's instructors outlining the academic accommodation he/she will need to ensure equality in classroom experience, outside assignment, testing, and grading. The instructor and student will meet to discuss how the accommodation(s) requested will be provided. For more information, access the website for the Office of Disabled Student Services: http://www.marshall.edu/disabled.

Grading Policy and Exam dates

The final grade will be based on the following components:

Regular Exams	300 points (100 points for each of the 3 in class exams)
Quizzes	150 points
Project	150 points
Final Examination	150 points (Comprehensive)
Total	**750 points**

The semester grade will be based on the percentage of the 750 total possible points, using the following scale:

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

EXAM I: Thursday, February 1st (tentative)
EXAM II: Thursday, March 1st (tentative)
EXAM III: Tuesday, April 3rd (tentative)
FINAL EXAMINATION: Tuesday, May 1st [5:00 – 7:00 PM]

Data Analysis Project Description: For this project, I will be providing data from which you have to pick a sample. You will be working in groups of 4.

The first challenge you have is to find an interesting question to investigate, **you must have a minimum of 30 observations in your sample.**

The project will consist of 4 distinct parts. In the first part, you have to talk about your idea and how you came up with this idea. In the second part, you will be summarizing data and using descriptive statistics and graphical displays. In the third part, you will be carrying out statistical inference and in the fourth part you need to combine your findings from the two parts to write a complete report.

Part I (15 points)

Introduction

Talk about your project idea, how you came up with the idea.

Part II (30 points)

Data description

Create a <u>histogram</u> and/or any other appropriate <u>graphical display</u> for data. Compute <u>summary statistics</u>. Talk about any interesting observations you might have, and indicate which summary statistics (based on the shapes of your distributions) would most accurately summarize your variable?

Part III (25 points)

Estimation

For each group, estimate the appropriate parameter of interest using point estimation as well as by constructing a confidence interval. In your own words, interpret the intervals and summarize your findings.

Part IV

A. Hypothesis Testing (30 points)

Conduct a hypothesis testing for any question of interest that you have. Write out your null and alternative hypotheses. Talk about the results of your hypothesis test. What is the p-value? Interpret the p-value in your own words. Based on the results of the hypothesis test, do you reject or fail to reject the null hypothesis? Then write down your conclusion. (Keeping in mind that the conclusion should be in terms of your alternative hypothesis)

B. Final Report (25 points)

Briefly summarize what you did for this project and what are your findings. Discuss any shortcoming of the methods you have used to summarize data. Did you discover anything that surprised you when you analyzed the data? Do you think the results would have been different if you had bigger sample sizes?

C. Reflection (25 points)

Summarize all the work done and how it was done. Talk about the whole project. If you are to do this project again, what would you change or what part/parts you would do differently? Explain

<u>Note:</u>

1) One Final report is to be submitted per group.
2) You will also be required to write a reflection. The reflection must be written <u>individually</u>. In this reflection, you must talk about your experience doing the project. What did you learn? If you had to do the project again, how would you do it differently?